

such as error detectors, motors, and hydraulic and pneumatic devices.

I especially enjoyed the two chapters on the design of linear systems. Here the authors include down-to-earth advice: "Once a design has been made acceptable by changes which satisfy test conditions, further changes should be avoided. It often happens that additional changes are requested in order to further improve performance, lower cost, etc. Such changes seem insignificant and unrelated to sources of trouble, but often prove very unwise." They also provide a step-by-step discussion of the design of several control systems which were actually built. The volume contains a large number of exercises for the students, and reflects throughout the authors' experience, both in the classroom and on the workbench. It should serve its intended purpose admirably.

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Cultivated Palms. Special issue of *The American Horticultural Magazine*. R. Bruce Ledin, Guest Ed. American Horticultural Society, Washington 2, D.C., 1961. 189 pp. Illus. Paper, \$3.

The general thesis of this handbook on the palms is "what the plants look like taxonomically and horticulturally . . . how to grow the plants. . . [and] the difficulties that may arise" in cultivation. The idea of preparing such a volume was presented by W. H. Hodge to the executive committee of the Palm Society when he was president of the society.

The material is divided into three sections: "An introduction to the palms," "Culture of palms," and "Uses of palms." The first section includes a paper by Hodge, entitled "The world of palms," eight pages (containing 32 illustrations) showing palm characteristics (fruit clusters; palm flowers, leaves, and stems; and others), a series of 80 full-page illustrations, arranged alphabetically by botanical name, called "Palm portraits," as well as other illustrations and papers.

The second and third sections contain 16 contributed papers, a check list of palms known to be growing in Hawaii (by L. W. Bryan), a list (one page) of living palm collections, and an index of palm names.

The Bradley Volume. A special volume of the *American Journal of Science* in appreciation of Wilmot Hyde Bradley on his sixty-first birthday. American Journal of Science, Sterling Tower, New Haven, Conn., 1960. 433 pp. Illus. \$4.75.

The Bradley Volume comprises 38 papers dealing with modern geologic science, written by 48 authors who hail from a dozen or so different institutions. This fine collection honors Wilmot Hyde Bradley who, as chief geologist of the U.S. Geological Survey from 1944 to 1959, directed an inspired program by the Geologic Division, a program that constantly sought and explored new vistas in geologic research. Traditionally the survey's forte has been the investigation of geologic problems by means of surface and subsurface detailed mapping and attendant topical studies. Bradley, dedicated to the growing importance of the interdisciplinary connections of geology with chemistry, physics, biology, and engineering, created within the survey another forte that is currently being maintained by a staff of vigorous young scientists who are setting the stage for future break-throughs in the understanding of geologic processes. It is this contribution to the development of the science and of the survey's research program that is the true focus of *The Bradley Volume*; accordingly, the assembled papers represent a spectrum of inquiry which recreates the image of this enlightened leader.

To list the papers by title or to comment on their excellence would be tedious. The book has no central theme other than the breadth of geology itself, as expressed in these short papers. Strong emphasis emerges on the experimental, theoretical, and philosophical aspects of the subject matter. In the papers dealing with geochemistry and geophysics, for example, measurements per se are stepping stones en route to the formulation of conclusions in crystal chemistry, mineral genesis, solution chemistry, and mineral stability in natural environments. Field observations and compilations, set forth in detail or graphically summarized, lead to the philosophical treatment of crustal formation, rock alteration, distribution of elements, and the petrologic history of igneous, metamorphic, and sedimentary rocks. Biological inquiry is used to develop perspective on organic resemblance and evolution, stratigraphic and

zoogeographic distribution, and paleogeology and sedimentary basins.

Although the individual specialist may find only a few papers in his field within this volume, the whole is much more than the sum of its parts; the assemblage represents a formidable sampling of modern geology, which brings credit to the *American Journal of Science* for its role in sponsoring *The Bradley Volume*. Certainly the volume brings great pride and pleasure to those of us who find that it is also a fitting tribute to Bill Bradley's keen sense of human values which underscores his concept of a creative research community. If you are interested in what modern geologists are thinking and writing about, you will want your own copy.

W. T. PECORA

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The Rich and the Poor. A study of the economics of rising expectations. Robert Theobald. Potter, New York, 1960. 196 pp. \$4.50.

The title suggests that this book could have been written 100 years ago when farsighted people in industrial countries were concerned with the broad gulf between the rich and the poor and when, in several countries, conservative statesmen urged the adoption of progressive taxation and social policy measures in order to forestall a revolt of the poor. They did it because of humanitarian motives and enlightened self-interest. They knew that a small group of rich people could not survive surrounded by hopeless poverty.

A very similar appeal, to both humanitarian motives and enlightened self-interest, is now addressed to the rich countries urging them to pursue a more vigorous policy in support of economic development in the poor countries. In this respect Theobald adds his voice to many others who have felt the same sense of urgency.

Most interesting is his elaboration of the thesis that different economic reasoning should apply to the industrially advanced and the underdeveloped countries. He points out, for instance, that even relatively stiff progressive income taxes do not seriously interfere with incentives to great effort or with the necessary capital formation in the industrial countries. If poor countries

in early stages of development follow the advice, frequently given to them, that they too should adopt a progressive tax system, they may seriously interfere with their economic development. The author warns against applying policies which may be suitable for one group of countries to the other group without full consideration of the differences in motivation, value systems, and institutions. His pet peeve is the neoclassical approach to economics, which believes that there is a truth in economics applicable to all countries and conditions.

GERHARD COLM

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Die Entdeckung neuer Organisations-typen im Tierreich. *Die Neue Brehm-Bücherei*, No. 258. Peter Ax. Ziemsen, Wittenberg, East Germany. 1960. 116 pp. Illus. DM. 6.50 (approximately \$1.60).

This small paperback in the "Neue Brehm-Bücherei" series is packed with information on a wide variety of recently discovered and unusual animal types, including *Neopilina*, Pogonophora, *Halammohydra*, *Monobryozoon*, Mystacocarida, Cephalocarida, Xenoturbellida, Gnathostomulida, Monotoplanidae, Polystyliphoridae, and *Latimeria*. The text is richly illustrated, well written, concise, and scholarly; where appropriate, emphasis is placed on morphology, physiology, ecology, or phylogeny. There are 104 references to a greatly scattered literature. Every serious Ph.D. candidate in invertebrate zoology should have this excellent little book.

ROBERT W. PENNAK

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New Books

Mathematics, Physical Sciences, and Engineering

Aerodynamic Capture of Particles. E. G. Richardson, Ed. Pergamon, New York, 1960. 208 pp. Illus. \$8. Proceedings of a conference held by the British Coal Utilization Research Association at Leatherhead in 1960; the discussion covers theoretical and fundamental aspects, experimental application of capture techniques, and capture of particles by raindrops.

Block and Graft Polymers. William J. Burlant and Allan S. Hoffman. Reinhold,

New York; Chapman and Hall, London, 1960. 172 pp. Illus. \$7.95.

Cobalt. Its chemistry, metallurgy, and uses. Roland S. Young, Ed. Reinhold, New York; Chapman and Hall, London, 1960. 431 pp. Illus. \$15. "This new book replaces . . . monograph No. 108 *Cobalt*, written by the present Editor."

Extractive and Physical Metallurgy of Plutonium and Its Alloys. Including a special introduction and annotated bibliography. W. D. Wilkinson, Ed. Interscience, New York, 1960. 324 pp. Illus. \$10.50. Based on a symposium (16-17 February 1959) sponsored by the Metallurgical Society and the American Institute of Mining, Metallurgical, and Petroleum Engineers.

Field Theory of Guided Waves. Robert E. Collin. McGraw-Hill, New York, 1960. 619 pp. Illus. \$16.50.

The Mysterious Earth. Lester Del Rey. Chilton, Philadelphia, Pa., 1960. 226 pp. \$2.95.

The New Age in Physics. Sir Harrie Massey. Harper, New York, 1960. 342 pp. Illus. + plates. \$5.

Official Methods of Analysis of the Association of Official Agricultural Chemists. William Horwitz, Ed. The Association, Box 540, Benjamin Franklin Sta., Washington, D.C., ed. 9, 1960. 852 pp. Illus. \$17.50.

Phosphorus Metabolism of Brain. P. J. Heald. Pergamon, New York, 1960. 202 pp. Illus. \$6.50.

Physical Methods of Organic Chemistry. vol. 1, pt. 3. Arnold Weissberger, Ed. Interscience, New York, 1960. 860 pp. \$24.50.

Polystyrene. William C. Teach and George Kiessling. Reinhold, New York; Chapman and Hall, London, 1960. 187 pp. \$5.

Principles of Meteoritics. E. L. Krinov. Translated by Irene Vidzunas. Translation edited by Harrison Brown. Pergamon, New York, 1960. 546 pp. Illus. \$12.

Pulp and Paper. Chemistry and chemical technology. vol. 3, *Papermaking*. James P. Casey. Interscience, New York, ed. 2, 1960. 337 pp. Illus. \$25.

Pure Mathematics. A university and college course. vol. 1, *Calculus*. F. Gerish. Cambridge Univ. Press, New York, 1960. 409 pp. Illus. \$5.

Qualitative Theory of Differential Equations. V. V. Nemytskii and V. V. Stepanov. Princeton Univ. Press, Princeton, N.J., 1960. 531 pp. Illus. \$12.50.

Radiation Chemistry of Organic Compounds. A. J. Swallow. Pergamon, New York, 1960. 389 pp. Illus. + plates. \$15.

Sixth National Symposium on Vacuum Technology, Transactions, 1959. Also cumulative index of 1954-1959 symposia. C. Robert Meissner, Ed. Pergamon, New York, 1960. 335 pp. Illus. \$17.50. Contents: 58 papers presented at the annual symposium; index A in which titles of papers presented at previous symposia are arranged in chronological order; index B, in which authors and coauthors are listed alphabetically.

Solid Propellant Rocket Research. Martin Summerfield, Ed. Academic Press, New York, 1960. 711 pp. Illus. \$6.50.

Solution of Equations and Systems of

Equations. A. M. Ostrowski. Academic Press, New York, 1960. 211 pp. Illus. \$6.80.

The Solubility Product Principle. An introduction to its uses and limitations. S. Lewin. Interscience, New York, 1960. 129 pp. Illus. \$3.50.

Space Trajectories. A symposium sponsored by the American Astronautical Society, the Advanced Research Projects Agency, and Radiation Incorporated. T. C. Helvey, Symposium Chairman. Academic Press, New York, 1960. 308 pp. Illus. \$12.

Specification and Engineering Writer's Manual. Thomas S. Sawyer. Nelson-Hall, Chicago, Ill., 1960. 231 pp. \$6.95.

Tables of Thermodynamic and Transport Properties of Air, Argon, Carbon Dioxide, Carbon Monoxide, Hydrogen, Nitrogen, Oxygen, and Steam. Joseph Hilsenrath *et al.* Pergamon, New York, 1960. 491 pp. \$20. A revised collection of tables originally published by the U.S. National Bureau of Standards as *Tables of Thermal Properties of Gases* (Circular 564).

The Use of Organic Reagents in Inorganic Analysis. A. I. Busev and N. G. Polianskii. Translated from the Russian by J. T. Greaves. Pergamon, New York, 1960. 82 pp. \$3.50.

Ultraviolet Guide to Minerals. A complete working manual for the use of ultraviolet light in locating and recognizing minerals. Including field identification charts. Sterling Gleason. Van Nostrand, Princeton, N.J., 1960. 256 pp. Illus. + plates. \$6.95.

Waves in Layered Media. Leonid M. Brekhovskikh. Translated from the Russian by David Lieberman. Academic Press, New York, 1960. 571 pp. Illus. \$16.

References and Bibliography

The International Who's Who, 1960. Europa Publications, London, ed. 24, 1960. 1053 pp. \$22.

Scandinavian Research Guide. Directory of research institutions within technology and science, exclusive of life sciences. Scandinavian Council for Applied Research, Blindern, Norway, 1960. 2 volumes (approximately 800 pp.). \$10. The guide, intended as a source of information on the following types of institutions—governmental, semigovernmental and cooperative institutes, and private laboratories which undertake contract work for others—covers institutions in Denmark, Sweden, Iceland, Norway, and Finland. Volume 1 (approximately 680 pages) provides a list of research institutes and laboratories arranged by subject—for example, mathematics, biosciences, and building. Information supplied about each organization includes its affiliation, the name of the head of the organization, the number and type of its staff members, and its research activities and publications. Volume 2 covers the following types of organizations: central research organizations, universities and institutes of technology, scientific societies (and their publications), central scientific and technical libraries and information services, and productivity centers. It also contains a bibliography, and three indexes—subject, institutional, and persons.