

were universally respected, but something went wrong.

In 1859, Charles Darwin hit him in his postulates, and he found his basic assumptions under attack. That Agassiz did not know at first what had happened to him is clear from his reactions. Later on, when he began to suspect, he was dazed and puzzled. He made an honest effort to understand the newer developments and to evaluate the evidence on which the theory of evolution was based, but he failed completely, as he showed by a paper he wrote just before his death.

A character as complex as Agassiz' is hard to depict, but Lurie has succeeded brilliantly. His treatment of Agassiz is both sympathetic and critical. He fits Agassiz into the intellectual climate of his time, but he also (and rightly) judges him from the vantage point of today. Historians of science, of course, must observe their subjects from these two viewpoints. It is only a truism to state that science changes drastically and continually, but that the scientists themselves are altered only with the slowness of organic evolution. A considerable number of our active, productive, and creative contemporaries furnish evidence that Agassiz was not a *lusus naturae* but that he was unique, perhaps, only in the way that all human beings are unique. He accomplished a great deal, advanced the science of his time, and rose to the top of his profession. He was unfortunate in that the science to which he had contributed so much left him behind some years before he died. The whole story of this interesting man is well told. All in all, Lurie has written a distinguished biography.

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Control Systems Engineering. William W. Seifert and Carl W. Steeg, Jr., Eds. McGraw-Hill, New York, 1960. xiv + 964 pp. Illus. \$15.

There are many treatments of specific aspects of control system engineering; few attempt as encyclopedic an account of the ancillary mathematical techniques as the present volume. There are chapters, written by various authors, on the mathematics suitable for the analysis of linear systems—that is, linear differential equations, linear integral equations, transform tech-

niques, and matrix methods. In addition, there are chapters on nonlinear differential equations, statistical theory and applications, optimization of linear systems, sampled-data analysis, numerical analysis, and an introduction to game theory.

While there are many sloppy mathematical statements in this book, a more serious objection is that it tries to cover too much ground and pays the price in superficiality. Although the volume is not likely to be considered suitable for use as a textbook, it can be rather valuable as a reference for the practicing control engineer.

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Radioisotopes and Radiation in the Life Sciences. 2nd Inter-American Symposium on the Peaceful Applications of Nuclear Energy, Buenos Aires, 1959. Inter-American Nuclear Energy Commission and the Argentine National Atomic Energy Commission. Pan American Union, Washington, D.C., 1960. 264 pp. Illus.

This symposium, jointly sponsored by the Inter-American Nuclear Energy Commission (IANEC), and the Argentine National Atomic Energy Commission, reflects the great progress achieved by the American States in the field of nuclear energy since the first inter-American symposium was held at Brookhaven National Laboratory in 1957.

The 38 papers presented by scientists from the 21 member countries of the organization dealt with 10 topics, among them problems of basic botany and zoology, radiobiology, clinical applications, animal studies, agriculture, entomology, and food preservation. Special emphasis was given to research of practical value to the Americas, such as tracer studies in the coffee plant, soil fertility studies, the use of radioisotopes and radiation in plant physiology, mutations produced in flowering plants, and milk formation in cows (studied with radiocarbon as a metabolic tracer). General aspects of the field, administrative problems, and radiation protection questions were discussed by experts in the introductory speeches, as well as between and at the end of the sessions. An attendance of

about 100 scientists from the Americas, and abroad (including observers from Canada) underscored the importance of this stimulating event in the history of the Americas and made possible its success.

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A History of Metallography. The development of ideas on the structure of metals before 1890. Cyril Stanley Smith. University of Chicago Press, Chicago, Ill., 1960. xxi + 291 pp. \$8.50.

This beautifully illustrated book covers much more than the specialized history of metallography; it should be of interest, as the author hopes, to those concerned with the broader aspects of the history of science. Cyril Stanley Smith, former director of the Institute for the Study of Metals at the University of Chicago, was so greatly interested in metallurgical history that he spent a full year in England, on a Guggenheim fellowship and a research grant from the National Science Foundation, following his avocation. The result of his research is this thought-provoking work covering the growth of concepts on the nature of all materials as well as on the structure of metals. The book will be especially useful for reference because of the extensive bibliographic notes that have been included. Most of the sources quoted have not previously been used in metallurgical histories and are not contained in any similar bibliography.

The book's first section outlines some of the artistic uses made by swordsmiths, armorers, and jewelers of surface phenomena depending on metal structure. Particularly interesting chapters cover the Damascus blade and the Japanese sword, considered by many to be the supreme form of metallurgical art.

A brief review of the rise of the corpuscular theory during the 17th century emphasizes the author's point that a proper balance between "applied" and "pure" science is required for the development of human knowledge. In the field of metallurgy, R. A. F. de Réaumur alone proceeded to develop corpuscular theory into something useful. In developing theories on the nature of steel and iron, he was able to

make innovations of great practical importance.

An entire section of the *History of Metallography* is devoted to the work of Henry Clifton Sorby. Sorby's great contributions to our knowledge of the structure of metals were the result of accurate observations made possible by his superior technique rather than by philosophical speculation. Sorby not only correlated the properties of iron and steel to changes in microstructure, but he showed that metals are undoubtedly crystalline and effectively disposed of the myth that metals "crystallize" under shock or vibration.

The final section of the book covers the advances in chemistry and physics in the 19th century and the work of some of the more influential metallurgists, such as Tschernoff in Russia, Osmond in France, Martens in Germany, and Howe in the United States. Smith concludes his history with a brief outline of developments in metallography after 1890, including x-ray diffraction studies and the use of the electron microscope. He points out that the optical microscope is still an important research tool to the metallurgist because the scale of aggregation revealed to the microscope can no more be ignored than can structure on any other scale.

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A Review of the African Species of the Genus *Cheumatopsyche* (Trichoptera, Hydropsychidae), with Special Reference to Those of Southern Africa, and the Ephemeroptera Types of Species Described by A. E. Eaton, R. McLachlan and F. Walker, with Particular Reference to those in the British Museum (Natural History). *Bulletin, Entomology*, vol. 9, No. 4, pp. 253-267, pp. 269-318. D. E. Kimmins. British Museum (Natural History), London, 1960. Illus. 20s.

These two important papers will be of real value to specialists concerned with these groups. The revision of *Cheumatopsyche*, with special reference to Southern Africa, presents a key and citations, distribution, and figures of the genitalia for 15 species. The list of types of Ephemeroptera, with particular reference to those in the British Museum (Natural History), includes

notes on over 200 lectotypes and holotypes, plus a few neotypes, syntypes, and topotypes. Sixty-five original drawings of genitalia and references to similar drawings published elsewhere cover practically all of the species mentioned.

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American Men of Science. A biographical directory. *The Physical and Biological Sciences*. A-E and F-K volumes. Jacques Cattell, Ed. Cattell Press, Tempe, Ariz., ed. 10, 1960. 1126 pp. and 1158 pp. \$25 each.

Aside from the one-third increase in the number of scientists listed, the only major change in the latest edition of this biographical directory is the combination of the previously separate physical sciences and biological sciences volumes into one alphabetical listing which will comprise four volumes. Thus the editor of *Science* is no longer classified as a biologist but as a man the first letter of whose last name lies between A and E. The advantage of an alphabetical listing is that the reader no longer has to guess, when looking up workers in biochemistry, biophysics, micropaleontology, and other border disciplines, where the editors of the directory have decided to put the particular objects of his search. The disadvantage is that if the reader's interest lies only in one specialty, then he might be able to save money by purchasing only a physical sciences listing or a biological sciences listing.

Some saving, however, is still possible in the new edition. The physical and biological sciences remain separated from the social and behavioral sciences. In the 9th edition the social and behavioral sciences constituted the third volume and in the 10th edition they are to make up a fifth volume. But in this separation there are again problems of classification and, in fact, many men formerly located in the social and behavioral sciences volume have now taken up residence in the physical and biological sciences listing. In going from the 9th to the 10th edition, we learn, for example, not only that Neil Bartlett, a psychologist, has moved from Hobart College, Geneva, N.Y., to the University of Arizona, but also that he has moved from volume 3 to volume 1.

As in the previous editions of this

reference work, the biographies contain useful information about each subject's professional career and fields of professional competence. The presentation is again compact and readable. The first two volumes are now available, and the editor has announced that the remaining volumes will be published at intervals of no longer than eight months. When completed the listing will contain around 125,000 names, and it will be time to begin the next edition.—J.T.

Miscellaneous Publications

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

Aviation Cartography. A historico-bibliographic study of aeronautical charts. Walter W. Ristow. Map Division, Library of Congress, Washington, D.C., ed. 2., 1960. 245 pp. \$1.75.

Bernice P. Bishop Museum Annual Report for 1959. "Prelude to a plan." Alexander Spoehr. Bishop Museum Press, Honolulu, Hawaii, 1960. 31 pp.

Differential Diagnosis of Yaws. C. J. Hackett and L. J. A. Loewenthal. World Health Organization, Geneva, Switzerland, 1960. 88 pp. \$3.25. This volume is intended to compliment the earlier monograph by Hackett [*An International Nomenclature of Yaws Lesions* (1957)].

Educators Guide to Free Science Materials. Mary Horkheimer Saterstrom, Ed. Educators Progress Service, Randolph, Wis., 1960. 317 pp. \$6.25. The guide, designed to identify existing free science materials, has units prepared by James R. Wailes, Harry K. Wong, William R. Ladson, Nellie R. McCool, and Steve R. Rasmussen. John W. Renner served as unit coordinator.

Research in School and College Personnel Services. Paul MacMinn, Carroll H. Miller, and Frank E. Wellman. U.S. Office of Education, Washington, D.C., 1960 (order from Supt. of Documents, GPO, Washington 25). 142 pp. \$0.55. Summaries of unpublished studies, September 1956-September 1958.

Studies on Calcium and Strontium-90 Metabolism in Rats. Fredrik C. Gran. Oslo Univ. Press, Oslo, Norway, 1960. 109 pp.

Teaching about the United Nations in the United States. 1956-1959 report. U.S. Office of Education, Washington, D.C., 1960 (order from Supt. of Documents, GPO, Washington 25). 96 pp. \$0.45.

U.S. Foreign Policy in a Changing World. Oliver D. Knauth. National Planning Assoc., Washington, D.C., 1960. 76 pp. \$1.50. Knauth, former member of the staff of the Office of War Information and political analyst with OSS, surveys the changes the 20th century has made in the traditional bases of national power (military strength, geographic location, and size of population) and points out that the altered line-up of power factors calls for new and changed foreign policies.