functions than are afforded by the self-consistent field method. The familiar "two kinds of improvement" to give needed electron correlation—namely, by configuration mixing and by explicit use of the interelectronic distance as a variable—are considered; after this there is a small section on polarization.

Appendix 3, added in October 1956, comprises notes and references to bring the earlier material up to date. Although the book itself deals with self-consistent field methods and not with results, Appendix 1 gives access, through a reference list, to all self-consistent field results published up to late 1956.

Douglas Hartree's small book will be a valuable reference source for those wishing to make self-consistent field calculations and will also be useful in its up-to-date references to self-consistent field theory and results and to related matters.

ROBERT S. MULLIKEN
University of Chicago

Mammals of the Great Lakes Region. W. H. Burt. University of Michigan Press, Ann Arbor, 1957. 248 pp. Illus. $4.75.

Mammals of the Great Lakes Region is a revision of the author's *Mammals of Michigan*. It includes the natural area of the Great Lakes drainage. Since plants and animals are no respecters of political boundaries, W. H. Burt has wisely chosen a natural area that takes in the watershed of these five lakes. Parts of eight states and Ontario are included. Wild mammals are difficult to study. For the most part, the smaller species are secretive and nocturnal; the larger forms, too, are difficult to observe. The author has introduced the known facts in a succinct manner, including not only his own great knowledge of mammals but that of others in the field.

Presenting some principles of adaptations, home range, populations, and so forth, Burt treats the 78 species and three recently extinct forms in admirable style. A short description, habits, and the known geographic range are documented for each species. Stylized sketches by the author help to identify the genus.

For each species there is a distribution map, which gives the present known range of the species within the area discussed. Unlike the ornithologist, the student of mammals must trap continuously to secure data on distribution and life-history of the smaller mammals. Too often it is a frustrating chore.

A summarized table includes data on the tooth formula, measurements and weights, gestation, number of young and litters, longevity, and home range. Selected references, both general and specific, provide a source for the reader who may wish to pursue the subject further. The book will serve the amateur and professional naturalist alike.

W. J. HAMILTON, JR.
Cornell University

Notions de Cytologie et Histologie. M. Chèvremont. Desoer, Liége, 1956. iv + 994 pp. Illus. + plates.

This impressive volume differs from other textbooks of histology mainly in its first section, on the cell, which, together with an introduction on history, methods, and techniques, covers 286 of the 994 pages. In this section the structure, cytochemistry, and biological significance of the cell and its constituents are unusually well and thoroughly presented. Concentrating on the cells in higher vertebrates, Chèvremont nevertheless succeeded in unfolding the entire aspect of present-day cytology, thereby producing not only an excellent introduction for students but also a highly informative and stimulating treatise for the workers in the field. To give a randomly chosen example, one finds not only a report on the antimitotic substances and their particular effects but also a discussion of their significance for the analysis of mitosis. Another example to indicate the broad and well-balanced presentation is the consideration of the profound physical changes that occur in the cytoplasm during mitosis, in spite of the greater stress present cytology must place on the chemical and metabolic changes. A third example is a brief and well-designed chapter devoted to the part that cytoplasmic constituents may play in heredity.

Although the second section, on the tissues, is traditional in the descriptions of epithelia (including glands and secretion in general) and connective tissue and its derivatives (including blood and muscle) and nervous tissues, it is consistent with one of the main tendencies of the book in that it states the problems of histology against the background of biology. This is emphasized by an introductory chapter on cell differentiation and specificity, which deals with the relationship of histology to embryology, to experimental biology, and to tissue culture. One may wonder here why growth and morphogenesis were not also considered. For each tissue the data on histogenesis, histophysiology, and histochemistry are presented.

The third section, on cell systems, apparatus, and organs, is in no way deprived of its fair share of attention by the elaborate presentations of the cell and the tissues. Except for the chapters on the nervous system and the sense organs, which give the impression of being appendixes rather than full-grown parts of the whole, there is adequate information on microscopic anatomy. The broad biological and functional approach was maintained throughout the special parts; a chapter such as that on the "Système histiocytaire" (18 pages), preceding the description of blood-forming organs, is especially characteristic of Chèvremont's high standard of teaching. Embryology, innervation, and blood supply are discussed for each organ, and separate sections on histophysiology (which cover four and a half pages for the lung, five and a half pages for the kidney, and four pages for the liver) emphasize the functional significance of the microscopic structures.

The volume is well and amply illustrated with about 300 microphotographs, several electron micrographs and diagrams, and ten plates of about 30 colored pictures. A subject index of 30 pages facilitates the use of the book and shows the wealth of information it has to offer.

Numerous references at the end of paragraphs, in footnotes, and in the text keep the reader up to date on the literature and serve to stimulate discussions and develop controversial points instead of presenting them in definite form. Early sources of our knowledge are referred to in the reviews on the history of a particular line of research. Since Giuseppe Levi's *Trattato Istologico* is the great European standard work, where additional information can be found, it seems unfortunate that the third edition (1946) is listed instead of the fourth (1954).

The volume is written in simple, lucid, and precise language, and it should be easily read even by those with a limited knowledge of French.

F. WASSERMANN
Argonne National Laboratory

A Manual of Pharmacology and Its Applications to Therapeutics and Toxicology. Torald Sollmann. Saunders, Philadelphia, Pa., ed. 8, 1957. 1535 pp. $20.

Just 40 years ago, the first edition of Sollmann was published and immediately became the major American textbook in pharmacology. Seven new editions have now followed the first. During these years, at least two other comprehensive textbooks have appeared —Goodman and Gilman, now in its second edition, and the recent composite volume edited by Drill—and other only slightly shorter volumes, like that of Krantz and Carr. These illustrate the in-

creasing growth of the field and the need for different books for different audiences. One might compare some of the strong points of these books (although admittedly the points are shared by all) by saying that Goodman and Gilman is particularly welcomed by medical students, Drill, by practitioners, and Sollmann, by serious workers in pharmacology, for it is an unequaled source of clear fact and detail. One turns to it automatically when specific information is needed. Although one hesitates to use the word *encyclopedic* because it sometimes suggests to students a forbidding tome, Sollmann is encyclopedic in the good sense and, at the same time, attractive to beginning workers. The device of large type and small type has always helped in this respect. All in all, this eighth edition is a worthy successor to the now almost legendary series of earlier volumes. The general content is the same—a systematic coverage of the field of pharmacology—and hardly needs further description.

It is impossible to close this review without a word about Torald Sollmann, the man. With Sollmann, the old quotation that "no man is the equal of his book" hardly applies, for he is truly the elder statesman of American pharmacologists, the very active chairman of the Council on Drugs of the American Medical Association, and the possessor of a legion of devoted friends.

WINDSOR CUTTING
Stanford Medical School

Progress in Low Temperature Physics. vol. 2. C. J. Gorter, Ed. North-Holland, Amsterdam; Interscience, New York, 1957. xi + 480 pp. Illus. $10.75.

This is the second, and last, volume of what amounts to a handbook of low-temperature physics. This volume consists of 14 separate articles, grouped in chapters, written by 22 people all of whom are specialists well known to the majority of workers in this field. The accounts are, accordingly, authoritative throughout and cover a considerable diversity of topics.

Authors of review articles (which these chapters are, essentially) are forced to be selective in their choice of material, especially in a swiftly developing and many-sided subject. Their choices are not always, and in fact not often, entirely pleasing to their colleagues. This is very likely to be the case with this book. Thus, some chapters appeared excellent to me, while others (I thought) might well have been deleted.

Specifically, the article by K. R. Atkins on the problems of the mobile helium film is first-rate and a pleasure to read, and it ought to be useful to everybody interested in this rather bizarre phenomenon. The same is true of the article on a very different topic—semiconductors at low temperatures—by V. A. Johnson and K. Lark-Horovitz. This article contains a great deal of information that is very difficult to dig out of the extensive literature. The chapter by D. Shoenberg on the "de Haas–van Alphen" effect contains all the latest thinking on that subject and is excellently presented.

To illustrate the diversity of the work, there is a very good chapter by M. J. Steenland and H. A. Tolhoek on nuclear spin alignment, especially of radioactive nuclei, by means of magnetic cooling techniques. This is a fairly recent and interesting development, since it amalgamates two hitherto unconnected fields of physics—namely, cryogenics and nuclear physics. The book was published before the use of this method to test parity conservation was reported, but the basic ideas are here outlined.

The book includes many other topics, such as theories of liquid helium (J. de Boer), paramagnetic relaxation (C. J. Gorter), solid helium (C. Domb and E. S. Dugdale), transport phenomena in metals at low temperatures (E. H. Sondheimer), liquid helium below 1°K (H. C. Kramers), and half a dozen other topics. It closes with an expert discussion by H. Van Dijk and M. Durieux of the "temperature scale." In principle, the precise determination of the Kelvin temperature of a batch of liquid helium is one of the nastiest measurements imaginable. In practice, it could be carried out easily by any reasonably bright sophomore. This happy paradox is the result of the patient and skilled work which has been going on for many years, mainly at Leiden, relating the Kelvin scale to the saturated vapor pressure. A very usable p versus T table, embodying the latest results, is included, and the whole is condensed to one page, which makes it very handy for photographic reproduction.

The printing leaves something to be desired. In my copy eight pages were blank, and the caption for one figure was several pages farther along.

C. T. LANE
Yale University

Pilot Plants, Models, and Scale-up Methods in Chemical Engineering. Robert E. Johnstone and Meredith W. Thring. McGraw-Hill, New York, 1957. 307 pp. Illus. $9.50.

There has long been needed a rather comprehensive textbook and appraisal of engineering models and scale-up methods. This book, written especially for chemical engineers, summarizes well both the state of knowledge and the applications of dimensional analysis for predicting performance of large-scale operations from laboratory and pilot-plant data. All the important topics of chemical engineering—including reactor kinetics, combustion, and corrosion—are encompassed. Each chapter can be read independently of the others, with little more background than is contained in the first three introductory chapters.

Chapter 5, on differential equations, is exceptionally good and the methods outlined therein on the development of various dimensionless groups give a clearer insight to dimensional analysis than do the usual methods of unit homogeneity of Rayleigh and Buckingham.

In spite of the many dimensionless groups discussed in this book (and in others), I cannot help feeling that there are only three or four such groups which are basic and have physical significance. All others are derivable from these basic groups or are quite synthetic. Moreover, all suffer from rather serious defects. Dimensionless graphs are either extremely sensitive or relatively insensitive. They compound the errors of whatever measurements are involved in the variables employed. Actually, as used by most engineers, dimensionless groups are desensitizing, and many functional relationships derived by their empirical use in engineering data are deceptive. Although the authors have failed to stress these limitations, they have nevertheless taken great pains, in their discussions and examples of applications, to point out the significance of various dimensionless groups. This has been needed, and for this reason and because the book is well written, I am convinced that it should be added to the library of every practicing chemical engineer.

J. M. DALLAVALLE
Georgia Institute of Technology

New Books

New Research Techniques of Neuroanatomy. A symposium sponsored by the National Multiple Sclerosis Society. William F. Windle, Ed. Thomas, Springfield, Ill., 1957. 107 pp. $4.75.

Scientific and Technical Translating. And other aspects of the language problem. United Nations Educational, Scientific and Cultural Organization, Paris, 1957. 282 pp. $4.20.

Soil, the Yearbook of Agriculture, 1957. U.S. Department of Agriculture, Washington, 1957 (order from Supt. of Documents, GPO, Washington 25). 797 pp. $2.25.

Vertebrates of the United States. W. Frank Blair, Albert P. Blair, Pierce Brodkorb, Fred R. Cagle, George A. Moore. McGraw-Hill, New York, 1957. 828 pp. $12.