It will, certainly, be very helpful for instructors who have to teach the philosophy of science and will also be accessible to students who are strongly interested in physics from the philosophical angle. The reader needs a certain degree of knowledge in mathematical physics. If this is the case, he will find in chapter 17 a presentation of the quantum theory in an understandable way with an emphasis on the points which are relevant for philosophical analysis.

Among scientists and scientifically minded philosophers there is today a general agreement about the logical structure of science. The analysis of science which has been performed around 1900 by men like E. Mach and H. Poincaré and which has been refined and integrated by men like H. Schlick and the group of Logical Empiricism (sometimes called Logical Positivism) has become today the backbone of every presentation of the philosophy of science. Margenau's book follows essentially the same line. In refusing "simple realism" he accepts the basic tenets of logical positivism: science consists of (1) a system of relations between "constructs", (2) the rules of correspondence, and (3) the mathematical and empirical checking of this system. Margenau's analysis of science is hardly different from the standard presentation of Logical Positivism that is given in the monographs: *Foundations of Logic, Mathematics and Physics* (Encyclopedia of Unified Science). However, Margenau introduces some expressions which are borrowed from traditional "idealistic" and "realistic" philosophy. Although his analysis of science is actually in full agreement with the analysis given by logical empiricism, these terms are added in order to provide some of the psychological satisfaction which one gets from traditional philosophy. The two principal terms of this kind are "reality" and "metaphysics".

Actually Margenau rejects "realism" and, implicitly, "reality" as a metaphysical concept. He uses, as a matter of fact, the expression "physical reality" to denote a system of symbolic principles from which, by means of the "rules of logic" and the "rules of correspondence", the observed facts can be derived. The word "reality" is here a kind of honorary title which is given to the most useful and beautiful system of this kind. There is certainly nothing wrong in this way of speaking. But one has to be clearly aware that this presentation has nothing in common with the metaphysical conception of reality and is "strict positivism". In a similar way the "metaphysical requirements" which a system has to fulfill, according to Margenau, and which are formulated in chapter 5 (as we described above), are, exactly speaking, "pragmatical requirements". They formulate the conditions under which the system is practical and beautiful. Margenau emphasizes repeatedly that these requirements are not of eternal validity but are changing during the evolution of human thought. Margenau says very aptly that the characteristic of metaphysical requirements is merely the slower rate of change. But, then, the distinction between "pragmatical" and "metaphysical" requirements disappears completely. There is hardly any difference between this kind of metaphysics and the "antimetaphysical" positivism.

There is, however, some risk in the terminology which is used in this book if it is taken too seriously. Margenau makes, e.g., the point that in the realm of subatomic phenomena the psi function is a part of the physical reality but the particles are not. This way of speaking can evoke the illusion as if a statement about "what is real" were a statement about facts. Strictly speaking, such a statement is a definition. "Causality" belongs to the author's definition of "reality" and he concludes that the particles cannot be "real" because they do not follow a causal law; but the "psi function" is "real" because it is determined by a differential equation. All this amounts to accepting the definition that what is to be "real" is to be "causal". By a slight change in the definition of "reality" we can prove that the psi function is an ordinary construct and the particles are "real". This was actually done by W. H. Werkmeister in his books and papers on the philosophy of science. It seems to me that the shortcomings of this way of speaking about "reality" become conspicuous when one tries to present Bohr's theory of "complimentarity" in this language. Margenau says: "Bohr does not ask science to make a choice. . . . We believe that science, in all its applications of quantum mechanics, has in fact made its choice, and its choice was the second alternative (description of nature in terms of the psi function instead of the position of particles)." But Bohr wanted to say that no choice of this kind would be scientifically attainable. Any decision would be, therefore, scientifically speaking, meaningless. The two alternatives of this choice are descriptions of the same phenomena for different purposes. Therefore, descriptions by psi function and by particles each serve their purpose equally well.

Although the centering of the book around "physical reality" is certainly a great help for a tight organization of the material and for attracting the interest of the student, there is also a certain danger in bringing into the focus of attention a concept which is very debatable. It leads easily to blurring the boundary line between questions about facts and about definitions.

Philipp Frank
Harvard University

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