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**The Language of Modern Physics.** An introduction to the philosophy of science. Ernest H. Hutten. Allen & Unwin, London; Macmillan, New York, 1956. 278 pp. $3.75.

Ernest Hutten subtitles his work "An introduction to the philosophy of science." Its six chapters divide naturally into three parts. The first two chapters deal with logic and semantics; the next three consider the basic concepts of classical and modern physics; and the last chapter discusses general characteristics of the scientific method. The book is addressed to the layman and is therefore kept on a nontechnical level. There are, for instance, scarcely a dozen formulas of logic or physics in the whole volume. Yet Hutten has written a serious work which he hopes will be read by both philosophers and physicists. I am prepared to recommend Hutten's book as being definitely superior to most of the similarly oriented books written by such English scientists as Eddington, Whittaker, or Hoyle. At no point is the book marred by a naive epistemology or by vague cosmological speculations —the besetting sins of many books on physics addressed to the layman.

There are, however, some general criticisms that I would like to make. The first is that the attempt to relate semantics to physics seems somewhat pretentious and premature. Any detailed application of semantics requires a formalized language, but, as the author repeatedly remarks, no such languages have yet been constructed for any substantial portion of physics. As a consequence the author's insistence on the relevance of semantics to physics leads to yet another nearly empty programmatic proposal in the philosophy of science. The author does not indicate a single clear *result* that might be obtained by such an application of semantics. In fact, once he turns to the analysis of particular physical concepts, the author's use of semantical notions is fairly superficial. A typical instance is his use of *model* in the vague sense of physics rather than in the precise and important sense of semantics.

What is surprising, in view of the author's interest in formalizing physics, is his neglect of the research which has been done on axiomatizing various theoretical portions of physics; only Carathéodory is mentioned. The author does not mention the work of Hamel, Hermes, Robb, Schnell, A. G. Walker, and others. Axiomatization of physical theory, as opposed to experimental work, may proceed in the standard mathematical manner within a set-theoretical framework and without recourse to semantics. The more modest aim of first axiomatizing theoretical physics in the sense just defined, which is the sense in which mathematicians axiomatize topology or the theory of Hilbert spaces, would seem to be a necessary prolegomena to any applications of semantics to the full corpus of physics, theoretical and experimental.

Following Carnap and other writers, the author distinguishes two kinds of probability: inductive probability or degree of confirmation, and probability as the limit of relative frequency. Concerning Hutten's generally sound discussion, I have two comments. One is that the reader is not made sufficiently aware of the severe difficulties which must be overcome by any adequate theory of inductive probability. And the second is that it is contrary to scientific practice to speak of the inductive probability of *sentences* on given evidence. This linguistic approach of philosophers unduly and unnecessarily isolates their work on the foundations

of probability from the mainstream of probability theory. The problems and results of inductive probability may all be formulated in the ordinary sample-space framework. Moreover, such a formulation emphasizes the fact that the fundamental problems of induction are problems of action or decision and not problems of language.

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