

authors (in 1956–1961, to interpret spectroscopic data) until the early seventies, when C.G. Pitt published his very important theoretical analysis. In fact I myself (unaware of Nesmeyanov's suggestion for mercury compounds) first used hyperconjugation in 1954 to interpret spectroscopic properties of organosilicon compounds, and in 1956 to account for the effects of Me_3Si groups on reactivity (and I discussed both aspects in my book on Organosilicon Compounds in 1960). Completely ignored is the all-important work by T.G. Traylor in the 1960's on charge transfer complexes, which was the most powerful factor in the acceptance of the importance of hyperconjugation in organometallic chemistry. His work preceded, and was certainly more influential than that on photoelectron spectroscopy which Dr. Ponec believes to have provided the first experimental evidence for such hyperconjugation; indeed, the authors of the earlier of the cited papers dealing with photoelectron spectroscopy actually used their results to argue in favour of inductive rather than conjugative effects. Again, contrary to the impression given in the review, I myself clearly attributed the reactivity of Ar-SiMe_3 bonds to powerful electron-release from Me_3Si groups β - to a carbonium ion centre as early as 1964, and specifically attributed this to hyperconjugation from 1969. I fear that similar inadequacies apply to other parts of the review.

The book has been printed by photoreproduction of typescript, with the reduction in readability which that entails. However, in this case the procedure is justified by the impressively low price, a pleasing feature of many Plenum publications.

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Electron Deficient Aromatic- and Heteroaromatic-Base Interactions; by E. Buncl, M.R. Crampton, M.J. Strauss, and F. Terrier, Elsevier, Amsterdam etc., 1984, vii + 499 pages, Dfl. 300. ISBN 0-444-42305-2.

The sub-title of this book, "The Chemistry of Anionic Sigma Complexes", gives a much clearer indication than of the content than does the main title. It is concerned with the carbanions ("Meisenheimer adducts" or σ -complexes) produced when appropriate aromatic compounds are treated with bases, and which are best known as intermediates in common nucleophilic aromatic substitutions. Such carbanions are usually associated, more or less closely, with metal cations, and that is why the book is reviewed in this journal.

The emphasis is on the properties of the complexes themselves, although their role in the mechanism of $\text{S}_{\text{N}}\text{Ar}$ reactions is also well described. The chapters are: Introduction (14 pages), Spectroscopic studies (109 pages); Theoretical studies (17 pages); Structure and reactivity (110 pages); Kinetics and mechanisms of sigma complex formation and decomposition reactions (76 pages); Role of sigma complexes in $\text{S}_{\text{N}}\text{Ar}$ processes (40 pages); Role of electron transfer and proton transfer processes (25 pages); Reactions of anionic sigma complexes (73 pages). There is an adequate subject index. There are a

few references as late as 1982, but the effective cut-off date in some chapters appears to be about 1980.

The book is authoritatively written; it fills an obvious gap in the literature and is to be welcomed. It has been printed from camera-ready copy, and thus is less pleasant to read than a conventionally typeset volume. It is exceptionally expensive for a book produced in this way, but it must find a place in many chemical libraries.

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Structure Determination by X-ray Crystallography; by M.F.C. Ladd and R.A. Palmer, 2nd edit., Plenum Press, New York and London; xviii + 502 pages, US\$39.50, ISBN 0-306-41878-9.

This is a second edition of a textbook first published in 1977. Much of the original remains unchanged, but an extra 109 pages have been added dealing particularly with direct methods in non-centrosymmetric space groups, the MULTAN program, Patterson search techniques, torsion angles and conformational analysis, and further treatment of least squares refinement. As in the first edition, the book is aimed at the undergraduate or post-graduate who is seriously studying single crystal X-ray crystallography, rather than the chemist who needs a guide book for a one-off structure determination. At the end of each chapter there are questions, with the solutions included at the end of the book. The first six chapters deal with crystal geometry; preliminary examination of crystals; intensity of scattering of X-rays by crystals; and methods in X-ray structure analysis. There is then the much extended chapter on direct methods and refinement, and finally two examples of real crystal structure determinations. There is throughout the book an emphasis on understanding the detailed workings of techniques which are in practice often carried out by using default options in standard computer programs.

Its relatively low cost makes this book a worthwhile purchase for the individual seeking a thorough treatment of the subject.

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