

COHEN-NAGEL ON LOGIC

An Introduction to Logic and Scientific Method. By Morris R. Cohen and Ernest Nagel. New York, Harcourt Brace, 1934. xii+467 pp.

The plan and purpose are indicated by the following extracts from the preface: "The present text aims to combine sound logical doctrine with sound pedagogy and to provide illustrative material suggestive of the role of logic in every department of thought." . . . "It is especially the hope of the authors that general readers as well as students of the natural and social sciences will find this book helpful towards an understanding of scientific method."

The work consists of two Books. Book I, *Formal Logic*, is a complete and lucid exposition of the formal logic of Aristotle, followed by a selection of material from modern authors, for example, de Morgan, Boole, Peirce, Whitehead and Russell, blended into a consistent whole. Book II, *Applied Logic and Scientific Method*, is an exposition of the logic of probable inference. The authors first clear the ground by pointing out errors in former treatises on inductive logic, then lay the foundations for an improved exposition by means of chapters on *Probability and Induction*, *Measurement*, and *Statistical Methods*. They show that the structure erected in Book I can be placed on these foundations, and illustrate the scientific method thus constituted by applying it to various fields of knowledge. Chapter 1 forms an introduction to the whole. Book II is followed by an Appendix on demonstrations, Exercises, and the Index.

At least a fourth of the book treats mathematical topics. Chapter 6 contains the formal properties of relations, the calculus of classes, and the calculus of propositions. Chapter 7 presents Veblen and Young's postulates for projective geometry, isomorphism, equivalence of axiom sets, independence and consistency of axioms, and mathematical induction. Chapter 8 contains a section on probability. Chapter 14 discusses sampling. Chapter 15 describes the nature of counting, and the measurement of intensive and extensive qualities. Chapter 18 is devoted to statistical averages, measures of dispersion and correlation, and dangers and fallacies in the use of statistics.

The work is pleasing and satisfactory. The chapters on *Aristotelian and Mathematical Logic*, *Methods of Experimental Inquiry*, *Statistical Methods*, and *Probable Inference in History*, are especially good. The method of presentation is excellent. Every chapter is introduced by an explanatory section. Every general statement, every passage which might otherwise be obscure, is explained by instances. Interest is stimulated by the occasional introduction of unconventional expressions, humorous comments, and fanciful examples. The style is flowing and rhythmical, but discursive in places. Occasionally, the combination of long sentences and paucity of punctuation is disconcerting (see p. 233, lines 34-37; p. 356, lines 23-27). The vocabulary is extensive, and includes words, such as equiprobable, musicology, which are not in the dictionaries. The book is well printed in all respects.

The authors' presentation of the scientific method differs in an important respect from that actually used in the exact sciences: scientists do not, except to a very limited extent, employ traditional logic in drawing their inferences.