Conway and Dobry-Duclaux. Subsequent chapters are equally interesting. Very many of the almost endless complications that can be built into the relaxation of flowing systems by awkward arrangements of the interconnecting bonds are illustrated in these pages. While all flow relaxations must obey statistical mechanics as expressed in absolute reaction rate theory, the complications in applying the theory include the usual extreme complexity of reaction kinetics. Whether one wants help in practical problems or background for his theoretical research one will find much of interest in these pages. This is a very useful book in a difficult field and deserves to be widely read.

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Available Energy and the Second Law Analysis. By EDWARD A. BRUGES, B.Sc., Ph.D., A.M.I. Mech. E., Senior Lecturer in Mechanical Engineering, University of Glasgow. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1959. viii + 124 pp. 14 × 22 cm. Price, $5.50.

By virtue of the second law of thermodynamics, the energy of a thermodynamic system can never be completely converted into useful work performed on the surroundings. If the system is at the same temperature and pressure as the surroundings, the maximum useful work available is equal to the change in the Gibbs free energy: $\Delta G = \Delta E - T\Delta S + P\Delta V$. In the more general case when the system (at T and P) is contained in an indefinitely large reservoir whose temperature and pressure are T_0 and P_0, the maximum work obtainable from the interaction of system and surroundings is the "available energy," $\Delta E - T_0\Delta S + P_0\Delta V$.

This concept, first outlined by Gibbs and developed by a number of writers since, is manifestly of great importance to mechanical engineers, of lesser importance to chemical engineers, and of still less importance to research chemists. In this small monograph, the author devotes the first two chapters to a brief and fairly clear review of the first and second laws of thermodynamics (but the concept of heat is never adequately defined, and a careless error has crept into the development of the thermodynamic temperature at the bottom of page 19). Chapters III and IV develop the ideas of available energy and irreversibility. Eight chapters of applications follow, the last two dealing briefly with chemical changes. Engineers may find in this book a useful summary of problems of thermodynamic design, but little insight into chemical thermodynamics is offered. (In fairness to the author, it must be said that the book is written for mechanical engineers, and no service to chemistry is claimed.)

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Fast Neutron Physics. Part I: Techniques. Edited by J. B. MARION, Department of Physics, University of Maryland, College Park, Maryland, and J. L. FOWLER, Physics Division, Oak Ridge National Laboratory, Oak Ridge, Tenn. Interscience Publishers, Inc., 250 Fifth Avenue, New York, N. Y. xiv + 983 pp. 16 × 23.5 cm. Price, $29.00.

"Fast Neutron Physics" consists of five sections. The first four sections are included in Part I and section V will compose Part II which will be published in the future. This volume is devoted to experimental techniques used in neutron studies covering the range from 1 kev. to several hundred Mev. The bulk of the material, however, pertains to energies below 40 Mev. The emphasis of the volume is on monoenergetic neutrons and their interactions with nuclei; however, polyenergetic sources also are discussed.

"Fast Neutron Physics" is meant to be a reference book. It is written so that each chapter is more or less complete in itself. This makes a certain amount of duplication necessary; however, the editors have done an excellent job in minimizing unnecessary repetition of material. There are numerous cross references to other chapters as well as to the original literature. Sixty-two authors, which represents a considerable amount of competence in fast neutron physics, have contributed to this work. The list of chapters and their authors is as follows: Radioactive Neutron Sources (A. O. Hanson); Kinematics of Neutron-Producing Reactions (J. Monahan); Monoenergetic Neutron Sources: Reactions with Light Nuclei (J. E. Brolley, Jr., and J. L. Fowler); Monoenergetic Neutron Sources: Reactions with Medium-Weight Nuclei (Jerry B. Marion); The $Li^7(p,n)Be^7$ Reaction (J. H. Gibbons and Henry W. Newson); Gas Recoil Counters (A. T. G. Ferguson); Recoil Detection in Scintillators (C. D. Swartz and George E. Owen); Recoil Telescope Detectors (C. H. Johnson); Photographic Plate Detection (R. Stephen White); Cloud Chamber Detection (William E. Stephens and H. Staub); Flat Response Counters (W. D. Allen); Neutron Detection by Reactions Induced in Scintillators (C. O. Muehlhause); Helium-3 Neutron Spectrometers (R. Batchelor and G. C. Morrison); Gaseous Scintillation Detectors (Charles M. Huddleston); Fission Detectors (R. W. Lamphere); Time-of-Flight Techniques (J. H. Neiler and W. M. Good); Neutron Flux Measurements (Joseph E. Perry, Jr.); Radioactivation Methods of Determining Neutron Flux (Paul R. Byerly, Jr.); Targets for the Production of Neutrons (J. H. Coon); Neutron Collimation and Shielding for Experimental Purposes (Alexander Langsdorf, Jr.); Laboratory Shielding (C. F. Cook and T. R. Strayhorn); Fast Neutron Dosimetry (G. S. Hurst); Fast Neutron Radiation Hazards (William T. Ham, Jr.); Computer Techniques (Harvey J. Amster, Edward J. Leshan and Martin Walt).

This book in the main is well written, clear, concise and very readable. It has also been well edited. This reviewer would have preferred to see the references as footnotes on each page rather than have them at the end of each chapter; however, this is a minor inconvenience to which readers are becoming accustomed.

"Fast Neutron Physics" will be a welcome addition to the libraries of all scientists interested in fast neutron technology.

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Nomenclature of Chemical Compounds. Edited by Coordination Committee of Documentation and Library Services, Committee on Nomenclature, and Editorial Board of the Journal of Japanese Chemistry. KENZO HIRAYAMA, DOROTHY U. MIZOGUCHI, and YUICHI YAMAMOTO, Editors-in-Charge. Nankodo, 23-3, Haruki-cho, Bunkyo-ku, Tokyo, Japan. March, 1960. xii + 394 pp. 18 × 25.5 cm. Price, yen 750.

Japanese chemists commonly use the English alphabet and spellings in the reproduction of the names of chemical compounds. Many take an active interest in the careful use of good nomenclature. To this end the Japanese Standing Committee on Nomenclature several years ago sought permission to translate into Japanese the various chemical nomenclature reports and pamphlets distributed by the Committee on Nomenclature, Spelling and Pronunciation of the American Chemical Society and to publish them in translated form. With a green light from America and with the coöperation of the Japanese Ministry of Education and the UNESCO Office in Tokyo these steps were taken, except that the names themselves were not changed. The Japanese version of these various pamphlets appeared in 1954 in the form of a 250-page paper-bound book. In 1957, a 368-page book was published which contained additional material, such as the 1951 rules of the Commissions of the International Union of Pure and Applied Chemistry (the IUPAC rules), and signed discussions, as in sections on High Polymers and Labeled Compounds (*cf.* review, THIS JOURNAL, **79**, 5328 (1957)).

In the book now being reviewed, the 1957 IUPAC rules are included. The 1951 IUPAC rules are repeated, except for those parts which have been changed and included by the IUPAC in its 1957 rules. Included in the 1957 rules are reports on hydrocarbons, fundamental heterocyclic systems, inorganic compounds and steroids. The 1955 and 1957 IUPAC recommendations on vitamins are included.

A Trilingual List of Names for Inorganic Compounds, etc. (occupying 21 pages), is included. The compounds are arranged according to the numbers of the IUPAC rules which are applicable, and are listed by formulas, followed

by names in English, French and German. In the List of Elements, the symbols recommended in the 1957 IUPAC rules are used. These are written in Roman type and arranged alphabetically. Each symbol is followed by its atomic number and its name in Japanese, English, German, French and Russian.

Non-adopted rules, recommendations and reports which appeared in the 1957 edition are included in this book.

In the appendix, the following material is again included: (1) Miscellaneous Chemical Prefixes; (2) Symbols, Signs and Abbreviations; (3) Pronunciation of Chemical Words; and (4) How to Use *Chemical Abstracts*.

The table of contents and the index are given in Japanese and in English.

CHEMICAL ABSTRACTS SERVICE
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Microbial Genetics. Tenth Symposium of the Society for General Microbiology held at the Royal Institution, London, April 1960. Edited by W. HAYES and R. C. CLOWES, Medical Research Council, Microbial Genetics Research Unit, Hammersmith Hospital, London, W. 12, England. Cambridge University Press, 32 East 57th Street, New York 22, N. Y. 1960. x + 300 pp. 16× 25 cm. Price, $7.50.

Every year the Society of General Microbiology in England sponsors an international symposium on a theme or problem of current interest and importance to microbial investigators. The volumes that have emanated from these symposia have proved their usefulness in many ways, some having become important reference works (*e.g.*, Adaptation in Microörganisms, Bacterial Anatomy, Virus Growth and Variation), and they have set high standards for international conferences of this kind. The present volume, the tenth in the series, is an excellent contribution to the field of Microbial Genetics, despite the fact that in recent years considerable attention has been paid by symposium organizers to this rapidly developing and extremely important field of research.

Several notable qualities raise this volume in distinction and value in comparison to other works covering the same field. The first of these qualities is its sensible organization; one gains the impression that as much care was given by the editors to the selection and arrangement of topics and areas for discussion as to the choice of eminent investigators as authors. The symposium is treated as the unfolding of the present state of our knowledge of the hereditary determinants, or genes, of microörganisms. At first, these genes are described as they occur as a group or assembly, namely, as part of a chromosome. Then their individual behavior is analyzed in terms of their fine structure, their recombinational interactions, and their activity in the metabolic economy of the cell. Further study then is made of their structure and function at the molecular level. Finally, some consideration is given to how they coöperate in the running of the complex society of which they are a part, the cell as a whole.

Another valuable quality of this volume is the number of papers that are sufficiently comprehensive and broad in scope to assure the adequacy of the review of the field and to provide some foundation for the other papers which deal with more specific aspects or problems. Especially commendable in this regard are the excellent reviews by Hayes on the bacterial chromosome, by Pritchard on the genetic fine structure of microörganisms as revealed by recombination analysis (a paper in which the author laudably attempts to bring together the divergent information that has been obtained from cytomorphological, cytochemical and genetic investigations, and in the higher forms of life as well), by Catcheside on the relation of gene structure to enzyme specificity, and by Brown on the role of the nucleic acids in the synthesis of specific proteins.

The remaining papers are uniformly of great interest. Kellenberger addresses himself to the structure of the bacterial chromosome as revealed by electron microscopy, and tries to correlate this information with other chemical information about its mode of replication. Jacob, Schaeffer and Wollman introduce a new concept, that of episomes, which are hereditary determinants that may be added to the genetic constitution of the cell (rather than replace some determinants already present in the cell) and exist in either an autonomously replicating condition or in an integrated state. The notion of episomes not only unifies our understanding of lysogeny, colicinogeny and the sex factor of bacteria, but stimulates interesting hypotheses concerning the regulation and differentiation of cells of higher plants and animals as well. Clowes reviews what has been learned of the fine structure of bacterial genes through use of the mode of genetic transfer known as transduction. Esther Lederberg emphasizes in particular the bacterial genes governing galactose metabolism. Harriett Ephrussi-Taylor raises some critical questions regarding the heterocatalytic activity and replication of infectious deoxyribonucleic acid during the process of genetic transformation. Garen furnishes a lucid account of an elegant procedure for understanding the control of the gene over the functional specificity of an enzyme through the particular case of alkaline phosphatase. Gierer brings us up to date on the structure and function of ribonucleic acid in the group of small viruses, which includes the tobacco mosaic and the poliomyelitis viruses. Maaløe deals with the integration of the genome, the protein-synthesizing particles in the cytoplasm, the enzymes and their substrates and end products in the regulation of growth. Danielli summarizes the results of recent experiments by himself and co-workers on the hereditary effects of nuclear exchanges between amebae of different species.

For the initiate Stocker provides a necessarily brief and condensed introduction to the concepts and terminology of genetics. Nevertheless, those unfamiliar with microbial genetics are not recommended to launch upon this volume without first assimilating some more elementary essays or reviews on the subject. Biochemists, however, will find extremely useful those papers dealing with the molecular aspects of gene structure and function, whatever difficulty they may experience with the purely formal aspects of genetic organization.

For biologists in general, and for geneticists in particular, this book should prove its worth, not only now but for some time to come.

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Organosilicon Compounds. By C. EABORN, Ph. D., D. Sc., Reader in Physical-Organic Chemistry, University of Leicester. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1960. x + 530 pp. 15 × 22.5 cm. Price, $15.00.

This handsome new book is the largest and most ambitious work on organosilicon chemistry to appear in the English language. Dr. Eaborn, reader in physical-organic chemistry at the University of Leicester, has concentrated within it everything that has come to light during his intensive study of the kinetics of the reactions of silicon compounds, and has used his ideas on the mechanisms of such reactions to correlate a vast amount of previously published material.

The plan of the book embraces 17 logical divisions, starting with preparative methods and general bond characteristics, then proceeding through reactions of all the major types of compound, and ending with a discussion of physical properties and analysis. An indication of the book's thoroughness is the inclusion of 10 pages and 6 extensive tables on the molecular spectra, interatomic distances and dipole moments of organosilicon compounds. Each chapter contains an exhaustive bibliography, and the reader is further helped by an unusually detailed table of contents and by a 23-page index of compounds and subjects. It is practically impossible to get lost in the book.

In his preface, Dr. Eaborn writes: "While I have drawn frequent parallels with carbon chemistry, I have, against my inclinations, not related the organic chemistry of silicon to that of other metalloids or metals." Just why he should go against his inclinations in this way is not clear to the reviewer (in whose experience the chemistry of silicon is closer to that of boron, germanium and tin than to that of carbon), unless it be out of loyalty to his university title or his past training.

Dr. Eaborn also explains in his preface that he has placed considerable emphasis on reaction mechanisms as a means of "introducing order into accounts of fragmentary and unrelated researches." In this he succeeds very well. The