Book Reviews

Essay in Physics. Herbert L. Samuel. New York: Harcourt, Brace, 1952. 178 pp. $3.00.

This book was first printed in England in February 1951, with a preface dated November 1950. The American edition includes an additional section on the theory of the expanding universe with an author's note dated August 1951.

The author is president of the Royal Institute of Philosophy, and throughout the book he makes a sharp distinction between the point of view of the philosopher and that of the physicist. The latter appears to him superficial in the sense that the physicist is not interested in "reality" or "fundamental causes" or "explanations" and is satisfied with descriptions of experience and with theories formulated in purely mathematical terms. The philosophers, on the other hand,

> . . . try to keep their eye on the processes of nature themselves and will not be content with their inter-measurements . . . they persist in seeking the "real essence" through a search for causes . . . it is in this realm (*i.e.*, the realm beyond the range of scientific observation and calculation), if at all, that the solutions to the fundamental problems that are still outstanding are most likely to be found (p. 39).

The book consists of two parts—in the first Lord Samuel expounds the arguments that make him dissatisfied with the achievements of present-day physics. The second part aims to be constructive by presenting a theory or picture of the universe that the author hopes may perhaps eventually be made to satisfy the demands of the philosopher. It is by this second part that the merit of the whole point of view must be judged, and it seems to me that if ever a point of view offered its own refutation, this is it. The fundamental reality is postulated to be energy, which is capable of existing in two forms, one quiescent, the other active. Most phenomena consist in the passage of energy from one form to the other. But if the physicist cannot "explain," to what extent can it be maintained that we have here an explanation? There is no suggestion of the details by which the transfer of energy between the two forms takes place, nor of what differentiates one sort of passage from another. All sorts of *ad hoc* assumptions have to be made for which there is no correspondence with any independent physical happening, and of which the meaning is predominantly verbal. Lord Samuel seems to have no conception of the nature of the problem of explanation, particularly of explanation in a brand-new field in which the old concepts fail. How can one begin the attack on such a field except by precise description?

One of the greatest mysteries for Lord Samuel is "momentum." He asks what "force" "makes" a body continue to move in a straight line. His discussion of the details of the motion of free bodies moving either horizontally or vertically in the earth's gravitational field introduces considerations essentially mathematical in character, but his thesis allows the use of none of the formal machinery of mathematics, with the result that even such elementary distinctions as between velocity and acceleration are confused.

His repugnance to mathematics makes him deprecate the precise descriptions of nature made possible by mathematical language, forgetting that the precisions so described are properly to be called discoveries about nature rather than human inventions, and that part of the task of the philosopher becomes the understanding of the precise relationships thus disclosed. The whole point of view and method of attack seem to me essentially a reversion to the Greeks, like the attack of the Greeks almost purely verbal, and perhaps even more sterile in suggesting new experiments or in correlating old ones.

The book concludes with a letter from Einstein, to whom Lord Samuel, a friend of Einstein's of long standing, had sent a copy of the book in proof, in the hope that Einstein would express his opinion. Einstein's letter is courteous and considerate, as would be expected, but the major part of the letter is occupied with seriously setting forth some of Einstein's reasons for not agreeing with Lord Samuel's views about "reality." The letter has its interest in making a little plainer some of the fundamental differences in point of view between Einstein and the majority of contemporary physicists—a disagreement that has been extensively explored in *Albert Einstein: Philosopher-Scientist* (SCIENCE, **111**, 409 [1950]), edited by Paul Arthur Schilpp.

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Microbial Decomposition of Cellulose: With Special Reference to Cotton Textiles. R. G. H. Siu. New York: Reinhold, 1951. 531 pp. $10.00.

The fact that textiles mildew or rot is a familiar one to the housewife, the camper, the cotton grower, and, more recently, to our armed forces operating in tropical areas. The amount of textile materials rendered useless in peacetime cannot be easily determined but is undoubtedly very great. The quantity rendered useless during the war in military operations was staggering. The seriousness of this situation moved the armed forces to seek methods for providing cellulosic textiles with protection from microbial decomposition. In particular, the Quartermaster Corps of the Army, in cooperation with the chemical and textile-finishing industries, began a campaign to find preparations that could be applied to military textiles and considerably extend their field life under storage and combat conditions.

This was the quick, stopgap, empirical, and practical approach. It was partially effective, but was not quite sufficient. The materials used were toxic to the