the interpersonal situation and the self-image. Thus rigidity of behavior becomes a technique for warding off anxiety. Inappropriate behavior often brings punitive response. If this response is consistent with the subject's self-image, it will reinforce his behaving in that way. In consequence, behavior disorders of the hostile-submissive variety are often considered chronic, difficult to cure. From Carson's analysis, however, it is apparent that a change in reinforcement contingencies could break the pattern.

The beginning of maladaptive responses is sometimes traced to childhood in a disturbed family, where the subject was exposed to reinforcement contingencies which differ from those of the culture at large. More generally some personality disorders may result from adaptation to a social system which deviates from society. Prisons and some mental hospitals may constitute such systems. If so, they will tend to increase the inability of the inmate or patient to interact effectively outside, a cruel paradox for supposedly rehabilitating institutions. In contrast, psychotherapy, discussed in the last chapter of the book, is seen as an interpersonal relationship designed to induce adjustive changes in the patient's interpersonal behavior.

Far from being parochial, this book brings together notions and findings from a variety of approaches in social and clinical psychology, sociology, and psychiatry. The attempt to integrate them in a consistent framework is brilliant, original, and attractive. The style is clear and plain, remarkably free from the professional jargon which often only masks our ignorance. The abundance of examples, some amusing, some tragic, and the liberal use of titles and subtitles enable the reader to proceed at a brisk pace.

The plan of the book is straightforward, yet it would have been helpful to provide a more detailed overview of it in the introduction. Likewise this reviewer would have appreciated a summary at the end of every chapter and a final chapter of conclusions. The second chapter, on Sullivan's theory, although quite good in itself, could have been integrated into the treatment of pathology in the latter part of the book, if not omitted altogether. The discussion of social learning, in the third chapter, is too general and sounds shallow; since the payoff matrix does lend itself to interpretation as a learning phenomenon, it would have been profitable to deal with social learning in the specific interactional framework developed in subsequent chapters. The matrix presentation of interpersonal patterns becomes rarer and then ceases altogether as the discussion becomes more concerned with deviant behavior. Stricter faithfulness to formal theory in dealing with pathology would have enhanced the scientific significance of this volume, which is nevertheless quite remarkable even in its present form.

In an era plagued by fragmentation and specialization in the behavioral sciences this book aiming at integration should be warmly welcomed.

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Membrane Transport in Plants

Transport and Distributon of Matter in Cells of Higher Plants. An international symposium, Schloss Reinhardsbrunn, G.D.R., Oct. 1968. KURT MOTHES, EBERHARD MÜLLER, AXEL NELLES, and DIETER NEUMANN, Eds. Akademie-Verlag, Berlin, 1968. vi + 218 pp., illus. Paper, 24 M. Abhandlungen der Deutschen Akademie der Wissenschaften zu Berlin, Klasse für Medizin, 1968, No. 4a.

The conference of which this book is the proceedings was somewhat unusual in that it was devoted largely to membrane transport problems in plant cells and tissues; the organizers of the frequent conferences on the problems of membrane transport barely recognize the existence of plants. Perhaps this neglect is justified in some respects, for perusal of the proceedings of this symposium demonstrates that in general plant physiologists lag far behind animal physiologists in this field. In the so-called developed countries the biological talent, manpower, and money go into the medical and animal sciences; we are all afraid of illness and death, not of malnutrition and starvation. And since plant cells are manifestly more complex, the relatively primitive nature of this field of plant physiology is not surprising.

The 22 contributions in this volume, all but one of which are in English, give a fairly accurate picture of the state of the subject today. In the light of what I said in the first paragraph, some of the papers are excellent; for instance Anderson on water permeabilities of cells of corn roots, Schnepf on transport by vesicles, Müller on regulation of transport, Lüttge and Cram on compartmentation analysis, Jeschke on the connection between electron transport and ion transport, Raven and MacRobbie on giant algal cells, Higinbotham on electropotentials and ion transport in higher plant cells. All these papers show how difficult it is to work with plants; the cells have thick layers of concentrated weak-acid ion exchangers—cell walls—around them and have only thin layers of cytoplasm packed with organelles; they are not well organized into tissues, and long-distance transport to and from tissues is not well understood.

Some of the papers are not very good and illustrate the backwardness of this area of plant physiology rather than the difficulties of the problems themselves. They seem to me to demonstrate, among other things, the self-isolation of many botanists, their poor training in the physical sciences, and their complete lack of knowledge of the work done by animal physiologists in membrane transport.

The volume, I'm afraid, is not well edited. The papers must have been printed as they were received, and in some the English is very poor indeed. I found the volume of value, however, partly because it is an accurate statement of the subject as it is—in its best and worst aspects—and partly because it gave me many ideas as to where progress can and should be made.

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Comparative Pharmacology

Use of Nonhuman Primates in Drug Evaluation. A symposium, San Antonio, Texas, May 1967. HAROLD VAGTBORG, Ed. Published for the Southwest Foundation for Research and Education by the University of Texas Press, Austin, 1969. xii + 644 pp., illus. $15.

Collections of symposium papers are all too often verbose "overviews" of the subject; this volume is a distinct departure from the generalized, dataless, philosophical analysis. Vagtborg has compiled—evidently from tapes as well as written submissions—a record of a conference the success of which rests

on the fact that each of the contributors is an active worker in the field and presents his data.

There are few papers in this volume which show the primate used instead of another animal that would have given equally valid and predictable results; in the majority of papers, the comparative aspects are emphasized, whether the comparison is of one primate with another or of a primate with a nonprimate and whether drug metabolism or psychopharmacology is being discussed. This is a recurrent theme in the otherwise diverse papers.

Probably the characteristic of primates that is most attractive to those of us whose ultimate aim is the extrapolation of findings to our own species is their varied and extensive behavioral repertoire. For this reason the largest section of the book (184 pp.) is concerned with neurophysiological and behavioral studies. The behavioral aspect has not been neglected in other sections, however, for biochemical derangements can be correlated with behavior as they are manifested in human disease conditions. Similarly, where behavior is the disturbance of primary interest, as in drug abuse, biochemical events are sought to mirror these changes. The animal-drug interaction occurs at many levels, and it is nice to see that most of these contributors recognize the integration of one physiological system with another.

As is common with books of this sort, each presenter provides his tables and graphs in his own form, and as usual some are less well constructed than others. The only other comment to be made is that some of the questions asked from the audience could have been edited out as superficial and noncontributory. By the same token, however, the record is certainly complete.

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Molecular Data on Enzymes

Enzyme Handbook. THOMAS E. BARMAN. Springer-Verlag, New York, 1969. 2 vols. xvi + 928 pp. $19.50.

The *Enzyme Handbook* is a two-volume collection of data on 1300 enzymes organized in numerical sequence according to the classification of the International Commission on Enzymes. With varying degrees of completeness it provides information on the equilibrium constant, molecular weight, specific activity, specificity, Michaelis constants, inhibitors, and light absorption and references for enzymes cited in the literature up to early 1968. It probably is the most exhaustive listing of known enzymes. As is pointed out in the foreword, "It would be foolish to hope that a handbook of this kind will provide all the information about enzymes which different specialists would wish to find." The futility of this hope is proven adequately. At best the handbook is a good though somewhat dated source for review articles and special information on particular enzymes. There are 14 pages of superfluous introduction, which could have been replaced easily by a single-page description of the format. The only physicochemical property listed is molecular weight. This is available for less than half of the enzymes, and for many of these the method and conditions of determination are either totally or partially omitted. The rest of the enormous quantity of data is kinetic information. The information is very heterogeneous, ranging from a simple statement on specificity for a number of enzymes to a single Michaelis constant (conditions not given) to a selective list of 19 (out of at least 100 known) substrates for chymotrypsin A complete with k_0's and K_m's to a list of 30 substrates for D-amino acid acetyltransferase with relative velocities. The light-absorption data refer only to the substrates, not the enzymes. No assay methods or isolation procedures are listed, and in many instances essential cofactors or coenzymes have not been mentioned.

Perhaps the most important consideration regarding a compilation of this sort is whether or not the data that have been selected are reliable and representative. This reviewer noted several errors of omission and commission concerning certain enzymes with which he is most familiar. No attempt was made to ascertain the extent of such shortcomings, and they might be fortuitous. Nevertheless, they indicate that one must view the data with certain reservations.

The handbook can be helpful to a sizable number of readers. For beginners it would certainly be a convenient starting point for collecting references, and for veteran enzymologists it is the best listing of enzymes available. Since it is already out of date with regard to many of the citations and may be under revision for a second edition, it might be worthwhile considering a loose-leaf version in the style of the Worthington or Boehringer manuals, which are more informative though obviously limited in scope.

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Resonances in Nuclei

Shell-Model Approach to Nuclear Reactions. CLAUDE MAHAUX and HANS A. WEIDENMÜLLER. North-Holland, Amsterdam; Interscience (Wiley), New York, 1969. xii + 348 pp., illus. $16.

In the past five years the shell-model approach to reaction theory has revived interest in this area of both atomic and nuclear physics. Wedding the shell model for bound states and the distorted-wave Born approximation for reaction amplitudes, this approach provides a new insight into the origin of resonances in both atoms and nuclei. Resonances are attributed to the decay of discrete states of an independent-particle Hamiltonian. These states are formed by exciting two or more particles to bound orbitals whose total excitation energy exceeds the binding energy of a particle in the ground state. The residual two-particle interaction enables these states to decay by particle emission, but their transient existence is reflected in resonances in elastic and inelastic processes.

A large number of papers have developed these ideas, clarified various new concepts associated with this approach, such as "doorways," developed techniques for handling difficulties introduced by narrow single-particle resonances, and presented the results of calculations. In this monograph the authors undertake to review this work and to give some assessment of it. Almost every significant paper on the subject has been referenced and their bibliography lists every citation of each paper. Nevertheless the bulk of the material in the monograph is taken directly from the authors' own papers. The reader is therefore well advised to remember that this is a book in which the judgments and conclusions are closely related to the authors' own research.

Topics include various formulations of the shell-model approach, approximation schemes for solving the equa-