

A useful reading list, a comprehensive table of references and separate author, subject and formula indexes add greatly to the value of this work.

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**Perspectives in structural chemistry. II.** By J. D. DUNITZ and J. A. IBERS. Pp. vii+159. New York and London: John Wiley, 1969. Price 103s.

The editors of the review series *Perspectives in Structural Chemistry* consider it one of the most important tasks in structural chemistry today to make critical assessments of the mass of already published knowledge in a search for unifying ideas. In Volume II one of the editors, J.D. Dunitz, sets a model example for future contributors with an authoritative review on conformations of medium rings. The specification of conformations is given with the aid of torsion angles which are defined in precise geometric terms. Strain energy is defined in terms of thermochemical measurements as an experimentally observed quantity but in 'theoretical' strain minimization calculations it appears to be related to various potential functions and interaction functions which are not too clearly explained and it is left for the reader to decide for himself the merits of these expressions. The main part of the article consists of a balanced and critical assessment of published structural work on carbon ring systems. Cycloalkanes are treated first and special attention is given to 8-14-membered rings. A few cases of rings containing nitrogen atoms are treated too. Unsaturated rings are treated in the next section. The consequences of introducing one or more double bonds into a cyclic system are considered and a number of structures are discussed. There is apparently little structural information on cycloalkynes which are treated in nine lines only. Most of the structures discussed are based upon X-ray crystallographic studies; many of them have been determined in the author's laboratory in Zürich. It is pointed out that even a well refined structure does not always lead to an unambiguous determination of molecular conformation; there are cases where molecules on equivalent sites may not have quite identical conformations.

The article is very well written and testifies to the author's great knowledge and understanding of crystallography and chemistry.

The second half of the volume is by Bruce R. Penfold on *Stereochemistry of Metal Cluster Compounds*. There are probably good editorial reasons for publishing the articles of Dunitz and of Penfold in the same volume but there are few chemical or stereochemical similarities between the two subjects considered except that rings do occur also in metal cluster compounds.

The author defines a metal cluster as 'a finite group of at least three metal atoms in which at least two pairs are close enough to be linked by covalent bonds'. Three main chemical classes are considered: the lower halides and chalcogenides of the second and third transition series; carbonyls and nitrosyls and related compounds of transition metals; compounds containing bonds between transition metals and elements of main groups II and III; a small group containing various transition metal compounds and another small group containing clusters composed of main group elements only.

The structural data on metal cluster compounds are of rather recent origin. Less than a dozen of 181 references are earlier than 1960. Although it has been known for a hundred years that there were several peculiarities about the chemistry of  $\text{MoCl}_2$  and related compounds it was not until 1967 that the complete structure determination of  $\text{MoCl}_2$  was reported, giving definite proof for the cluster structure. Principal structural data for a great number of compounds are presented in tables. Typical structures are depicted in well designed drawings. The parallel development of X-ray diffraction techniques and of refined methods for the production of single crystals (*e.g.* transport reactions) has provided a sound basis for the stereochemistries of a number of compounds of simple stoichiometry as for a great variety of rather complex transition-metal carbonyls and nitrosyls and their derivatives.

The article of Penfold is of the same high standard as that of Dunitz and few university libraries could afford to be without this new series. Individual crystallographers should have a broad field of interest in stereochemistry to make good use of both the articles.

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