

Books

The Planet Venus. By Patrick Moore. 132 pp. The Macmillan Co., New York, 1957. \$3.00. *Reviewed by C. C. Kiess, National Bureau of Standards.*

"Venus is a planet of mystery. . . it is the world about which we know least. . ." This is Moore's appraisal of our acquaintance with the "earth's twin", our nearest planetary neighbor, after his examination of all the available, but scanty, observational evidence concerning her physical state. Of her mechanical properties there is no doubt: orbital size and shape, period of revolution, mass, volume, density, all are known with the same degree of accuracy as for the other members of the solar system. But her surface features, whether land or sea, whether subject to diurnal and seasonal changes, whether they support life or deny it existence, are all hidden from observation by the opaque atmosphere with which she is enshrouded, for, "Unlike [her] mythological namesake, Venus is hidden coyly behind an impenetrable mantle of cloud." Yet many of the notable astronomers and a large company of amateurs have spent countless hours observing this mantle telescopically in efforts to detect in its monotonous brilliance those slight variations and markings that might lead to some understanding of her physical features. It is to the spectroscope and the thermocouple, however, that we are indebted for the only quantitative information we have about the composition of Venus's atmosphere and its temperature.

From this exiguous material a sizable stream of speculation, some of it fanciful if not fantastic, has flowed. In nontechnical language the author has presented it all in its historical development. His is the first book to do so, and, perhaps, it will be the only one in its field for a long time to come, until enough new data have accumulated to supplant it. For the student of astronomical history the list of references to the literature cited will be extremely valuable, and will serve as a starting point for future studies. It is to be regretted that this list omits the authors and places of publication of the pioneering work on Venus with the thermocouple.

Concepts of Force: A Study in the Foundations of Dynamics. By Max Jammer. 269 pp. Harvard U. Press, Cambridge, Mass., 1957. \$5.50. *Reviewed by R. T. Weidner, Rutgers University.*

Here is an historical and critical treatment of a central concept in physics. It is a study in miniature of

the history of ideas in the philosophy of science as reflected in changing modes of thought about force. Professor Jammer's book traces the rise of force from the primordial "*nht*" in Egyptian antiquity through its zenith as the central element of physical reality in classical mechanics to its near demise under modern criticism. In 269 pages, a veritable *tour de force*.

The story of force through ancient thought, Greek science, and preclassical mechanics is that of the separation of ontological, teleological, and anthropomorphic implications associated with force from its strictly scientific aspects. In the triumph of classical mechanics, Newton and his immediate successors not only refined the meaning of force but theologized it. Under the relentless epistemology of Kirchhoff, Hertz, Mach, and other antimetaphysicians, force nearly vanished into thin air; and with general relativity, gravitational force truly vanished into the space-time continuum.

What then is force? The author asserts that "Force if divested of extrascientific connotations reveals itself as an empty scheme, a pure relation . . . a methodological intermediate that in itself carries no explanatory power whatever." But it is no mere will-o'-the-wisp; it plays a most constructive role in modern physics which contemporary criticism shows always speaks in the language of *as if*.

The book shows authoritative scholarship, with numerous references to and multilingual quotations from original sources, but it is remarkably free of the turgid prose that so frequently characterizes writing in the philosophy and history of science. Nevertheless, there are occasional lapses into a sort of scholarly gobbledygook of which the author's description of the Cartesian view of gravity is a delightful example: "some kind of antiperistatic turbulence of the plenum".

To read *Concepts of Force* is to gain a new and profound understanding of force and dynamics and to feel a fresh sympathy for hapless undergraduates who, after a few weeks of physics, are brusquely called upon to give a good, clear definition of force.

Biographical Memoirs of Fellows of the Royal Society, Vol. 3. 328 pp. The Royal Society, London, England, 1957. 30s. *Reviewed by J. C. Polkinghorne, University of Edinburgh.*

Every year the Royal Society publishes a series of biographical memoirs of those of its Fellows and Foreign Members who have died in the preceding twelve months. Each memoir is written by an expert, often a friend of the subject, and gives an account of his scientific work and its significance and a character sketch of the man himself. A photograph, facsimile signature, and bibliography are appended. The result is an invaluable record of the lives of the leading scientists of the British Commonwealth and of some of the most distinguished scientists from outside the Commonwealth who have been Foreign Members. This is an example that could profitably be followed by all the great Academies. The material for such obituaries often rapidly disap-