It started with Becquerel

WEAK INTERACTIONS AND NUCLEAR BETA DECAY. By H. F. Schopper. Interscience, New York, 1966. $15.40

by M. E. Rose

In the beginning there was only nuclear beta decay. While the processes that we now refer to as weak decays existed in the laboratory side by side with nuclear beta transformations for many years, they were studied as independent processes and investigated with somewhat different motivations than those that impelled the workers in the nuclear vineyard. The radical change that was generated by the work of C. N. Yang and T. D. Lee and others almost a decade ago has now resulted in the well known unification of the study of weak-interaction processes wherein the accidental preeminence of nuclear radioactivity is submerged, at least from the point of view of theoretical understanding. Nevertheless, the account given by Schopper is somewhat strongly weighted on the nuclear side, as the title may indicate. Fully half the book is devoted to this aspect of the subject and the last chapter, on nuclear spectroscopy, occupies over 100 pages out of a total of somewhat less than 400. This is not to say that the treatment of pionic, muonic and strange-particle decays is not lucid. On the whole the author is to be commended for the skill with which he has presented a rather abstruse subject so that even first-year graduate students should be able to cope with it. It must be conceded, however, that this part of the book is sometimes a bit skimpy. As an illustration of the point, the influence of strong interactions on the weak-interaction Hamiltonian is presented without much discussion of the path by which the final result is obtained. Again, the evidence provided by pionic decay is omitted from the discussion of the conserved-vector-current hypothesis. Other examples could be cited.

On the whole Schopper's book is a welcome addition to the literature. The task he has undertaken is no small one and on the credit side is that virtually every major question of interest is given adequate attention and the references given should supply the interested reader with full details. On the debit side there is some evidence of a too hurried analysis. His remarks in chapter 5 concerning contributions by Reitz and by Felsner are untrue. The argument concerning annihilation of two neutrinos is doubtful and the discussion of chapter 6 wherein emphasis is placed on the transformation properties of linear and angular-momentum vectors rather than the coupling constants is likely to be misleading. Finally, in the first subsection of chapter 10 the word *reformulation* should have quotation marks around it. This refers to the work of the Heidelberg group that introduces nothing new so far as physics is concerned and the advantages for the analysis of experimental data are hard to discern. In fact, this and the following two subsections in chapter 10 seem unnecessarily complicated with the appearance of some mathematical expressions that obviously can be simplified.

Despite a sprinkling of misprints, which should be easy to spot, the publishers have once again earned the gratitude of the reading public for an excellent technical presentation.

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A machine or a self?

THE IDENTITY OF MAN. By J. Bronowski. 108 pp. The Natural History Press, Garden City, New York, 1965. $3.95

by R. Bruce Lindsay

The nature of man has long been a mystery, perhaps the principal mystery of human experience. Scientists and philosophers alike have examined it with all the tools at their disposal, and have argued about it interminably with no little heat. At the present time it is generally agreed by scientists that man's body is a physico-chemical system of considerable complexity but in principle not different from those much simpler systems that man himself is able to put together with materials he finds in nature. This is commonly summarized in the statement (somewhat misleading in its terminology) that the body functions largely as a machine. But the trouble with this conclusion is that it is based not only on human observation but also on human thought. Thinking is itself a mysterious process. It is usually associated with the brain. The problem then arises: Is the brain as a part of the body also a machine? Much modern research connected with high-speed computers has suggested that the answer to this question may well be in the affirmative. If this indeed is the case, philosophers may well raise the critical question: What becomes of the "self," that entity which provides the individual human being with his identity, making him feel different from the rest of mankind?

This is the problem to which the distinguished author of the book under review addresses himself. In four relatively brief chapters entitled re-

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spectively: "A Machine or a Self," "The Machinery of Nature," "Knowledge of the Self" and "The Mind in Action," he examines various attitudes toward the identity of man, and presents his own conclusions. It must be confessed that the book is not an easy one to read, and in this respect is not as convincing as the author's earlier work *Science and Human Values*. Nevertheless he reaches the conclusion that man can be and is both a machine and a self, where he defines "self," as "the process in which all his (i.e. man's) experiences of the body and of the mind, are fixed as knowledge. What makes man unique is the nature of his knowledge."

The book is therefore essentially an excursion into epistemology, in which man's knowledge of nature is contrasted to his knowledge of his fellow men. It is to the latter that the concept of self is primarily associated. This inevitably leads to a comparison of science and literature as separate languages for the discussion of experience and the embalming of knowledge. There are some engaging and illuminating flashes of insight expressed here, but the reviewer cannot resist the conclusion that the author in the face of one of the most difficult problems in human experience has attempted more than he has accomplished in the brief compass of his book.

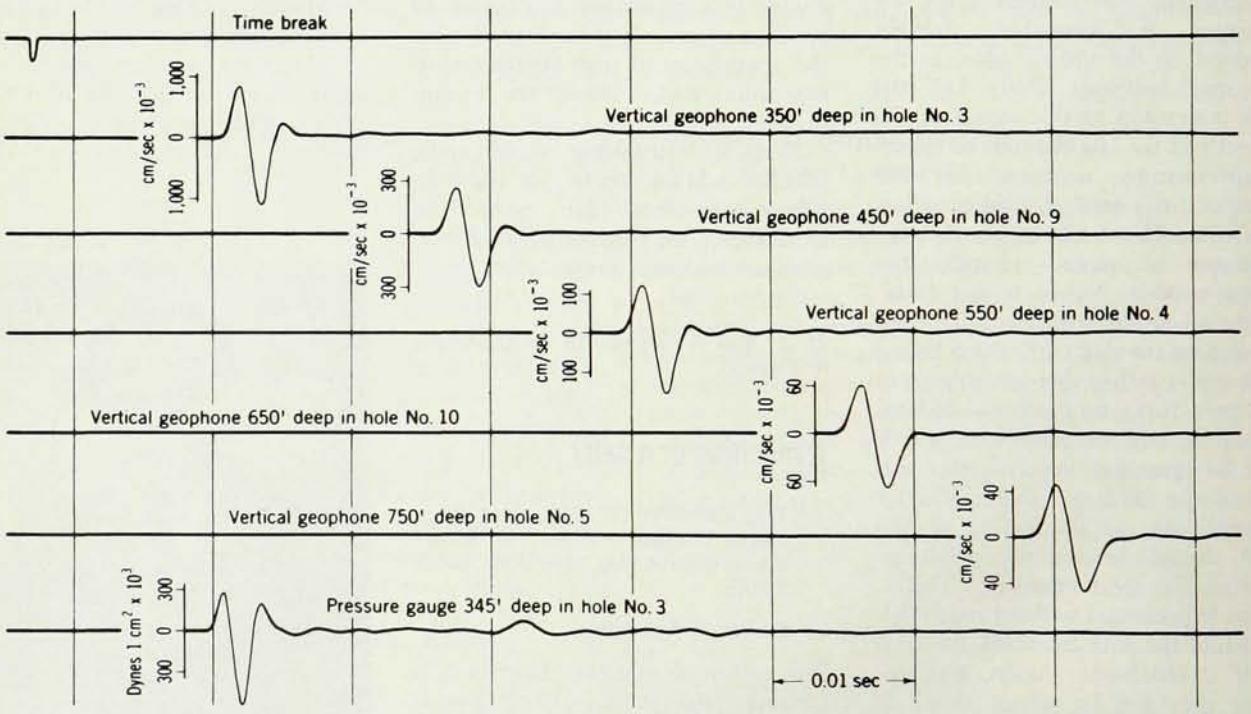
Earth shaking

SEISMIC WAVES: RADIATION, TRANSMISSION, AND ATTENUATION. By J. E. White. 302 pp. McGraw-Hill, New York, 1965. $14.50

by R. Bruce Lindsay

Interest in seismology, or the study of elastic waves in the earth, continues unabated. In recent times the subject has, of course, taken on a new dimension because of the importance of artificially created earthquake waves in oil prospecting. Increased attention has also been focused on this field in connection with the detection of underground nuclear explosions. Much of the new work on the propagation of various types of mechanical waves in the earth, subject to all kinds of boundary conditions, is still in the periodical literature, and hence a book that summarizes the essentials of the latest applications is very welcome. White has provided such a book as one of the well known International Series in the Earth Sciences.

The author has wisely refrained from encumbering his volume with a complete theoretical review of the propagation of elastic waves in solid media. He has indeed reviewed plane-wave solutions of the wave equation with particular reference to waves along and across boundaries. Much attention is paid to various types of media and what the velocity and attenuation of elastic radiation can tell about their properties. There is a long chapter on loss mechanisms in solids. In view of the importance



VERTICALLY TRAVELING COMPRESSIONAL WAVES generated by a charge of 1 lb of dynamite at a depth of 260 ft. From: *Seismic Waves: Radiation, Transmission and Attenuation.*