SHORTER NOTICES

L'algèbre abstraite. By Oystein Ore. (Actualités Scientifiques et Industrielles, No. 362.) Paris, Hermann, 1936. 52 pp.

Ore's pamphlet is the sixth in the series: Exposés d'analyse générale, edited by M. Fréchet. It gives an excellent introduction to so-called abstract algebra. The fundamental concepts are defined and their significance explained. The most important theorems are stated and the direction of modern development is indicated. Proofs are not given but reference is made to a large number of books and papers.

The subjects treated are: the theory of fields under their different aspects, commutative rings and ideals, non-commutative rings, systems of hypercomplex numbers and their representations, some parts of the theory of groups, and finally structures, which last theory has been developed by Professor Ore's own investigations.

The book is clearly written and should be a great help to anyone desiring to form some general idea of this part of mathematics.

It is certainly a difficult task to present so many theories on so few pages. These difficulties Professor Ore has overcome in an admirable manner.

RICHARD BRAUER

Wahrscheinlichkeit Statistik und Wahrheit. By R. von Mises. Einführung in die neue Wahrscheinlichkeitslehre und ihre Anwendung. 2d revised edition. Edited by P. Frank and M. Schlick. (Schriften zur Wissenschaftlichen Weltauffassung, vol. 3.) Vienna, Springer, 1936. 8+282 pp.

The approach of von Mises to probability by means of "collectives" is now so well known that a detailed review of the second edition of *Wahrscheinlichkeit Statistik und Wahrheit* is hardly necessary. He defines a collective as a *sequence of observations*—and there is the nub of the difficulty. An observation is not a concept usually met in pure mathematics, and requires careful explanation. There are severe requirements laid on a sequence of observations which is to be called a collective, and it has been pointed out by many writers that these requirements are impossible of fulfillment if by a *sequence of observations* is meant a fully defined sequence of symbols, say numbers, representing the observations.* On the other hand, von Mises is apparently unwilling to go to the other extreme and state explicitly that by a *sequence of observations* he means a sequence of actual observations of an experiment which is being repeated indefinitely, but whose infinitely many results can never be obtained all together. (The rules of the *Regellosigkeit* axiom would then be decided on before the experiment started, and the axiom would become a prediction of future experimental results—a description of physical occurrences rather than a mathematical axiom.)

* More accurately: the *Regellosigkeit* axiom has no precise significance if this is to be the meaning of a *sequence of observations.*