

BOOK REVIEWS

Of Men and Galaxies. By Fred Hoyle. 73 pp. University of Washington Press, Seattle, 1964. \$2.95.

Reviewed by J. Gillis, Weizmann Institute of Science, Rehovot, Israel.

It is stimulating as well as amusing to follow the speculations of a brilliant mind. In these lectures Professor Hoyle discusses a wide variety of topics ranging from some of the less edifying aspects of budget-jockeying among scientists to the possibilities of communication with extraterrestrial civilizations. Most of the assertions belonging to the former end of the range of topics can be examined in the light of observation, and it must be admitted with regret that they stand up well to the test. The topics at the other end are as yet beyond our investigation, and for that reason are more fun as subjects of speculation.

It would be salutary if practising research scientists made it a rule to take time off occasionally and devote some thought to where we all came from and what is our destination, and to the background against which we are travelling. If this book encourages them to do so it will have served its purpose. At the least, it is guaranteed good value for an evening's sophisticated entertainment.

Collected Scientific Papers. By Wolfgang Pauli. R. Kronig and V. F. Weisskopf, eds. Vol. 1, 1133 pp.; Vol. 2, 1408 pp. Interscience, New York, 1964. \$70.00

Reviewed by Nandor L. Balazs, State University of New York at Stony Brook.

Pauli often used to say, with a slight shake of his head, "Man soll keine Irrlehren verbreiten" (Do not propagate false doctrines). His collected works show how completely he succeeded in following this advice: they show variety, depth, generality, and clarity. The two volumes, which exceed 2500 pages, are organized as follows: Volume I contains his contributions to books and his books on meson theory; Volume II contains his articles published in journals, conference reports, and discussions. Each volume carries an index to both vol-

umes. The first volume also contains a photograph of Pauli from his later years, a short introduction by the editors (which contains a brief autobiography of Pauli), and finally a facsimile of a letter written by Pauli to Weisskopf on January 27, 1957, after his first encounter with the experimental results which dealt with the nonconservation of parity. (The cryptic reference at the end of this letter refers to his article in *Scientia*, 1936, reprinted in Vol. I, p. 737.) Within each volume the arrangement is chronological.

Pauli's interest in physics was universal and specific. He was inspired by any problem with general implications but not by problems which were merely applications of a theory however complex, unless they served didactic purposes. (One can appreciate this most easily by contrasting, say, Fermi's collected works with Pauli's.)

The contributions number about one hundred and thirty articles belonging to several major fields: relativity (7;1), quantum theory (33;5), quantum field theory and symmetry (34), statistical mechanics and thermodynamics (6), philosophical articles on the conceptual foundations of natural sciences, psychology, book reviews. (The numbers in brackets give the number of papers published in the corresponding fields. Where a second number appears, it refers to the more extensive review articles.) The articles are reproductions from the original. This worked very well, except in one case. The famous article on Relativity (I,1) is a reproduction of the German original, while the supplementary notes (I,238) refer to the page numbers of the English translation. Also, one wishes that the *Handbuch* article on wave mechanics (I,771) were a reprint of the original 1933 edition and not of the revised edition of 1958, since the revision eliminated the interesting last thirty pages on field quantization.

Everybody has his favorite articles. Instead of discussing my own favorites,

let me mention a few remarks which are amusing and characteristic of Pauli. The theory of the Mössbauer effect gave rise to an active discussion on the instantaneous or slow nature of emission, and on the quantum versus classical description of radiation damping. One will appreciate Pauli's insight, if one notes that in 1926, before the advent of wave mechanics, he already emphasized the fundamental differences between the classical and quantum theory of emission in spite of the strong formal similarities (I,69-70). [See, also, his illuminating remark in a book review about the mean life of an oscillator state in classical and quantum theory (II, 1391)]. Another extraordinary piece is a short discussion between Dirac and Pauli (II,567) about the definition of the energy of an electron in an external magnetic field, with particular reference to the Landau diamagnetism. All those who feel that this problem is trivial, or obvious, should first read Dirac's objection and Pauli's answer. The best critique of Bohm's and de Broglie's work on a causal interpretation of quantum theory is given in (I,1115). Many of the asides are worth noting. They not only give a human touch, but also tell about Pauli's way of assessing others. On Dirac: "... with his fine instinct for physical realities, he started his argument without knowing the end of it ..." (II,1239); on Schwinger: "A careful reading of the paper shows, however, that it does not permit one to draw certain conclusions about Schwinger's own opinion on this point" (I,1242). (The paper referred to is Schwinger's own!) Those of us who are strongly in favor of the algebraic and/or symbolic approach to quantum theory would do very well to read Pauli's strictures in his reviews of Born's and Jordan's *Elementare Quantenmechanik*, and Dirac's *The Principles of Quantum Mechanics*, (II, 1397). As he says "one cannot blame here the reviewer for finding the grapes sour because they are out of his reach." Pauli's inter-