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BOOK REVIEWS

R. M. ACHESON: **An Introduction to the Chemistry of Heterocyclic Compounds.** Interscience Publishers, New York, London, 1959. 342 pp., $5.00, 35s.

THE object of this work, as stated in the Preface, is to provide an account of the modern aspect of heterocyclic chemistry suitable for the use of advanced students.

The dearth of such text-books is not so serious now as it was when Dr. Acheson embarked on his project, because meanwhile the encyclopaedic accounts in the Elderfield series have been supplemented by shorter books, for example those by Albert, Bentley, and Katritzky and Lagowski. It is interesting to see how the slightly differing points of view of these authors are reflected in their treatment of similar material. Acheson's modification is essentially descriptive, a kind of Sidgwick's *Organic Chemistry of Nitrogen* (revised by Baker and Taylor) brought selectively up to date.

The purpose, which has been largely achieved in a satisfactory manner, has evidently been to display the chemical character of the substances treated as completely as possible. We are told what happens and special characteristics are pin-pointed, so that the reader of this book traverses the region like a sightseer in an observation car. He will find much to awaken his curiosity and will be stimulated to think for himself. Unfortunately the theoretical background of heterocyclic chemistry is not sufficiently clearly expounded. The old-fashioned use of the concept of canonical forms is adopted throughout and there are few illustrations of the value of representation of electronic displacements in conjugated systems, which are so very relevant to explanations of chemical properties in the series.

Again the maps of π-electron densities of typical compounds, derived theoretically, are reproduced without any clear indication as to how they may be used. For example, that for quinoline is stated (p.217) to suggest that electrophilic reagents will attack the carbocyclic ring at positions 5- and 8-. But the values given are:

3-, 0·978; 5-, 0·956; 6-, 0·989; 7-, 0·947; 8-, 1·003.

It must be emphasized that such figures have never been related in a satisfactory manner to orientation phenomena. The figures showing angles of bonds and distances between atoms are more valuable, being experimentally founded for one thing, but perhaps they will be more appreciated by the research worker than by the student.

The omission of the alkaloids is understandable but unfortunate in that much fundamental chemistry necessarily went with them.

There is a little too much of the three and four rings and space saved at the beginning could have been well used at the end, that is, on more extended description of the pyrimidines and similar groups.

In spite of these minor criticisms, the book will be an important addition to the library of the student of organic chemistry. It is an original work and a kind of hybrid between a textbook and a reference book. This stimulating volume can be warmly recommended to advanced students of organic chemistry and of biochemistry and especially to those who are already well versed in the underlying theoretical basis of the science. They will here find ample material to which they may apply the principles of the electronic theories of structure and reactions.

R. ROBINSON

P. B. D. DE LA MARE and J. H. RIDD: **Aromatic Substitution: Nitration and Halogenation.** Butterworths Scientific Publications, London, Academic Press, New York, 1959. 252 pp., 50s.

THIS monograph is a new and original work in that the material has not been previously collected in one place. The emphasis is on reaction mechanism which is adequately discussed in terms of kinetic and other physico-chemical principles, the nature of the reactants, and the conditions of the experiments.

Sections on the ground states of molecules, transition states and equilibria in solutions are followed by consideration of the methods used for the identification of reaction paths and the possible stages of interaction. This includes the evidence for complex formation and the molecular species, on the nitric acid and derivative side, which are directly concerned in the nitration process. Here the inclusion of practical details gives a welcome air of verisimilitude to the narrative. Consideration is also given to nitrosation and nitration by way of the lower stage of oxidation.

The treatment of orientation in aromatic nitration is also interesting but far from satisfactory due to the capricious selection of the studies to which reference is made. Moreover the references made are not infrequently to later workers, earlier investigations of the same topics being completely ignored. The statement in the Preface "It is hoped that the literature citations are reasonably representative, but they have been chosen to illustrate scientific points and not to adjudicate on matters of priority" discloses some anticipation of criticism. It is not as disarming as it appears intended to be and does not justify the failure to mention the true origins of ideas or discoveries.

This work gives a thoroughly biased account of the historical side of the qualitative electronic theory which is in any case not presented as carefully, or even lucidly, as the excellent treatments of reaction mechanism. The chapters dealing with halogenation, rearrangements, polycyclic substances and heterocyclic aromatics are similarly highly interesting but with the same defects. The wave mechanical treatment of valency and similar approaches are not used to a large extent in the body of the work but are separately, and on the whole acceptably, discussed in a later chapter.

The book is a thoughtful contribution to our understanding of one of the best explored fields of organic chemical reactions, but there are serious omissions and selective dogmatism creeps into the discussion in several places.

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