

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-

Kodak reports on:

the things some people want in front of a television camera tube . . . a fish story with a picture to prove it



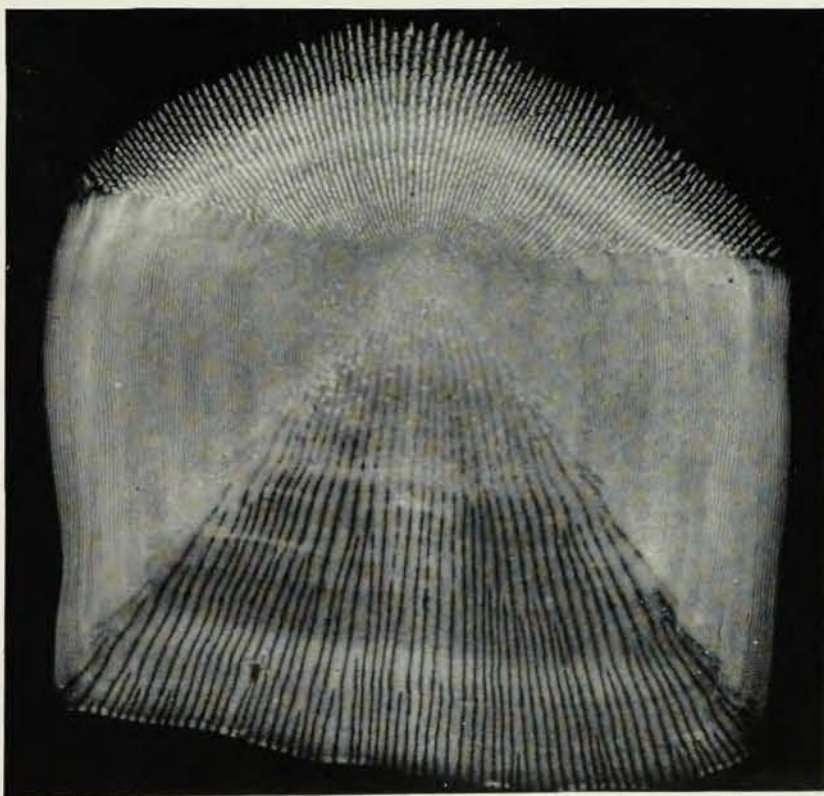
It will be interesting to see if this picture and the paragraph of type you are now reading succeed in their purpose (and it's a long, long shot) of eliciting even a single letter,

wire, or phone call from a party seeking a strong and competent organization to take on the development, design, and/or construction of a complex optical-mechanical

system for feeding some sort of image into a television camera tube. The quest for such a contact is suggested by the very satisfactory manner in which our work is progressing on two such projects, the first television bombsight and the first airborne television gunsight. In security-dictated disorder, the photograph suggests the kind of components we make and put together for these affairs. Nor are our talents along these lines newly acquired, even if Ed Sullivan* doesn't stress them on Sunday evenings when discussing our more popular mechanical and optical products. The letter, wire, or phone call should go to Eastman Kodak Company, Military and Special Products Division, Rochester 4, N. Y.

*The fact may little signify, but Ed and most of the other figures of live television reach the magic screen through Kodak Television Ektanon Lenses on the studio cameras.

This is a microradiograph of a striped bass scale. In microradiography one passes low-voltage x-rays through a specimen to a special fine-grain photographic emulsion in intimate contact with it. The resulting photographic image then becomes a subject for conventional photographic enlargement or photomicrography. If you already know that much, there is then some point in requesting of Eastman Kodak Company, Special Sensitized Products Division, Rochester 4, N. Y., information about an improved material for this work which we hope to have available in the near future. The same source can also provide a recently updated bibliography on results and techniques with microradiography. But don't ask us about striped bass and the lessons to be learned from their stripes or scales. Ask the Fish and Wildlife Service of the U. S. Department of the Interior in Washington.



This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

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pears. Even in this volume it has proved impossible to find details of the place of birth and parentage of one of the Fellows.

The physicists appearing in this volume are J. Evershed, L. V. King, H. R. Robinson, H. N. Russell, F. Soddy, Sir John Townsend, and H. Weyl.

Practical Astronomy. By W. Schroeder. 206 pp. Philosophical Library, Inc., New York, 1957. \$6.00. *Reviewed by Cecilia Payne-Gaposchkin, Harvard College Observatory.*

Mr. Schroeder has written an excellent little book, which can be recommended to anyone who has an interest in the heavens. In an unpretentious manner and with the simplest mathematical concepts (it calls only for arithmetic and the geometry of the triangle, circle, and ellipse) it makes the motions of stars and planets both clear and interesting.

Excellent maps of the best-known constellations lead simply into astronomical coordinates and time. The construction of nocturnals, quadrants, sundials, and other simple instruments is described with the aid of diagrams and templates. Projection and the astronomical triangle are described and illustrated so that anyone can execute them with ruler and compass.

The motions of the planets are illustrated with equal clarity; sections on the moon and eclipses follow. There are directions for mounting binoculars for astronomical observation and for the construction and mounting of a simple telescope. The book ends with suggestions for interesting observations that can be made by simple means. There is a brief, but good, bibliography for those interested in further reading.

An amateur astronomer will read the book with delight and with profit. It will also be of great use to the teacher who wishes to make the elementary ideas of astronomy clear and who needs to find simple and inexpensive ways of illustrating his lectures.

Statistische Mechanik. Vol. 5 of Einführung in die Theoretische Physik. By Werner Döring. 114 pp. Walter de Gruyter & Co., Berlin, Germany, 1957. Paperbound DM 2.40. *Reviewed by William Fuller Brown, Jr., University of Minnesota.*

In the four previous volumes, the author has treated mechanics, electromagnetism, optics, and thermodynamics. The new volume, like its predecessors, has the following characteristics. It is of pocket size: each page contains about 36 lines, and each line is about 1.6 times as long as the word *Schwerpunktsgeschwindigkeitsvektors*. In this and in other respects the book is well suited for use during waits between trains (or during TV commercials). It shows the results of careful selection, organization, and presentation of material. It includes critical discussion of basic problems.

There are three parts. In Part 1, Kinetic Theory of Gases, the topics covered include the usual elementary ones, the Maxwell velocity distribution, and gas vis-

cosity. The calculations of mean free path and the like are carried out only for simple cases that avoid intricate integrations, but the complexities of the more general case are mentioned. In Part 2, Boltzmann's Principle, both the classical and the quantum treatments are based essentially on the canonical ensemble. Its properties are developed by a quasi derivation for a system in equilibrium with a thermostat; to avoid the complexities of Fowler's method, Döring uses one that I, alas, find unconvincing. Topics covered in this part include the Einstein and Debye specific heat theories and the Planck radiation formula. In Part 3, Statistics and Thermodynamics, the author develops the statistical interpretation of entropy and then uses it to discuss such further topics as the entropy of ideal gases and the theory of degenerate gases. He severely criticizes the common use of "most probable" values with its reckless handling of factorials. The book ends with a warning against cosmic generalizations, and it contains no mention of Maxwellian demons or information theory.

This is a very readable book; it will give beginners a good introduction to the subject and others a helpful review.

Annual Review of Nuclear Science, Vol. 7. Edited by James G. Beckerley, Robert Hofstadter, Leonard I. Schiff. 496 pp. Annual Reviews, Inc., Palo Alto, Calif., 1957. \$7.00 in US; \$7.50 elsewhere. *Reviewed by S. D. Warshaw, Argonne National Laboratory.*

This seventh in a series of yearly review articles in what is evidently a rather vaguely defined field of knowledge consists of twelve separate articles. Of these, six are physics (three of these "nuclear physics" in the classical sense and three particle physics), four are biophysics (or more properly radiation biology) and two are chemistry. All of the senior authors are among the leaders in their respective fields. The level of sophistication varies from a statement that "the cost per unit weight of shielding material increases rapidly with density" to an assertion that "roughly speaking the operation CPT for a conventional field theory Hamiltonian is equivalent to Hermitian conjugation". The connection that ties these together appears to be that they deal somehow with problems that arose, historically, from the discovery of ionizing radiation. Your reviewer is as opposed to narrow specialization as he is to other forms of sin. Still it would seem that even a modern da Vinci would have trouble maintaining a continuously high level of interest in all of the disparate titles in this volume.

In more detail, the articles are (not in the order of printing): "Mu-meson physics" (Rainwater); "Collision of < 1 Bev particles (excluding electrons and photons) with nuclei" (Lindenbaum); "Hyperons and heavy mesons (systematic and decay)" (Gell-Mann and Rosenfeld); "The collective model of nuclei" (Villar); "Nuclear and nucleon scattering of high-energy electrons" (Hofstadter); "Measurement of nuclear spins and static moments of radioactive isotopes" (Nierenberg);