and also from a rather intensive study of 22 surgical patients in hospital. These hypotheses formed the basis of questions employed in a questionnaire-type survey of some thousand Yale students, yielding 149 cases who had undergone surgery that had been anticipated in advance.

The main approach to all of the psychological problems is psychoanalytic, and the data are almost entirely verbal (sometimes even bordering on the anecdotal) in character. The bond with psychoanalysis is easy enough to see, but the relationship between this study and other current investigative work in the field of psychology is much less clear. In his preface Janis deplores two extremes: the superficiality of the anecdotal accounts that abound in field studies of "stress," and the pedanticism of attempts to investigate stress phenomena in the psychological laboratory. He considers that his materials and methods (in the setting of the surgical wards) may represent an optimal admixture of breadth and rigor. While the author is to be commended for his originality of approach, I doubt that he has achieved this happy balance. By comparison with the hard core of objective data that constitute anything like solid evidence, discussions, speculations, and detailed accounts of what patients said in interview bulk very large indeed.

The author is well aware of the limitations placed upon any conclusions about "stress" in general from material obtained entirely from surgical patients, and in the concluding paragraph of the book he mentions other situations that should be studied in the next step of a general program for the study of stress. One might wish, then, that Janis had chosen to use his subtitle for the title of this book.

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Radioaktive Isotope in der Biochemie. Engelbert Broda. Deuticke, Vienna, 1958. 326 pp. Illus.

This book was written to introduce the reader to the "methodicalness" of biochemical research with tagged atoms. A presentation of the fundamentals of radioactivity and radiation chemistry is followed by a detailed discussion of special, well-selected problems. These are closely connected with the chief principles of biochemical isotope research and constitute an extensive survey of the applications and possibilities in this field and in neighboring disciplines.

A good bibliography, with emphasis on foreign—especially American—literature, supports the monograph and makes it a stimulating, rewarding study. The chapter on radiation biology and radiation protection is of importance for every research worker in the field, whether he is a chemist, biochemist, physiologist, microbiologist, or medical man. All such workers may use this book to advantage, since the author has more than achieved his goal.

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The Earth and its Gravity Field. W. A. Heiskanen and F. A. Vening Meinesz. McGraw-Hill, New York, 1958. x + 470 pp. Illus. $12.50.

Here is one of those very important unifying monographs of which there are always too few. Written for the small group of specialists by recognized experts in the field, it is probably of equal, if not greater, importance to the much wider group of physicists and geologists who are interested in the subject but do not have the time or background to read the original papers.

With this larger class of readers in mind, the authors have discussed not only the instruments and methods used to obtain and analyze gravitational data but the important geological questions which are answered in part by these data. Thus, the problems of gravitational anomalies and the isostatic adjustment of the earth's crust are discussed as well as such topics as convection currents in the mantle, the origin of continents, polar migration, the shear pattern of the earth's crust, the implications of the deviations from isostatic equilibrium, and the formation of geosyncline belts. Of more direct concern in connection with gravitational questions are the problems of earth tides and of physical geodesy (which is discussed in considerable detail).

Reading this book as a physicist, not a geophysicist, I was struck by a curious situation. Gravitation, and its nature, had long been considered to be a dead issue for physicists. Newton's theory of gravitation, dating from the 17th century, had been presumed correct except for small relativistic effects. In any case gravitation was considered to be far too weak an interaction to be important. (The gravitational interaction between an electron and a proton is 10^{-40} times the electrostatic interaction.) Why, then, was I reading this book? The answer is strange. Some of us—by no means the majority of physicists—suspect that because of the very great concentration of energy at the center of a particle, gravitation may be the dominant interaction which holds a particle together. Whether or not gravitation is important depends upon the characteristic size of a particle, and concerning this we know essentially nothing. Some of us also have doubts about the relativistic gravitational effects. Furthermore, some relativistic effects may be large, and this would have led, for example, to a substantially stronger gravitational interaction in the past.

The earth is an important source of answers to these questions. First, it contains a history of the past four billion years. Second, it is a remarkably stable laboratory, which can be used to answer fundamental questions concerning the gravitational interaction. Thus, this well-written new book by Heiskanen and Vening Meinesz is of importance, not only to the geologists and geophysicists, but to a small group of physicists interested in the nature of the gravitational field.

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Moments of Discovery. vol. I, *The Origins of Science.* vol. II, *The Development of Modern Science.* George Schwartz and Philip W. Bishop, Eds. Basic Books, New York, 1958. 1005 pp. Illus. $15.

This anthology contains numerous brief but interesting selections from scientific writers, from Hippocrates to Oppenheimer, accompanied by an editorial commentary incredibly inaccurate in its history and sophomorically naive in its conception of science. Galileo's dates are given as 1565–1642 on one page and as 1564–1643 on another (both are wrong); Harvey's death is given as 1657, then as 1667; Kepler dies first in 1620, then in 1630. The history is often as bad as the chronology. How surprising to read that Roger Bacon deserves credit for "promoting the idea of the sphericity of the earth" (shades of Eratosthenes!); that Galileo invented the telescope and with it produced "experimental support" for the Copernican hypothesis; that Huygens constructed a pendulum clock 12 years before he was born; that Halley visited Newton "to discuss the validity of Kepler's theory of elliptical orbits"; that "Galileo's system" became Newton's first and second laws!

The historical sketch which opens the first volume might well have been written 50 years ago (parts of it by Voltaire himself); it ignores completely the results of modern research on Babylonian astronomy, the mechanical investigations of the Middle Ages, and the like. The succeeding essay, on "The nature of science and discovery," with its picture of the

great scientists who "occasionally descend from the heights to the level of the layman," of Roger Bacon exploding "the specious logic of the Fathers of the Church," and so forth, is equally unsound.

It is unfortunate that such interesting selections and illustrations should be so badly edited. The editors are lucky that George Sarton, whom they praise enthusiastically but not very judiciously, is not alive to subject their sloppy production to his rigorous standards of truth and accuracy.

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New Books

Abstract Bibliography of Fruit Breeding and Genetics to 1955. Rubus and Ribes—a survey. Technical Communication No. 25. R. L. Knight and Elizabeth Keep. Commonwealth Agricultural Bureaux, Bucks, England, 1958. 254 pp. $6.80.

Advances in Electronic and Electron Physics. vol. 10. L. Marton, Ed. Academic Press, New York, 1958. 330 pp. $10. Contents: "Nonuniform d-c electron flow in magnetically focused cylindrical beams" (W. G. Dow); "Defects in diamond-type semiconductor crystals" (E. Billig and P. J. Holmes); "Microwave optics" (J. Brown); "Developments in computer logical organization" (W. L. Lawless); "On some aspects of tube reliability" (E. G. Rowe); "Recent developments in cathode-ray oscilloscopes" (J. E. Day). A cumulative author and subject index is included.

Agriculture and Animal Husbandry in India. M. S. Randhawa. Indian Council of Agricultural Research, New Delhi, India, 1958. 380 pp. Rs. 15.

The Atom and the Energy Revolution. Norman Lansdell. Philosophical Library, New York, 1958. 200 pp. $6.

The Aztec: Man and Tribe. Victor W. von Hagen. New American Library, New York, 1958. 222 pp. Paper, $0.50.

Bibliography of Plant Protection, 1948–1949. J. Barner. Biologische Bundesanstalt fur Land- und Forstwirtschaft in Berlin-Dahlem, Berlin, 1958. 689 pp.

The Big Red Schoolhouse. Fred M. Hechinger. Doubleday, Garden City, N.Y., 1959. 240 pp. $3.95.

British Fermentation Industries. J. M. Whitmarsh. Pitman, London, 1958. 147 pp. 25s.

Drinking and Intoxication. Selected readings in social attitudes and controls. Raymond G. McCarthy. Yale Center of Alcohol Studies, New Haven, Conn.; Free Press, Glencoe, Ill., 1959. 474 pp. $7.50.

Economics for the Mineral Engineer. Edmund J. Pryor. Pergamon, New York and London, 1958. 254 pp. $6.

Environmental Influences on Prenatal Development. Beatrice Mintz. Univ. of Chicago Press, Chicago, 1959. 100 pp. $3.

The Foundations of Capitalism. Oliver C. Cox. Philosophical Library, New York, 1959. 510 pp. $7.50.

The Evolution of Culture. The development of civilization to the fall of Rome. Leslie A. White. McGraw-Hill, New York, 1959. 389 pp. $7.50.

The Geology of South Australia. Prepared by members of the South Australian division of the Geological Society of Australia and edited by M. F. Glaessner and L. W. Parkin. Melbourne Univ. Press, Melbourne, Australia, 1958 (order from Cambridge Univ. Press, New York 22). 163 pp. $8.50.

High Temperature Effects in Aircraft Structures. Nicholas John Hoff, Ed. Published for and on behalf of Advisory Group for Aeronautical Research and Development, North Atlantic Treaty Organization by Pergamon Press, New York and London, 1958. 364 pp. $12.

Handbuch der Physik. vol. 51, *Astrophysics II: Stellar Structure.* Springer, Berlin, 1958. 838 pp. DM. 175.

Literaturquellen und ihre Kürzungen aus der Bibliographie der Pflanzenschutzliteratur. J. Bärner. Biologische Bundesanstalt für Land- und Forstwirtschaft in Berlin-Dahlem, Berlin, 1958.

The Meaning of Home Science. Rajammal P. Devadas. Sri Avinashilingam Home Science College, Coimbatore, India, 1958. 54 pp. Rs. 2. Dr. Devadas is the chief home economist, Ministry of Food and Agriculture, Government of India. The chapters in this book are based on talks given by her in two seminars on home science conducted at Avinashilingam Home Science College.

Muir's Text-Book of Pathology. Revised by D. F. Cappell. Arnold, London, ed. 7, 1958 (order from Williams and Wilkins, Baltimore, Md.). 1221 pp. $14.50.

Origin of Granite in the Light of Experimental Studies in the System $NaAlSi_3O_8$-$KAlSi_3O_8$-H_2O. Memoir 74. O. F. Tuttle and N. L. Bowen. Geological Soc. of America, New York, 1958. 153 pp.

Les Papillons. Guy Mathot. Presses Universitaires de France, Paris, 1958. 126 pp.

Poliomyelitis. Papers and discussions presented at the Fourth International Poliomyelitis Conference. Compiled and edited for the International Poliomyelitis Congress. Lippincott, Philadelphia, Pa., 1958. 702 pp. $7.50. The papers presented at the sessions were divided into the following groups: "Vaccination against poliomyelitis"; "Enteric viruses producing diseases simulating poliomyelitis: echo viruses, coxsackie viruses"; "Studies on cultured mammalian cells"; "General considerations of viruses"; "Diagnosis"; "Basic problems of respiratory distress in patients with poliomyelitis"; "Group and home care of patients with respiratory or extensive paralysis"; "Final general session—summary of viruses, care and rehabilitation and closing remarks."

Primer of Free Government. William Bergen Chalfant. Philosophical Library, New York, 1959. 160 pp. $3.

Progress in the Chemistry of Organic Natural Products. vol. 15, 244 pp. $9.75. vol. 16, 226 pp. $9.50. L. Zechmeister, Ed. Springer, Vienna, Austria, 1958.

The Pulse of Radar: the Autobiography of Sir Robert Watson-Watt. Dial, New York, 1959. x + 448 pp. $6.

Miscellaneous Publications

(Inquiries concerning these publications should be addressed, not to Science, *but to the publisher or agency sponsoring the publication.)*

An Annotated Bibliography of Research in Economically Important Species of California Fish and Game. California Legislature Assembly Interim Committee Reports, vol. 5, No. 5. Compiled by William F. Scheuermann, Jr. California Assembly Interim Committee on Fish and Game, California Legislature, Sacramento, 1958 (order from Room 3111, State Capitol Annex, Sacramento). 271 pp.

Optical Properties of Saturn's Rings. pt. I, *Transmission.* Smithsonian Contributions to Astrophysics, vol. 2, No. 13. Allan F. Cook, II, and Fred A. Franklin. 6 pp. *Evolution of Arthropod Mechanisms.* Misc. Collections vol. 138, No. 2. R. E. Snodgrass. 77 pp. Smithsonian Institution, Washington, D.C., 1958.

Three North American Cretaceous Fishes. pt. I, *Remarks on* Helmintholepis vermiculatus *Cockerell.* David H. Dunkle. Proceedings of the U.S. National Museum, vol. 108, No. 3401. David H. Dunkle. 8 pp. *Taxonomy and Nomenclature of Three Species of Lonchura (Aves: Estrildinae).* Proceedings, vol. 108, No. 3402. Kenneth C. Parkes. 14 pp. Smithsonian Institution, Washington, D.C., 1958.

Notes on African Bulbuls. Family Pycnonotidae, class Aves. Fieldiana: Zoology, vol. 35, No. 6. Austin L. Rand. 78 pp. *Marine Mollusks from Bougainville and Florida, Solomon Islands.* Fieldiana: Zoology, vol. 39, No. 20. Alan Solem. 14 pp. $0.30. *The Crocodilian Genus* Paleosuchus. Fieldiana: Zoology, vol. 39, No. 21. Frederick J. Medem. 20 pp. $0.50. *A New Genus and Species of Fish from the Gulf of Mexico.* Fieldiana: Zoology, vol. 39, No. 22. Loren P. Woods. 4 pp. $0.10. *A Note on the Philippine Frogs Related to Rana Macrodon.* Fieldiana: Zoology, vol. 39, No. 23. Robert F. Inger. 3 pp. $0.10. *Stoneflies from the Philippines (Plecoptera).* Fieldiana: Zoology, vol. 42, No. 6. Stanley G. Jewett, Jr. 10 pp. $0.40. Chicago Natural History Museum, Chicago, Ill., 1958.

The Native Brotherhoods: Modern Intertribal Organizations on the Northwest Coast. Bureau of American Ethnology Bull. 168. Philip Drucker. Smithsonian Institution, Washington 25, 1958 (order from Supt. of Documents, GPO, Washington 25). 194 pp. $1.

Hodgkin's Disease. Annals, vol. 73, art. 1. Antonio Rottino, Consulting Ed. 380 pp. $4.50. *Third Tissue Homotransplantation Conference.* Annals, vol. 73, art. 3. Blair O. Rogers, Consulting Ed. 330 pp. $5. *Psoriasis.* Annals, vol. 73, art. 5. Peter Flesch, Consulting Ed. 126 pp. $2.75. *Photoreception.* Annals, vol. 74, art. 2. Jerome J. Wolken, Consulting Ed. 246 pp. $3.50. *Enzymes in Blood.* Annals, vol. 75, art. 1. Laurens P. White, Consulting Ed. 384 pp. $5. *The Basic and Clinical Research of the New Antibiotic, Kanamycin.* Annals, vol. 76, art. 2. Maxwell Finland, Consulting Ed. 391 pp. $5. New York Acad. of Sciences, New York, 1958.