

Organic Compounds

Chemistry of Terpenes and Terpenoids. A. A. NEWMAN, Ed. Academic Press, New York, 1972. xiv, 450 pp., illus. \$25.

Terpene chemistry has provided an immense source of problems whose solutions have been a stimulus for the development of new synthetic organic procedures and for the development of theories that are now fundamental to organic chemistry. Simonsen's five-volume series offered a comprehensive and authoritative coverage of terpene chemistry through the early '50's, but it is now badly outdated and, at least in the case of the first three volumes, is in need of complete revision. The present work offers a single-volume survey of the progress on terpenes achieved in recent years. It features an introduction to terpenes, a chapter on selected transformations of monoterpenes, and chapters outlining, using a biogenetic framework, work on sesquiterpenes, di- and sesterterpenes, triterpenes, and carotenoids. It ends with a chapter on biosynthesis. Considering the biogenetic emphasis in most chapters, one wonders why the last chapter was not placed near the beginning of the text.

Students should find this book an excellent introduction to terpene chemistry and research workers specializing in the field should find the material it contains of some value. However, the challenge of the massive undertaking required to update Simonsen still presents itself to workers in this field.

JOSEPH WOLINSKY

*Department of Chemistry,
Purdue University,
West Lafayette, Indiana*

Blood Constituents

Blood Lipids and Lipoproteins. Quantitation, Composition, and Metabolism. GARY J. NELSON, Ed. Wiley-Interscience, New York, 1972. xii, 980 pp., illus. \$39.95.

This book is a compilation of 16 papers by 21 contributors who attempt to fulfill the goal set by the editor of providing "a reasonably complete summary of the field" of blood lipids and lipoproteins. Their efforts have generated a 980-page volume which includes extensive author and subject indexes and has a fairly elegant editorial vest. As is often the case with

a multiauthor approach, the book lacks continuity, suffers from redundancy, and often reflects the authors' particular biases. At a time when information on plasma lipoproteins and formed blood constituents is being obtained at an explosive rate, and a parallel growth of books and reviews on the subject has resulted, the reader may be led to wonder whether this newcomer provides sufficiently novel coverage of information and concepts to justify its purchase or consultation.

On the positive side, the book contains a critical and detailed treatment of methods for the isolation and quantification of lipids from plasma, red blood cells, white blood cells, and platelets. That this is the major emphasis of the book is clearly evidenced by the fact that half of the chapters are devoted to this topic. The methods described reflect the authors' individual preferences, however, and the reader may find it difficult to determine which of the various methodologies listed have gained both acceptance and general use. The significance ascribed in this book to blood lipids is exemplified by the assignment of an entire chapter to the application of the relatively sophisticated technique of infrared spectroscopy to their analysis. On the other hand, the proteins of the lipoproteins of the plasma and those of the red-cell membranes are given relatively little attention, and the presentations contain the many inadequacies that have been clarified by workers in the field since these chapters were completed. Plasma lipoproteins as intact complexes are dealt with authoritatively with regard to methods for their isolation and quantitative analysis, and also with regard to their biosynthesis. A discussion of the metabolism of plasma lipoproteins is included, although the coverage of the subject is somewhat fragmentary and far from exhaustive. A particularly detailed account of the distribution of plasma lipoproteins in normal and diseased states is given, and this should prove valuable to the reader with a clinical orientation.

Considering its broad scope, the book suffers from a serious imbalance among the topics discussed. A surprising omission is a detailed treatment of the chemical and metabolic relationships among lipids of circulating lipoproteins and cell membranes. Such a chapter could have helped to reduce the information gap that now exists between in-

vestigators working on "soluble" and "insoluble" lipoproteins.

This book should prove particularly valuable, from the technical standpoint, to lipid biochemists, and to those interested in plasma lipoproteins; it will be less so to other specialists. These may wish to consult it at least for the references, which are numerous and well indexed.

ANGELO M. SCANU

*Departments of Medicine and
Biochemistry, University of Chicago
Pritzker School of Medicine,
Chicago, Illinois*

Neurochemical Manipulation

Immunosympathectomy. A meeting, Milan, 1969. GEORGE STEINER and EDUARD SCHÖNBAUM, Eds. Elsevier, New York, 1972. xiv, 254 pp., illus. \$27.50.

Although the near-magical properties of the sympathetic nerve growth factor (NGF) and its antiserum have been known for nearly 20 years, the present symposium volume is one of the first to be devoted exclusively to a comprehensive review of this field. The use of NGF antiserum is emphasized, whereas another recently published symposium summarizes work on NGF itself (E. Zaimis and J. Knight, Eds., *Nerve Growth Factor and Its Antiserum*, Athlone, 1971). These two volumes provide the most up-to-date and complete source books for those interested in a research story which has many fairy-tale-like qualities.

Nerve growth factor is a protein found in special abundance in mouse salivary glands and in certain snake venoms. It has a unique biological activity as a potent and specific stimulant of the growth of postganglionic sympathetic neurons and sensory neurons. These effects are seen most prominently in the sympathetic or sensory ganglia of young animals when the neurons are not fully developed. Similarly, antibodies to the salivary gland NGF are most effective in young animals. When such antisera are administered to neonatal mice, rats, or other mammals, they cause a permanent loss of adrenergic neurons from sympathetic ganglia—a process known as "immunosympathectomy." The 14 chapters in this volume give a general review of the sympathetic nervous system and its normal development and describe in

detail the morphological, biochemical, and functional consequences of immunosympathectomy. This process has been of considerable value as a research tool for studies of many aspects of adrenergic mechanisms, since it allows a very substantial destruction of the sympathetic nervous system to be achieved by a few simple injections. The use of this technique has, for example, helped to clarify the cellular localization of many of the enzymes associated with catecholamine metabolism.

On the other hand, immunosympathectomy has not proved to be the perfect tool for studies of the functional significance of the sympathetic nervous system. The technique unfortunately does not cause a complete destruction of the sympathetic nervous system and has no effect on catecholamines in the adrenal medulla or the central nervous system. The residual catecholamine stores, together with a supersensitivity to catecholamines which develops in most tissues, may well explain the rather disappointing absence of physiological effects of immunosympathectomy. Thus, the treated animals retain relatively normal cardiovascular control, temperature regulation, endocrine function, and behavior. They are, however, resistant to some forms of experimentally induced hypertension and more sensitive than normals to cold and other forms of stress.

It seems likely that the use of immunosympathectomy as a method for the experimental destruction of the sympathetic nervous system will be replaced by the newer techniques of "chemical sympathectomy" using the drug 6-hydroxydopamine. The latter compound causes a very extensive destruction of the sympathetic nervous system when administered to neonatal animals. Apart from its ready availability, 6-hydroxydopamine has the added advantage of being able to destroy adrenergic neurons in the central nervous system as well as in the periphery (see T. Malmfors and H. Thoenen, Eds., *6-Hydroxydopamine and Catecholamine Neurons*, North-Holland, 1971).

Nevertheless, the mode of action and the possible developmental significance of NGF and its antisera remain neurobiological mysteries of the first order. The present volume does not answer these questions, but provides a useful source and review of background information. The contributions are written by world authorities, and the book

is well produced with many good photomicrographic illustrations.

Anyone who reads this and the other two volumes referred to here will be well versed in the arts of chemical manipulation of the life and death of adrenergic neurons.

L. IVERSEN

*Medical Research Council
Neurochemical Pharmacology Unit,
Medical School,
Cambridge, England*

Vascular Mechanisms

The Physiology of the Cerebral Circulation. M. J. PURVES. Cambridge University Press, New York, 1972. xiii, 420 pp., illus. \$26. Monographs of the Physiological Society, No. 28.

The physiology and metabolic functions of the cerebral circulation resemble those of other vascular beds in some ways but differ substantially and importantly in others. These differences are particularly important in regard to metabolic permeability, the presence of specialized metabolic carrier functions, and the remarkable capacity of the cerebral vasculature to alter its arteriolar resistance in response to changes in the carbon dioxide and oxygen tension of the blood and the tissue. Being closely related to problems of human cerebral vascular disease, and for technical reasons having been most extensively and accurately studied in man rather than in animals, the cerebral circulation has received attention in numerous and recent reviews, symposia, and conference proceedings. However, this is the first English-language textbook on the subject. The volume departs somewhat from the more clinically oriented treatment that has marked many other reviews on the subject and usefully discusses the cerebral circulation more from the standpoint of the general physiologist. In doing so, it gives rather more attention to animal experiments and less to the lessons learned from observations on man than is usually the case. The text, which is clearly written and traditional in its approach, goes from general to specific considerations—first anatomy, then to hemodynamics, then to factors regulating vascular resistance, and finally to the relation of cerebral blood flow to metabolism and to pharmacological agents. The illustrations are well chosen and clear and the writing is for the

most part sensibly didactic and well balanced. The enormous bibliography in the field has been reduced to a generally well chosen list of references, although few are more recent than 1969, which is a handicap for those actively working in this rapidly changing field.

One of the main features that differentiate the volume from other treatises on the subject is its meticulous description of older anatomical and physiological experiments, many of which modern workers may have overlooked or forgotten. The volume also gives considerable and accurate attention to the anatomy and possible function of the extensive innervation of the cerebral vascular bed, citing much often neglected material. Methods of measuring the cerebral blood flow are presented in detail and with critical evaluation. The influence of nervous control of the cerebral circulation is Purves's special interest, and he interprets as favorably as the facts will at present allow the often conflicting evidence for neurogenic influences on the cerebral circulation. This area of investigation undoubtedly will attract more attention during forthcoming years; hence this is an especially valuable part of the book.

The close couple between cerebral blood flow and metabolism is well described, as are many of the main unsolved physiological problems related to it. However, the fastest moving research has been on this aspect of the cerebral circulation, and several important recent studies are omitted from the volume. Thus it is disappointing to find no mention of the work of Kogure *et al.* linking cerebral tissue lactate production to vasodilatation in hypoxia, or of Ter Pogossian's remarkable new techniques for simultaneously measuring cerebral blood flow and metabolism in man with the use of intracarotid injections of oxygen-15. Such probably unavoidable omissions, plus the fact that the author largely avoids consideration of how disease alters the cerebral circulation, mean that the volume will be useful mainly to students of general physiology and introductory students of medicine. For them, as well as for those who need a solid grounding in the classical literature and concepts on the subject, the book is to be highly recommended.

FRED PLUM

*Department of Neurology,
Cornell University Medical College,
New York City*