mal are disorders of this highest level. Their symptoms develop with complete bilateral symmetry, in both cerebral cortices, showing that hyperactivity in some central subcortical mechanism is responsible for the disorders. The loss of consciousness characteristic of both states is an indication that consciousness is normally focalized subcortically in the centrencephalic system. However (on pp. 481 and 482):

> It is obvious that the higher mental functions which distinguish man from lower animals, such as speech, the capacity for higher mathematics, and other abstract thought processes, are not possible without the cortex. . . . The vast interconnected network of cells and fibers in the cortical matrix must, therefore, constitute an essential part of the machinery of the mind. But without the constant selective activating influences of the reticular network of the higher brain stem, the cortical mantle lies dormant. . . . Highest level functions cannot be strictly localized, but result from a dynamic interaction between centrencephalic mechanisms and those areas of cortex the function of which is momentarily being employed at a given time.

Moving from these discussions of highest level functioning, the authors include chapters on diagnosis and treatment, particularly with drugs, on the technique and interpretation of electroencephalograms and electrocorticograms and on cranial roentgenography. Final chapters deal with the technique of surgical excision of epileptogenic foci and the history of patients after operation.

This is really an extraordinary book, distinguished by its broad sweep of interest and effort, which no reviewer can adequately describe. It will mean much to the growing company of experts in many fields who are seeking better to understand the functioning of the human brain. In its pages, the neurophysiologist, the neurosurgeon, and the neurologist, the psychologist, the psychiatrist, and even the philosopher will find enrichment for thought and practice.

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Advances in Genetics, Vol. V. M. Demerec, Ed. Academic Press, New York, 1953. 331 pp. Illus. $8.50.

This new volume of *Advances in Genetics* will prove a very useful and interesting addition to the geneticist's library, since it contains much important material that previously had been incompletely and insufficiently known. This is particularly true for two articles by H. Kikkawa and by T. Tanaka. These, for the first time, review for the Western reader the large amount of work done in silkworm genetics largely by Japanese authors. It appears clearly from these reviews that the silkworm is one of the best analyzed and most favorable materials from a genetic point of view. The number of mutants known is considerable, and linkage data are available for 15 out of 28 chromosomes. The organism seems to be particularly valuable for the study of biochemical genetics. There exists a wealth of material concerning the development and biochemistry of genetically controlled pigment characters. The genetic control of amylase in the silkworm belongs to the best substantiated cases of gene-enzyme relationships. Furthermore, in *Bombyx* has been described the only case known to the reviewer in which genes affect the selective permeability of cells. The wealth of material contained in these two articles will make them a highly stimulating contribution to the genetic literature.

Two articles deal with microbial genetics. Pontecorvo's paper on the genetics of *Aspergillus nidulans* differs from most of the reviews published in *Advances* in that it contains a large amount of previously unpublished material obtained by the author and his collaborators over a number of years. It presents a complete survey of the life cycle, the methods of study, the formal and biochemical genetics of this first homothallic organism ever investigated genetically. A number of highly important findings, such as the occurrence of at least two series of pseudoalleles and the discovery of the new phenomenon of "relative heterothallism" are described. The author puts particular stress on the comparison of the genic action between organisms carrying the same genes in heterozygous and heterocaryotic conditions. The possibility of artificially inducing diploid nuclei has made possible a thorough analysis of mitotic crossing over and of vegetative segregation. The paper is full of important new information and will make stimulating reading for every geneticist. The monographic treatment chosen by the author to publish these results provides pleasant reading and presents a more coherent picture of the different problems attacked and solved than could be achieved by a series of short communications. It appears that a thorough treatment of a series of interrelated investigations may be preferable to the usual manner in which each single problem is published in an isolated paper.

Hershey presents a review of the genetics of bacteriophage. The review is short, concise, and complete, covering the whole material in the field critically and with admirable clarity. Because it is clear and easy to read, this paper will aid in acquainting workers active in other fields of genetics with the fundamental importance of the facts of bacteriophage genetics.

The two remaining papers deal with different phases of population genetics. E. B. Ford presents a review of Genetics of Polymorphism in the Lepidoptera. The work and the views of the author on balanced and transient polymorphism may be presumed to be well known to all geneticists and have been repeatedly reviewed. In the present article, the author adds more recent results obtained from his own studies and from those of other authors and integrates them with his theory. A review by W. Frank Blair on Population Dynamics of Rodents and Other Small Mammals contains a compilation of data and observations on phenomena such as home range, dispersal, and reproductive behavior of different species of mammals, mostly rodents. The paper does not deal

with genetic data, but it will prove valuable to geneticists who plan to work on population genetics of small mammals.

On the whole, the present volume can be highly recommended to geneticists and to biologists in general. It contains a number of contributions that will prove to be of high importance for the development of the science of genetics. Every geneticist will find in it information that will be valuable for the progress of his own work and in the development of his own ideas.

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Electrochemical Constants. N.B.S. Circular 524. Proceedings of the National Bureau of Standards Semicentennial Symposium on Electrochemical Constants, held September 19–21, 1951. National Bureau of Standards, Washington, D.C., 1953. (Order from: Supt. of Documents, GPO, Washington, D.C.) 310 pp. Illus. $2.

Much more emphasis in today's chemistry centers on the properties of substances than was given in past decades. Scientists are probing to greater depths into the reasons for the behavior of substances and systems and are acquiring fuller understandings of the ordered complexity of forces that interplay to give to the material its peculiar properties. It is necessary that investigators get together at not too infrequent intervals to pool their information.

This volume prepared by Walter J. Hamer contains 30 papers presented by 42 authorities at the Symposium on Electrochemical Constants held by the National Bureau of Standards. The papers discuss the latest developments, both experimental and theoretical, in the field of fundamental electrochemistry from many leading establishments in the United States and abroad. Although many constants, tables, and graphs are contained in this book, it cannot be considered a handbook of complete information.

Each contributor, in general, gives the historical background of his particular subject and then critically reviews the pertinent findings. Experimental details are entirely omitted, and the design of experimental apparatus is illustrated only briefly. More detailed description of apparatus is given where the apparatus is a major contribution to the field of investigation. For details of experimentation, the reader is referred to the original literature in the bibliography following each chapter.

The material presented in the 30 specific titles falls into the following general fields: coulometry and the faraday, conductance, transference, standard cells, thermal phenomena, cell potentials, absolute half-cell potentials, overvoltage, electrode kinetics, electrochemical double layers, proton transfer reactions, potential diagrams and chemical behavior, activity coefficients, and equilibria in electrolytic solutions.

The contributors to this work are to be congratulated for the clarity of their presentations and for suggesting and outlining approaches for further studies. With new tools continually becoming available, there is no reason to doubt that further and deeper probing into these problems will lead to more complete understanding of electrochemical phenomena.

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New Books

Fourth Symposium (International) on Combustion. Held at Massachusetts Institute of Technology, September 1–5, 1952. Published by the Standing Committee on Combustion Symposia, Bernard Lewis, Chairman. Williams & Wilkins, Baltimore, 1953. 926 pp. Illus. $7.00.

Sample Survey Methods and Theory. Vol. I: *Methods and Applications*; Vol. II: *Theory.* Morris H. Hansen, William N. Hurwitz, and William G. Madow. Wiley, New York; Chapman & Hall, London, 1953. Vol. I, 638 pp., $8.00; Vol. II, 332 pp., $7.00.

Annual Review of Nuclear Science, Vol. 3. James G. Beckerley *et al.*, Eds. Annual Reviews, Stanford, Calif., 1953. 412 pp. Illus. $7.00.

Manual of Cane-Growing. Australian agricultural and livestock series. Norman J. King, R. W. Mungomery, and C. G. Hughes. Angus & Roberston, Sydney, 1953. (U.S. distr.: Anglobooks, New York.) 349 pp. Illus. + plates. 63s.

Die Welt der Ungewohnten Dimensionen. Arnold Hildesheimer. A. W. Sijthoff, Leiden, Holland, 1953. 368 pp. Illus. Dutch fl. 17.90.

Refining of Oils and Fats for Edible Purposes. A. J. C. Andersen. Academic Press, New York, 1953. 204 pp. Illus. + plates. $7.00.

The Mars Project. Wernher Von Braun. Univ. Illinois Press, Urbana, Ill., 1953. 91 pp. Illus. $3.95.

Advances in Applied Mechanics, Vol. III. Richard von Mises and Theodore von Kármán, Eds. Academic Press, New York, 1953. 324 pp. Illus. $9.00.

Thermionic Valves: Their Theory and Design. A. H. W. Beck. Cambridge Univ. Press, New York, 1954. 570 pp. Illus. $12.00.

Viruses. Cold Spring Harbor Symposia on Quantitative Biology, Vol. XVII. Biological Laboratory, Cold Spring Harbor, N. Y., 1953. 301 pp. Illus. $8.00.

The Actinide Elements. Glenn T. Seaborg and Joseph J. Katz, Eds. McGraw-Hill, New York, 1954. 870 pp. Illus. $11.75.

Cell Chemistry. A collection of papers dedicated to Otto Warburg on the occasion of his 70th birthday. Dean Burk, Ed. Elsevier, Houston–Amsterdam, 1953. 362 pp. Illus. $7.50.

Organic Syntheses, Vol. 33. Charles C. Price, Ed. Wiley, New York, Chapman & Hall, London, 1953. 115 pp. $3.50.

Physiological Acoustics. Ernest Glen Wever and Merle Lawrence. Princeton Univ. Press, Princeton, N. J., 1954. 454 pp. Illus. + plates. $10.00.

From Fish to Philosopher. Homer W. Smith. Little, Brown, Boston, 1953. 264 pp. Illus. $4.00.

The Challenge of Our Times. Contemporary trends in science and human affairs as seen by twenty professors at the University of Wisconsin. Farrington Daniels and Thomas M. Smith, Eds. Burgess, Minneapolis, Minn., 1953. 364 pp. Illus. $3.50.

Causality in Natural Science. Victor F. Lenzen. Thomas, Springfield, Ill., 1954. 121 pp. $3.00.