The practical importance of this field as well as many problems baffling the engineering community are exposed.

All in all these books not only are sources of information but whet the appetite of the reader for contributing to this challenging field. They not only fill an important gap in the scientific literature, they help carry the message of the emergence of a new and exciting interdisciplinary scientific interest that has grown out of a time-honored but relatively narrow discipline.

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Molecular Conformations

Stereochemistry of Organic Compounds. ERNEST L. ELIEL and SAMUEL H. WILEN, with a chapter by Lewis N. Mander. Wiley, New York, 1994. xviii, 1267 pp., illus. $75 or £57.

Science historians may record that the last half of the 20th century was organic chemistry's "era of stereochemistry." Fittingly, the era began with Barton's pioneering *Experientia* paper (1950) that pointed out the profound significance of the chair conformation of cyclohexane and the far-ranging consequences of the difference between "axial" and "equatorial" substituents and with the first experimental determination of absolute configuration of an organic molecule, sodium rubidium (+)-tartrate, by Bijvoet in 1951. These two developments, one dealing with dynamic and the other with static stereochemistry, were followed shortly by seminal publications from Cram (1952), Prelog (1953), and Dauben (1956) on the stereochemical outcome of additions to the faces of prochiral carbonyl groups and from Zimmerman (1957) on the preferred conformation of the transition state for reaction of an enolate with an aldehyde. At the same time, the now-standard system for stereochemical nomenclature was being formulated (Cahn and Ingold, 1951) and perfected (Cahn, Ingold, and Prelog, 1956). These important developments during the 1950s set the stage for an explosion of activity in many different aspects of stereochemistry, which continues until the present time.

During this period of exponential growth, two of the most influential stereochemical textbooks were Ernest Eliel's *Stereochemistry of Carbon Compounds* (McGraw-Hill, 1962) and the Eliel-Allinger-Angyal-Morrison book *Conformational Analysis* (Wiley, 1965). Generations of chemistry students (the author included) "cut their stereochemical teeth" on these important texts. Now comes the long-awaited update, *Stereochemistry of Organic Compounds* authored by Eliel and Samuel Wilen, with a significant chapter on stereo- selective synthesis by Lewis Mander. In 14 chapters spread over 1267 pages, the authors have distilled the essence of a large field.

Stereochemistry of Organic Compounds does an excellent job of surveying the subject at a level appropriate for a chemistry graduate student and will no doubt become a standard resource for chemistry teachers at all levels. The book covers all of the standard topics that one would expect to find in a comprehensive discussion of stereochemistry, such as symmetry elements and symmetry point groups, methods for the determination and notation of absolute configuration, properties of stereoisomers, separation of stereoisomers, and chiroptical properties. In addition, there are detailed synopses of less common aspects of stereochemistry. For example, chapter 6, "Properties of stereoisomers. Stereoisomer discrimination," is a well-crafted discussion of "the physical properties of enantiomer pairs and methods for the determination of enantiomer composition." This chapter includes a succinct definition of "homochiral" and "heterochiral," words coined by Lord Kelvin in 1904 and much misused in the recent chemical literature. It also includes cogent discussions of such interesting topics as biodiscrimination and origins of enantiomeric homogeneity in nature.

One of the most useful sections of the book is Mander's 156-page chapter 12, an excellent précis of the burgeoning field of stereoselective synthesis. Here the reader will find a well-organized summary of diastereoselective synthesis, enantioselective synthesis, and double stereodifferentiation. All of the important synthetic reactions are treated, with ample discussion of modern mechanistic rationale as applied to stereoselectivity. This chapter alone could form the syllabus for a modern graduate course in stereocontrolled synthesis.

The final chapter, "Chirality in molecules devoid of chiral centers," provides

Vignettes: Homely Experiments

Just think of the shape taken by water as it flows down the plug-hole of the bath—a distinctive spiral vortex, either clockwise or counterclockwise. And don't believe anyone who tells you that it flows one way in the Northern Hemisphere and the other in the Southern. Do the experiment yourself: keep track of several spiral exits from your bath and you will find that the water goes either way, depending on the movements you produce in the water as you step out of the bath. And by simply swirling the water the other way, you can reverse whichever spiral first forms. The Coriolis force that is related to the rotation of the earth is very weak, and you need special conditions to see its effects on liquid flow patterns. Only if there is no other stronger influence to initiate a vortex will the Coriolis force break the symmetry of water flow and induce a clockwise spiral in the Northern Hemisphere and counterclockwise in the Southern.

—*Brian Goodwin*, in *How the Leopard Changed Its Spots: The Evolution of Complexity* (Scribner)

The upper arm has three degrees of freedom at the shoulder, which is a ball-joint. If you start with your right arm hanging by your side, you can raise it in a straight line either forwards or to the side, making two degrees of freedom. To assure yourself there is a third, raise your arm level with the shoulder and pointing straight ahead, with the index finger extended. Now bend the elbow till your index finger points straight up. Finally, without further bending of the elbow and keeping the upper arm still pointing straight forward from the shoulder, rotate the forearm anticlockwise until the index finger points to the left.

. . . The shoulder is indeed a remarkably mobile joint, and only excellent design is able to give such a variety of motions through such large angles, while retaining strength and small size. It is not surprising that it dislocates from time to time.

—*Michael French*, in *Invention and Evolution: Design in Nature and Engineering* (second edition; Cambridge University Press)

particularly interesting reading. In addition to providing a good overview of the better-known examples of this class (for example, allenes, spiranes, trans-cycloalkenes, biphenyls, metallocenes), this chapter covers fascinating topics such as "atropoisomerism about sp^3-sp^3 bonds," "molecular propellers and gears," and "cyclostereoisomerism."

Throughout the book, the authors have used sections in smaller print to present subject matter that "may not be in the mainstream of the argument, but may be of interest to some of our readers." Although the technique is used rather unevenly in the various chapters, I found these "nonessential" sections to contain some of the most interesting passages in the book. A few examples, chosen more or less at random, are: a discussion of holohedral and hemihedral crystals (p. 164); a discussion of the dependence on wavelength of the photostationary state in the photoisomerization of *cis*- and *trans*-stilbene (p. 583); a discussion of "in-in" and "in-out" bridged bicyclic diamines (p. 792); and a mnemonic for remembering the signs of the octant rule sectors (p. 1026).

The book has a useful 20-page glossary of stereochemical terms and a thorough 56-page index. Chapters are thoroughly referenced to the original literature, although it would have been desirable to have these citations at the bottom of the page, rather than gathered at the end of the chapter. Considering the scope and thoroughness of the book, it is a bargain at $75, and most practicing organic chemists will probably want to have it in their personal libraries.

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Books Received

AIDS 1994. A Year in Review. M. Adler *et al.*, Eds. Current Science, London, 1994. vi, 373 pp., illus. $74.95 or £49.95.

AIDS and Behavior. An Integrated Approach. Judith D. Auerbach, Christina Wypijewska, and H. Keith H. Brodie, Eds. National Academy Press, Washington, DC, 1994. xx, 338 pp., illus. $39.95.

Behavior and Mind. The Roots of Modern Psychology. Howard Rachlin. Oxford University Press, New York, 1994. xii, 163 pp., illus. $35.

Behind the Mule. Race and Class in African-American Politics. Michael C. Dawson. Princeton University Press, Princeton, NJ, 1994. xii, 234 pp., illus. $35.

Biodiversity and Global Change. O. T. Solbrig, H. M. van Emden, and P. G. W. J. van Oordt, Eds. University of Arizona Press, Tucson, 1994. x, 227 pp., illus. Paper, $33.

Case Studies in Superconducting Magnets. Design and Operational Issues. Yukikazu Iwasa. Plenum, New York, 1994. xiv, 421 pp., illus. $59.50.

Challenges in Synthetic Organic Chemistry. Teruaki Mukaiyama. Oxford University Press, New York, 1994. x, 225 pp., illus. Paper, $29.95. International Series of Monographs on Chemistry, 20. Translated from the Japanese edition (Tokyo, 1987); E. Baldwin, Transl. Ed.

The Damaged Brain of Iodine Deficiency. Cognitive, Behavioral, Neuromotor, and Educative Aspects. John B. Stanbury, Ed. Cognizant Communication, Elmsford, NY, 1994. viii, 335 pp., illus. $105. From a symposium, Philadelphia, PA, May 1993.

Double-Edged Sword. The Promises and Risks of the Genetic Revolution. Karl A. Drlica. Addison-Wesley, Reading, MA, 1994. x, 242 pp., illus. $20.

Economic Progress and the Environment. One Developing Country's Policy Crisis. Douglas Southgate and Morris Whitaker. Oxford University Press, New York, 1994. x, 150 pp., illus. $35.

Endangered Species Recovery. Finding the Lessons, Improving the Process. Tim W. Clark, Richard P. Reading, and Alice L. Clarke, Eds. Island Press, Washington, DC, 1994. xii, 452 pp., illus. $48; paper, $25.

Fables of Abundance. A Cultural History of Advertising in America. Jackson Lears. BasicBooks, New York, 1994. xvi, 492 pp., illus. $30.

Food Biotechnology. Microorganisms. Y. H. Hui and George G. Khachatourians, Eds. VCH, New York, 1994. xvi, 937 pp., illus. $195.