serious thinking about the subject matter of this volume. Unless general congresses are more highly appreciated, Professor Spärck's remarks may have been made in vain.

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**Through Alchemy to Chemistry.** A procession of ideas and personalities. John Read. Bell, London, 1957 (order from Macmillan, New York). xvii + 206 pp. Illus. $3.75.

John Read has added to his books on organic chemistry and alchemy a new and particularly delightful survey of historical developments from alchemy to present-day chemistry. Although only 206 pages long, including three of glossary and ten of index, this is a very readable introduction to the history of chemistry. The emphasis rests on alchemy, the discussion of which comprises about one-half of the volume. Although the story of Paracelsus does not begin until the seventh of the ten chapters, some main lines of "modern" chemistry are clearly and effectively drawn. However, Read confines this part of the picture too severely and shows only something of the chemicals, nothing about chemical reactions.

The short biographies are masterly, informative, and entirely reliable. For example, Lavoisier's work in "agriculture and many other national matters" is not omitted, as it sometimes is even in larger histories of chemistry.

The text is enlivened by 50 illustrations, showing portraits, equipment, and working scenes, including the "tailpiece" from J. B. Porta's book of 1608 on distillation.

This is the sort of book which makes a welcome gift for students of any kind and age, providing relaxation and stimulation.

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**Die Evolution der Organismen.** Part 4; part 5. Gerhard Heberer, Ed. Fischer, Stuttgart, Germany, 1955; 1957. 143 pp.; 252 pp.

The new edition of the great German handbook of evolution is nearing completion with publication of the five chapters of the two latest installments. A sixth and final part is in preparation.

Part 4 begins with a discussion by Franz Schwanitz of the origin of cultivated plants. In his classic *Origin of Species,* Darwin very effectively used the origin of cultivated plants and domestic animals to substantiate the all-importance of selection. A review of the results of plant and animal breeding is therefore a legitimate component of a modern review of the theory of evolution. In this survey of plant breeding, Schwanitz finds confirmation for Darwin's contention that selection can create almost anything it wants. Varieties of plants have been produced with large size, high productivity, the loss of certain undesirable characteristics, high or low variability, or other, sometimes highly improbable, attributes. The changes occur amazingly fast if large enough numbers of individuals are available for selection. Here we have experimental evolution in its truest form. Schwanitz presents the recent results in this field and attempts to determine the respective contribution of mutation (including chromosomal mutations and polyploidy), hybridization, and other factors. It is a competent treatment of the established knowledge, with an apparently deliberate avoidance of some of the more controversial and more speculative aspects of the field.

The corresponding chapter on animals, by Herre, brings together much of the exceedingly scattered literature on the domestication of animals. Earlier claims for a hybrid origin of domestic animals have not been confirmed; indeed, conclusions drawn from the detailed analyses of fossils associated with prehistoric man are in complete opposition to such an interpretation. There is great parallelism in the phenomena of domestication, not only when different species of wild animals are brought into domestication but also when the same species is repeatedly domesticated in different areas. Herre particularly emphasizes the effects of domestication on various organ systems, such as the endocrine, and on body proportions, somewhat along the lines of Stockard's work.

Much in current accounts on domestication is still descriptive and anecdotal. Indeed one has the feeling that the biology of domestication is a potential gold mine, of which only the surface has so far been scratched. The most recent findings of population genetics, for instance, have hardly been applied to an interpretation of the phenomena of domestication. The breakdown of developmental and genetic homeostasis in the wake of one-sided selection is, as Lerner has pointed out, undoubtedly one of the main causes of the domestication phenomena.

The various theories concerning the origin of new phyletic types are discussed by Heberer in a chapter (the first of part 5) that is particularly valuable from the standpoint of methodology. Heberer shows that the concept of gradual evolution is favored by all the available evidence and that the hypothesis of the origin of new types through saltations (macromutations) is based on a misunderstanding of known genetic mechanisms. The phenomena of mosaic evolution (particularly among so-called "missing links") and the invariable coincidence of gaps in phyletic series with gaps in the fossil record greatly strengthen the theory of gradual evolution. The documentation of this thesis by Heberer is broad and convincing, and it contains much that is new and original.

Von Krogh gives an orthodox summary of the anatomical similarities and differences between man and the other primates. The fossil history of man is presented by Gieseler in great detail (159 pages) and with abundant illustrations. As a summary of the literature this account is very useful. Unfortunately there is little attempt at synthesis. On the whole, *Pithecanthropus, Sinanthropus,* Neanderthal, and so on, are still presented as so many "types" of fossil hominids, without any real biological interpretation. As long as only a few scattered remains of fossil man existed, no other course was open. The time has now come, however, for bold hypotheses aiming to make sense of the diversity of remains of fossil man. Such hypotheses can be made only through analogy with the variation, in space and time, of other species of mammals.

The work continues to be very attractively illustrated. It contains an unusual amount of material that would be suitable as illustration for lectures and in the classroom.

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**Electron Microscopy.** Proceedings of the Stockholm Conference, September 1956. F. S. Sjostrand and J. Rhodin, Eds. Academic Press, New York, 1957. xi + 355 pp. Illus. $17.50.

The papers presented at the Electron Microscopy Conference held in Stockholm in September 1956 are divided into 14 sections: "Instrumentation," "Electron Optics," "Electron-Specimen Interaction," "High Resolution Electron Microscopy and Electron Diffraction," "Specimen Preparation Techniques in Biology and Science," "Cell Ultrastructure, General," "Nerve Cells and Receptors," "Muscle and Other Contractile Elements," "Collagen, Cartilage, Bone," "Pathology," "Microbiology," "Botany," "Paper and Textile Research," and

"Metallography and Other Industrial Applications."

The book is well organized, in view of the numerous fields of interest, and the reproduction of the photographs is excellent. The reader will get more out of this book if he has command of German, since about one-third of the articles are in that language.

The papers dealing with reflection and scanning electron microscopes indicate the interest and efforts being expended on development of instruments wherein thin specimens are not necessary. The techniques of sample preparation as described in some of the papers should aid workers who are trying to develop similar techniques for their own work.

The efforts to obtain high resolution have been successful to the point where 10 angstroms has been gained; however, it is apparent that such high resolution is obtained only with ideal samples and with ideal instrument performance; the normal resolution remains in the range of 25 to 50 angstroms.

The number of papers in the interesting and important field of metallurgy is quite small. Two very interesting and important papers on the study of dislocations in thin foils were presented. The techniques presented in such papers should promote greater interest in the study of the dislocation theory by means of the electron microscope.

This publication illustrates the extremely wide scope of electron microscopy. While the book itself cannot be recommended as a reference book, it embraces work from leading scientists in a very large number of fields, both here and abroad.

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**An Encyclopedia of Annual and Biennial Garden Plants.** Charles O. Booth. Faber & Faber, London, 1957 (order from Macmillan, New York). 488 pp. Illus. $12.50.

The zest with which American publishers view erudite British garden books appears to be irrepressible. Obviously expert in treatment, and somewhat overpowering in content, this British import deals, with painstaking care, with hundreds of annuals and biennials that most American gardeners will never see. To give an example—the author treats of 39 annual or biennial species of *Campanula*, and of these only about half a dozen are likely to be in cultivation here.

The book, then, is patently for the experts, and it would be difficult to find a better one. All experiment-station workers in horticulture, writers, and editors will find in it—what is nowhere else so well done—careful, precise definitions of over 1400 species and varieties, facts about their culture and care and about their pests, and even their chromosome numbers.

About two-thirds of the book is in the nature of an encyclopedia; the rest consists of introductory matter and appendixes, such as a glossary of terms, a table of specific equivalents, an index of common names, a table of chromosome numbers, an index of pests, and a list of seedsmen in overseas (non-British) countries. (Many of those mentioned as being seedsmen in the United States are actually nurserymen and sell no seeds, and one of the seedsmen has been out of business for four years.) There is also a list of pest-control-product manufacturers—all British, hence the list is useless here. In spite of these handicaps, this is a highly recommended book, well worth its rather steep price but obviously not for browsing by amateurs.

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**The Chemistry of Organometallic Compounds.** Eugene G. Rochow, Dallas T. Hurd, and Richard N. Lewis. Wiley, New York; Chapman & Hall, London, 1957. vi + 344 pp. $8.50.

Teachers of graduate courses in organometallic chemistry will be indebted to the authors for a book which presents a systematic approach to the subject and should serve admirably as a textbook. The book is obviously not intended to be a comprehensive or detailed treatment of organometallic phenomena, but rather a systematic survey of the field, with generous lists of literature references for the reader whose interest has been stimulated. Those engaged in organometallic research will find the many tables useful, although the descriptive portions are too limited in detail to be of much reference value in any specialized area.

The systematic approach is developed from a general consideration of the carbon-metal bond and the types of bonds which characterize the groupings of organometallic compounds. The authors judiciously have not attempted a rigid classification into types and subtypes, preferring rather to discuss groupings defined by the periodic table of the elements. A separate chapter, which should appeal to students, is devoted to a general survey of preparative methods.

Readers who are expert in specific areas covered by the book may take issue with certain explanations or observations in their field of specialization. This does not detract unduly from the value of the book as a systematic approach to organometallic chemistry.

The authors are to be complimented on a very timely introduction to a subject which has aroused considerable interest in both industrial and academic circles.

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**Radiation Shielding.** B. T. Price, C. C. Horton, and K. T. Spinney. Pergamon Press, London and New York, 1957. ix + 350 pp. Illus. $10.

This book, volume 2 of Division X (*Reactor Design Physics*) of the *International Series of Monographs on Nuclear Energy,* deals with the problems of shielding modern nuclear equipment such as reactors, betatrons, synchrotrons, and linear accelerators. During nearly ten years of reactor construction, shielding was handled primarily on an empirical basis, resulting in unnecessarily heavy and expensive designs. With modern developments, such as mobile reactors operating at sea and commercial exploitation of nuclear power on land, the emphasis in radiation shielding has shifted from the purely empirical phase into the area of theoretical understanding. The book puts the emphasis on the physical principles of shielding after presenting, in the first chapter, an excellent survey of the background cause of all our shielding problems and needs: the biological hazards of nuclear radiations. The discussion is confined to the requirements of the aforementioned equipment, leaving very high-energy accelerating machines for a later study. The individual chapters deal with the attenuation of gamma rays and high-energy electrons, with neutron physics, and with neutron attenuation in thick shields. A special chapter gives often-used mathematical formulae for different source-sizes and shapes.

The last chapter presents applications of the physical principles to practical problems, emphasizing the often complicated task of designing the proper shield for very powerful equipment. A great number of valuable material-constants and figures make this chapter of special value to the engineer and physicist working in this challenging field. At a time when nuclear power, from its role at sea, on land, and in the air, has stepped over the threshold into outer space, this book will be very welcome.

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