

BOOK REVIEW

Cycloaddition reactions of heterocumulenes; by HENRY ULRICH, Academic Press, Inc., New York, 1967, ix + 364 pages, 132 s.

Heterocumulenes are compounds containing a system of cumulative double bonds, $X=Y=Z$, involving at least one atom which is not carbon. The principal examples, which the author deals with in separate chapters are: ketenes; carbon suboxide; isocyanates; isothiocyanates; carbodiimides; carbon dioxide, carbonyl sulphide, and carbon disulphide; sulphenes ($R_2C=S(O)=O$); *N*-sulphinylamines ($RN=S=O$), and sulphur diimides ($RN=S=NR$). One of the double bonds in these structures can add in a 1,2- or 1,3- or 1,4-sense across a suitable multiply-bonded reagent to form a 4-, 5-, or 6-membered ring respectively. Such reactions, which do not involve organometallic compounds, provide the central theme for this book; this is a valuable survey and the treatment is excellent.

The organometallic content is limited to the arbitrary but welcome inclusion, in a total of some 30 pages, of the 1,2-additions involving singly-bonded metallic compounds, MA, to give the acyclic adducts $MX(Y)(Z)A$. Many examples of reactions of this type have been established recently, and include all the acceptor molecules listed above except the sulphenes, and a wide variety of metallic bonds such as B-H, Pb-H, Mg-C, Zn-N, Si-N, Pb-N, Hg-O, Al-O, Sn-O, Sb-O and Sn-P. Such reactions provide routes to new types of organometallic compounds, and the basis of many new organic syntheses.

Ulrich's account of these reactions helps to see them against their broader organic background, and suggests further ways in which these reactions might be extended.

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