IX is inconsistent as it starts with a section on hydrogenation then proceeds to sections on functional groups so that, while Lindlar's catalyst is mentioned in the hydrogenation section, it is not found in the acetylenes section. No mention is made of catalysts other than Pd, Pt, and Ni.

Chapters X and XI are very good indeed and Chapter XII serves the useful purpose of pointing up the often underestimated value of alkali fusion as a meaningful degradation tool but does not include enough alkaloid cases; some of the alkali fusions in the strychnine field, for example, would have been illuminating examples. The chapter on polysaccharides is deficient in instrumental adjuncts to the chemistry, but beyond this the reviewer is not qualified to comment. Also inexpert in modern peptide degradation, the reviewer would only point to the lack of nonhydrolytic cleavages and the short section on selective cleavage in the protein chapter. One may wonder whether any substantial value can accrue in devoting only 28 pages to this extensive field. Chapter XIV, although written by the editor of the series, is careless and parochial to the point of self-indulgence; the examples are almost exclusively from the morphine field and only six of the 112 references date later than 1954, the date of the author's monograph on morphine chemistry. The examples rarely lead to generalization and no rationale is offered for these reactions (Hofmann, Emde, von Braun) taking different courses in different cases. The statement, unqualified by any mechanistic discussion, that cyanogen bromide reacts preferentially at benzylic sites is not borne out in the case of lycorine, but this important example is not cited. The two chapters on carbon–carbon bond fission (of which XVI is the better by far) should have been unified as one, for the present organization is confusing; the first two methods dealt with under single-bond fission being in fact reagents for double bonds! Grob's conversion of vicinal diacids to olefins with lead tetraacetate is omitted, as is epoxidation with pertrifluoroacetic acid. The very short chapter (XVIII) on degradation of side chains and long chains seems also an unnecessary separate division, more properly fused into a single chapter on carbon–carbon cleavage.

If it were not for the long and superb collection (XIX) of methods for stereochemical determination by Belleau and McLean, the second of these two volumes would probably not be worth buying. This chapter, more than one-third of the book, gathers together, as no other review has, the many different approaches to solving problems of stereochemistry and expounds them lucidly and in a modern vein. It is the only chapter in the two volumes to deal with the use of kinetics in structure determination. Finally, de Mayo's chapter on rearrangement is, as he points out, different in that it does not intend to provide a methodological guide but is merely "a record of the unexpected, the unintended, and, occasionally, the unfortunate." It is a fitting last chapter and makes fascinating reading. It also contains, as many other chapters do, formulas CCXXXIX, CXLVIII, CLXXXVIII, etc.; how long must chemical readers yet be frustrated by these vestiges of a dead civilization?

DEPARTMENT OF CHEMISTRY
BRANDEIS UNIVERSITY
WALTHAM, MASSACHUSETTS 02154
JAMES B. HENDRICKSON

Gas Chromatography. By HOWARD PURNELL, Lecturer in Physical Chemistry, University of Cambridge; Fellow of Trinity Hall. John Wiley and Sons, Inc., 440 Park Avenue South, New York 16, N. Y. 1962. vii + 441 pp. 15.5 × 23.5 cm. Price, $12.00.

The development of gas chromatographic applications for a seemingly infinite variety of problems continues to flood the literature with improvements and innovations in techniques, practices, and chromatographic theory. Until the past year or so, comprehensive and up-to-date treatments of all of these aspects have been rather lacking. Now, several books have appeared almost simultaneously that do cover the whole spectrum of chromatographic usage, and which can furnish the necessary introduction and background for the increasing number of chemists who find that chromatographic knowledge and skill is a must. One of the best of these is the well-written "Gas Chromatography" by Dr. Howard Purnell.

Dr. Purnell is an active participant in chromatographic development and has made significant contributions to both theory and practice. The present book derives much of its strength from this breadth of experience and knowledge on the part of the author.

The book is divided into three sections: the physicochemical background of gas chromatography, chromatographic theory, and chromatographic practice. The background in physical and chemical theory is rather succinctly described in the first section, and covers the relevant aspects in sufficient detail for the nonphysical chemist to understand the basic principles underlying the separations.

The section on chromatographic theory is much more detailed, especially in the coverage of the rate theories and experimental tests of their validity. The total coverage of physicochemical background and chromatographic theory is quite extensive, more so than in most treatments of chromatography, and very welcome in the profusion of largely empirical chromatographic knowledge.

For a large number, perhaps the great majority, of gas chromatographers, the application of this technique is a matter of finding satisfactory substrate and column conditions for the separation, without sufficient opportunity to optimize conditions or check the pertinent theory. At the present rate of publication of gas chromatographic papers, new solutions to problems will make any book largely out-of-date at publication. However, spot checks in areas of particular interest to our own research showed sufficient detail to lead to the current best solutions. For example, the detection of radioisotopes in a flow system is barely mentioned, but the included references would readily lead to useful descriptions; the separation of isotopic molecules is covered rather well for H_2, HD, D_2, and *ortho–para* varieties of H_2 and D_2, and mentioned for others; the beginning to a solution for some other difficult separation problems we have faced is also to be found.

This book furnishes a solid basis for the gas chromatographer and should maintain its usefulness for many years.

DEPARTMENT OF CHEMISTRY
UNIVERSITY OF KANSAS
LAWRENCE, KANSAS
F. S. ROWLAND

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