

The reader is now in a position to be given a more complete discussion of assemblages—of electrons and atoms in metals, of molecules and ions in crystals and in liquids and solutions. He can understand more clearly the ordering effect of van der Waals, Coulomb and valency forces and the opposing effect of random motions. The three fundamental ideas which form the basis of modern chemistry are thus combined: matter is made of atoms, heat is mechanical motion of atoms and molecules, and particles have a wave-like nature.

The equilibrium patterns of chemistry are manifold and varied, but changes of pattern give "vitality and movement to the scene"; and the last section of this book gives a beautiful discussion of chemical changes. Collision theory, transition state theory, thermodynamic analogies, and energy and entropy factors are discussed with clarity, rigour and simplicity; their fields of usefulness in the theory of reaction rates and their limitations are set out. Typical reaction mechanisms are outlined: bond breaking, ionization, atom transfer, electron transfer, energy transfer, chain reactions—and the student is shown how in all these problems our knowledge of valency forces, molecular configuration and motion has made our ideas of chemical changes more precise; and how, here as in equilibrium, ordering into pattern carries with it the concomitant increase of entropy.

This book will give the student the right picture of the subject as a whole; it brings together the various lines of attack, showing clearly their several powers and limitations. It will inculcate rigour of thought and a critical approach—but at the same time will stimulate the student to take up tools which are so attractively presented to him, to sharpen them, and to use them for himself. He will go to his specialist monographs and lectures on thermodynamics, quantum theory or statistical thermodynamics with a proper understanding of their positions and their uses.

The specialist will understand his specialism the better for seeing it set in the subject as a whole.

The research worker will be stimulated to thought and investigation by the problems which are hinted at or are thrown into relief: there is none of the finality of the last word about this book; the inquiry goes on—"that is perhaps the greatest fascination of its adventure".

The book is beautifully written: there are occasional flashes of wit and asides of philosophy—indeed, teaching in its highest form: that sense of intimate conversation with a master.

M. G. EVANS

## PURE AND APPLIED CHEMISTRY OF ACRIDINE COMPOUNDS

### The Acridines

Their Preparation, Physical, Chemical and Biological Properties and Uses. By Prof. Adrien Albert. Pp. xiii+381. (London: Edward Arnold and Co., 1951.) 70s. net.

THE investigation of acridine compounds has, in recent years, been to a large extent in the hands of Prof. A. Albert and his collaborators, and it is gratifying to know that the considerable experience which they have gained should now be available, with much else besides, in this volume. To the average student of organic chemistry the subject of acridine

is all but a closed book, and the present work should dispel any ideas that may be abroad to the effect that the chemistry of acridine derivatives is dull and uninspiring.

The first eight chapters (Part 1) of the book deal with preparative methods for the synthesis of acridines, acridans and acridones, and it is early apparent that the author has written into its pages a wealth of sound practical experience. A number of preparations, either of acridine derivatives or of essential intermediates, are described at the end of each chapter, and the style is simple and direct, although occasionally a laboratory colloquialism replaces the more formal language of the text-book.

Part 2, also of eight chapters, discusses physical and chemical properties of acridines, preparation and properties of substituted acridines, aminoacridines, quaternary acridine derivatives, reduced acridines, acridones, thioacridones and binuclear derivatives. The degradation of substituted 5-aminoacridines in alkaline solution with hydrogen sulphide, noted by Hammick and his pupils, is not specifically mentioned although the reference is given in a misleading context. Apart from this slight criticism, the first two sections of the book are written in a balanced and critically objective manner.

The first chapter of Part 3, dealing with the utilization of acridines in clinical medicine, has been written a little more enthusiastically and somewhat less objectively than preceding and later chapters. Obviously Prof. Albert sees in the acridines a potential source of valuable drugs in addition to mepacrine and the existing aminoacridine antiseptics; for he asks the leading question (p. 234), "Have the possibilities of using acridines in therapy been exhausted?" and adds, "The answer is most emphatically no", going on to say that "... the clinical possibilities of 'the acridines' are potentially as fertile as those of 'the benzenes' (which recently contributed sulphamylamide, *p*-aminosalicylic acid and chloramphenicol)", although it is conceded "that, as with other nuclei, the acridine ring contributes only a fraction to the biological action of its derivatives". Part 3 continues with a stimulating chapter on chemical constitution and antibacterial action; but the chapter dealing with the antimalarial action of acridine derivatives would have gained somewhat in perspective by even brief mention of chloroquine, which is derived, at least in theory, from mepacrine by ablation of one of the benzene rings.

The remaining chapters of the book cover tinctorial properties of acridines, the connexion between constitution and colour in the acridine series, and fluorescence and chemiluminescence among acridines. The work ends with a really excellent reference and author index, together with a good subject index and an index to the preparations described.

The author is to be congratulated on the completeness with which he has covered his subject and on his ability to write authoritatively and with equal facility on so diverse a range of specialized aspects of pure and applied organic chemistry. Most organic chemists and many biologists will find much to interest them in this volume, and its well laid-out tables, ninety-nine in all, will save many time-consuming searches in the literature for data on acridine and its derivatives. All concerned with the production of this book, author, printers and publishers, may derive satisfaction from the certain knowledge that their work will be gratefully received by a wide range of readers.

J. WALKER