

Book review

Total Synthesis of Natural Products: The Chiron Approach, by STEPHEN HANESSIAN, Pergamon Press, Oxford, 1983, xvii + 291 pages, £ 11.25, \$20.00.

For many years, carbohydrate chemistry was widely regarded as too specialised and consequently was largely ignored by “mainstream” organic chemists. Over the last ten years or so, however, this situation has changed with the recognition that carbohydrates provide convenient chiral starting-materials for the synthesis of many chiral, non-carbohydrate, natural products. There is now little doubt of the contributions, past, present and future, of carbohydrates to “mainstream” organic chemistry, just as there is little doubt that Professor Hanessian’s book will do much to continue the process of integration.

The book sets out to show that, just as strategies for the synthesis of complex molecules may be evaluated using retrosynthetic methods with identification of synthons, many strategies of stereospecific synthesis may be evolved following the identification of chirons. (Synthons are identified following bond-breaking processes where no priority is given to retaining chiral centres; chirons are identified by bond-breaking processes where the highest priority is given to retaining sequences of chiral centres.) Such chirons are often prepared conveniently from carbohydrate derivatives or from natural products such as amino acids and terpenes.

In sections of the book on Design and Discovery, Professor Hanessian describes how some molecules have obvious carbohydrate-type symmetry, whereas in others the relation to carbohydrates is partially or completely hidden. Procedures are described for establishing the relation to the carbohydrate, and factors which govern the choice of carbohydrate precursors are discussed.

The bulk of the book is a section on Execution, which describes a great number of examples (there are more than 150 flow charts) in which the retrosynthetic approach and the synthetic methods are described in detail. The flow charts helpfully describe all the reagents used. The arrangement of chapters within the section on such topics as acyclic molecules, molecules containing a tetrahydrofuran ring, a tetrahydropyran ring, a butyrolactone ring, a carbocyclic ring, a macrolide ring, etc., is based on the chemistry of the target molecules.

The book is of great value for two reasons. Firstly, it describes the concept of using carbohydrates as chirons in a most illuminating way. Secondly, it provides many examples which illustrate the approach and amongst which most readers, as they follow the flow charts, will discover examples of reactions for which they will find ready application. This latter contribution may be the most important for those

who find the logic and jargon of the retrosynthetic methods unnecessarily demanding or tedious and who prefer a more intuitive approach.

Professor Hanessian's book, which is well presented and produced, is to be welcomed and recommended.

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