Asymmetric Synthesis, Volume 3; Stereodifferentiating Addition Reactions, Part B; edited by J.D. Morrison, Academic Press, 1984, xiii + 578 pages, US $ 84.50.

This is the second half of the third volume of a multivolume work reviewing progress in asymmetric synthesis since 1971. The literature up to that date was reviewed most comprehensively by Morrison and Mosher in their book "Asymmetric Organic Reactions". Whilst the orientation of the book is clearly towards the organic chemist, organometallic chemists will also find a good deal of interest.

The first chapter details stereoselective alkylation reactions of chiral metal enolates, and neatly classifies the types of chirality transfer which may occur. Aldol reactions, in the next chapter, are arranged both according to the metal involved and according to the type of stereoselection achieved. The discussion of chiral oxazolines in Chapter 3 centres mainly on the compounds which may be obtained by reactions of their lithio derivatives, but they may also act as sources of chiral Grignard reagents and chirally modified aluminium hydride reducing agents. Alkylations of chiral hydrazones also involve mainly lithio derivatives, the structure of which is crucial in determining the degree of diastereomeric and enantiomeric induction occurring. The figure detailing the asymmetric synthesis of a secretion of the "daddy long-legs" is charmingly annotated with pictures of the relevant insects. Chapter 5 gives an account of cyclisations involving carbon—carbon bond formation and Chapter 6 discusses cyclisations involving carbon—heteroatom bond formation. Whilst most of the metal complexes discussed are functioning as Lewis acids, There is a useful section in Chapter 6 in which nucleophilic attacks on alkenes coordinated to metals are considered, as well as a scrutiny of mercuricyclisation. The treatment of asymmetric cycloaddition reactions also includes reviews of Lewis acid catalysed reactions, and additionally describes metal catalysed asymmetric cyclopropanation. The final chapter, describing chirality transfer in asymmetric sigmatropic rearrangements, is slightly disappointing in that little mention is made of the metal catalysed versions of this reaction, which occur with excellent selectivity under very mild conditions.

Many of the subject areas of this book have not been reviewed recently and the development of enantioselective syntheses has been proceeding at a rapid pace in recent years. Literature coverage in most chapters seems complete up to the end of 1982, with a few references from 1983, and appears to be both extensive and well chosen. Whilst it would admittedly have been difficult to produce an index for this type of volume, this would have considerably enhanced the book's utility, particularly to the reader inexperienced in the field. At $ 84.50, the volume is perhaps a little expensive for individual purchase but this valuable series should be available in the library of every institution involved in modern synthetic chemistry.

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