Medicinal Chemistry

Psychopharmacological Agents. vol. 1. Maxwell Gordon, Ed. Academic Press, New York, 1964. xvi + 678 pp. Illus. $23.50.

The organization of this book is, in general, based on the review, in separate chapters, of the major classes of psychopharmacological agents. To the extent allowed by the diverse nature of the subject matter, each chapter covers the history, synthesis, pharmacological activity, in vivo distribution and metabolic fate, and, briefly, the clinical uses of each class of psychopharmacological agents, as well as the relevant analytical methods. The editor believes that by having the discoverers or developers of each class of compounds write the chapter on that particular compound, he has achieved a more authoritative treatment of this complex subject. This approach, however, leads to bias in some chapters. In general, the papers provide a successful balance with respect to the scientific disciplines involved, but the major emphasis is on the chemical rather than the biological approach.

A review of phenothiazines was considered for this volume, but the chapter proved to be a monograph in itself and will be published as a separate volume. Volume 1 covers the literature up to 1963, and supplementary material will be made available in the appendix of volume 2.

The editor does not mention butyrophenone types of antipsychotic compounds. This is unfortunate because in Europe haloperidol and its congeners represent one of the largest groups of antipsychotic componds in present-day clinical use.

Usually the number of pages devoted to each type of compound is in accord with the clinical usefulness of that compound. A possible exception is the treatment of the monamine oxidase inhibitors, but in this case the many types, and the numerous clinical disappointments because of toxic side-actions, merit the more complete discussion. A second exception may be the 13 pages allotted to benactyzine, which seems large in view of the fact that all of the rauwolfia alkaloids are covered in 21 pages.

The chapters on the chlordiazepoxides and imipramine types are perhaps the most interesting from the standpoint of medicinal chemistry and structure-activity relationships. The final chapter, on psychotomimetic drugs, is exceptionally well written and comprehensive.

The book is written by and for medicinal chemists and pharmacologists who are interested in the present state of the development of psychopharmacological agents. The drug-oriented clinician who is interested in psychopharmacology can find here the pharmacological basis for the clinical trial of agents in man and some indication of their scope of application. He will not find any details on the types of clinical syndromes that have responded to the psychopharmacological agents.

CARL C. PFEIFFER
New Jersey Neuropsychiatric Institute, Princeton

Statistics

Introduction to Experimental Statistics. C. C. Li. McGraw-Hill, New York, 1964. xii + 460 pp. Illus. $11.50.

This book, in the author's own words, is intended to be ". . . useful to the practising experimental worker as well as to the student." Whether or not it will satisfy the practising experimental worker, only time will tell, but I am sure that it will prove useful to the serious student. However, there is a third person who should certainly be thankful that Li has written this particular type of book. I refer, of course, to the teacher of statistics, for *Introduction to Experimental Statistics* contains many "explanations" (algebraic, geometric, and verbal) that should prove invaluable to those of us who are continually seeking better ways to explain the concepts and techniques of statistical analysis.

This book is divided into three parts: Basic Mechanics and Theory (14 chapters), Experimental Designs (15 chapters), and Some Related Topics (4 chapters). The first 14 chapters, which are essentially the same as the author's earlier book, *Numbers From Experiments: A Basic Analysis of Variation*, contain not only the algebraic and geometric concepts that are encountered in many statistical techniques but also an introduction to regression and analysis of variance. Part 2 is devoted to the more common experimental designs (completely randomized, randomized complete block, Latin square, and the like) and includes discussions of such related topics as factorials, concomitant data, and missing observations. Part 3 contains chapters on multiple measurements, multiple comparisons, unequal group variances, and change of scale. Tables are not included, but owing to the availability of many fine sets of tables, this is not a serious omission.

As enjoyable and informative as I found the book to be, I nevertheless did not appreciate the experience of contending with yet another notation for sums of squares. An even more disturbing experience, however, was the encountering, on page 59, of the following statement regarding the use of Model I or II in the analysis of variance: "In the great majority of cases, however, the investigator may argue either way, depending on his mood and his handling of the subject matter. In other words, it is more a matter of assumption than a matter of reality." With such a philosophy, I cannot agree.

In spite of the critical comments made in the preceding paragraph, it is my belief that Li has written a most useful book. In particular, it should prove especially helpful to serious students and to dedicated teachers.

BERNARD OSTLE
Statistical Test Design, ROCKETDYNE, North American Aviation, Inc.

Modern Mathematics

Lectures on Modern Mathematics. vol. 2. T. L. Saaty, Ed. Wiley, New York, 1964. x + 183 pp. Illus. $5.75.

This volume, the second in a three-volume series, contains six expository lectures given at George Washington University and sponsored by the Office of Naval Research. The purpose of each lecture is to describe a substantial research area of mathematics, broadly and comprehensively, for an audience of mathematicians not specialists in that area.

The first article "Partial differential equations with applications in geometry," by L. Nirenberg, is in two parts. The first covers equations with constant and with variable coefficients, boundary value problems, and singular in-

tegral operators. The second part includes existence and deformation of complex structure on manifolds and index of elliptic operators.

In "Generators and relations in groups—The Burnside problem," Marshall Hall, Jr., discusses, among other topics, the "word problem," the unsolvable problems, free groups, and the Burnside problem. He states a dozen or so intriguing problems. (It is unfortunate that the references are incomplete, ending with number 34, although the text list references with numbers as high as 70.)

"Some aspects of the topology of 3-manifolds related to the Poincaré conjecture," by R. H. Bing, is a thorough account, with the necessary definitions and examples that a nonspecialist might need, and with excellent illustrations. The topics include fake cubes, curves encircled by tori, and nice shrinking. The final section is an answer to the question "Why are mathematicians interested in finding a solution to the Poincaré conjecture?"

There are two lectures by Lars Gårding: the first is "Some problems in the theory of partial differential equations," and the second is "Uniformization in Cauchy's problem." The first includes Sobolev spaces and boundary problems, hyperbolic equations, and Frobenius's theorem. The second lecture has sections in uniformization and the geometry of uniformization.

A sentence in the introductory section of "Quasiconformal mappings and their applications," by Lars V. Ahlfors, reads as follows: "An excellent way to acquaint the mathematical public with the trends in my special field is to relate some of the experiences of this author and fellow specialists in dealing with the heritage of Teichmüller." The article includes quasiconformal and conformal mappings, extremal problems, and the generalized Riemann mapping problem. At one point, the author remarks, "Quasiconformal mappings have found their place in the toolkit of the well-equipped analyst, and that is that." (It is not helpful to the not-so-well-equipped analyst to find that there is no list of references.)

The final lecture in volume 2 is "Differential topology," by J. Milnor. Here the reader is introduced to such topics as the diffeomorphism problem and the cobordism problem. (The nonspecialist who may be alarmed at the new words may be more at ease when he learns that a diffeomorphism is a smooth homeomorphism with a smooth inverse and that "smooth" means "differentiable of class C^∞.") The author discusses characterizations of the n-sphere, some exotic spheres, and how to recognize an honest sphere. The illustrations are excellent.

As I remarked in my review of the first volume [*Science* **142**, 1049 (1963)], it is difficult to judge the success of the actual lectures. However, it should be reported that, if I were that graduate student mentioned in the preface, embarking on a research career (heaven forbid!), I would be dismayed rather than encouraged by the two articles on partial differential equations. On the other hand, the remaining four articles are of such a nature that I would be interested enough to want to know more.

R. D. JAMES
Department of Mathematics, University of British Columbia

Popular Astronomy

Astronomy Highlights. *Apollo and the Moon* by Franklyn M. Branley; *Birth and Death of the Stars* by Kenneth L. Franklin; *Captives of the Sun: The Story of the Planets* by James S. Pickering; *Design of the Universe* by S. I. Gale; *Man in Space* by Fred C. Hess; *Space Age Astronomy* by Kenneth L. Franklin; *The Sun in Action* by Thomas D. Nicholson; and *Time and the Stars* by Joseph M. Chamberlain. Published for the American Museum-Hayden Planetarium by Natural History Press, Garden City, N.Y., 1964. 32 pp. each; paper, 50¢ each.

Riddles of Astronomy. Otto O. Binder. Basic Books, New York, 1964. xiv + 210 pp. Illus. $4.95

The present interest in the space age has resulted in the publication of many books that attempt to explain the new ideas of astronomy and space exploration for the layman. At best these books show how astronomers and other scientists work, how they gather observational data and draw conclusions, and the current status of our knowledge. The poorer books go off into wild flights of imagination in which all hypotheses are accepted and no attempt is made to distinguish between commonly accepted data of observation and figments of the imagination. The two works under review illustrate these two approaches.

The series, Astronomy Highlights, from the American Museum-Hayden Planetarium presents an excellent introduction to some of the fields of modern astronomical research. Each booklet takes one subject and covers this subject with a good review written in layman's language. The writing is factual, with good emphasis on the current status of our knowledge of the field and of some of the problems not yet solved. The booklets contain a great deal of information presented on a level that can easily be understood by the high school, and the intelligent junior high school, student. Each booklet serves to lay the foundation of the subject and to provide a good starting place for further study in the references contained at the end. They are highly recommended as good examples of popularizations for high school and junior high school students.

Riddles of Astronomy presents an array of real and imagined problems in astronomy. The philosophy of the book is best illustrated by the author's statement that "perhaps the sinking of Atlantis was the ruthless act of cosmic conquistadors"; he then goes on to say that such an idea is " . . . sheer speculation perhaps. Fanciful, fiction-like, wildly imaginative, improbable. But not impossible." The book presents a collection of other "not impossible" ideas such as artificial Cepheid variables programmed by an advanced civilization to send code signals; silicon men on Mercury with glassy fluids in their veins; the artificial nature of the two moons of Mars; and the suggestion that the Siberian meteor of 1908 was a visiting space ship from an antimatter universe. The following statement is made in the foreword: " . . . the host of significant questions asked ensures the merit of this book." But I find little merit in such questions as the following: "Are other Star-Sun people Monsters? Does the phantom satellite of Venus exist? Can Hypotheticus, if it turns up, really be good instead of bad luck?" And many others of similar nature. The book as a whole is a distortion of the scientific thinking of astronomers today.

HENRY ALBERS
Vassar College Observatory, Poughkeepsie, New York