proximately one third of the book.

The authors have wisely restricted their discussion to the more relevant or commonly encountered aspects of each topic. The clear and concise theoretical treatments included in the discussion of experimental methodology make this book a useful reference source for the researcher and graduate classroom instructor alike. This book would, however, be a great deal more valuable had the authors taken more care in updating certain sections in the book. For example, in reviewing techniques to study enzyme mechanisms or structure, the authors tend to concentrate on techniques that were popular ten years ago and exclude from discussion more recent ones. To site a specific example, temperature and pressure studies of enzyme reactions were included in the chapter covering enzyme kinetics, yet a discussion of isotope effects on enzyme reactions was completely omitted. Similar types of omissions are made in some of the theoretical treatments. For example, great detail is given to equations which describe the pH behavior of enzyme reactions most of which was taken from papers published a decade ago. The more current theoretical treatments provided by W. W. Cleland and others were completely ignored as were papers dealing with supporting experimental studies. The chapter which appears most severely effected by being out-of- date is that dealing with enzyme mechanisms.

Perhaps equally disturbing is the authors' frequent failure to provide references that are either current or general in nature. Thus, while "Enzymes" provides the reader with a well-organized, concise review of the vast area of enzymology, its value is somewhat compromised by the fact that it is already at least five years out-of-date.

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Gas Tables. Thermodynamic Properties of Air, Products of Combustion and Component Gases, Compressible Flow Functions

Joseph H. Keenan, Jing Chao, and *Joseph Kaye*, John Wiley & Sons, NY 1980. xiv + 217 pp. 22 × 26.5 cm. $22.50.

This book is a revision of the 1948 edition of the "Gas Tables" written by J. H. Keenan and Joseph Kaye. It follows the same format and is designed for use in thermodynamic calculations where air and its constituents and the products of combustion of hydrocarbons with air are considered. A table for combustion with 100% excess air has been added with the remainder of the book essentially unchanged. The volume remains unique as a source of these thermodynamic data.

The authors of the second edition have used the latest physical, molecular, and spectroscopic constants to compute the reported properties. Recent atomic weights of carbon and hydrogen provide the molecular weights of the hydrocarbon fuels. The gross and net enthalpies of combustion for liquid and vapor fuels at 25° C are reported for 16 paraffins, 15 olefins, and 7 alkylbenzenes. The chapter on data sources gives a detailed description of the statistical mechanical partition functions used to compute the ideal gas thermodynamic functions.

The volume provides data for one-dimensional, isentropic, compressible flow. Tables of Rayleigh lines, Fanno lines, and the normal shock function are given at selected values of the polytropic exponent. Some additional tables for two-dimensional flow functions are also given for the polytropic exponent 1.4.

The numerical values in this second edition are significantly different from the first edition values at low and high temperatures. The central portion of the tables are nearly the same. This is the reason for presenting the second edition. Those who must make thermodynamic or gas dynamics calculations for air, its constituents, and hydrocarbon fuel combustion product systems will find these data very helpful. These data can be used in a classroom and a design office. Those who do computations routinely will probably have access to computer codes for doing their calculations. This book can serve to check the results produced by the computer codes.

The book is attractively printed and easy to read. Unfortunately, all tables are presented in English units. Conversion factors to SI and other units are provided, but this is always cumbersome. On balance, the authors have provided a source of thermodynamic data which many will find useful for many years to come.

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Gas Chromatography with Glass Capillary Columns

Walter Jennings, Academic Press, New York, 1980. Second Edition. Figs. and tables. 23 × 16 cm. xiv + 320 pp. $25.00.

There probably does not remain a single practitioner of packed-column gas chromatography who has not at one time or another stared incredulously at a capillary chromatogram of several hundred baseline-resolved peaks. Yet, there is today absolutely no question that separations are possible with such systems which simply cannot be realized otherwise. Thus, considerable interest has arisen over the past few years regarding open-tubular columns for GC (delayed somewhat as a result, perhaps, of the original patent covering the methodology), and activity in this field continues to grow at a remarkable pace.

The second edition of this text seeks to introduce the title subject to those already versed in gas chromatography as well as to provide a number of practical guidelines for those now engaged in related areas of research and development. Chapter one provides a modest introduction to the theory of the chromatographic process which, however, contains a few errors: Gaussian peak widths at the inflection point w_i are 2σ whereas those at half the height of the peak $w_{1/2}$ are $2\sigma\sqrt{2 \ln 2} = 2.355\sigma$. Thus, the two are not identical. Measurement of peak widths is facilitated simply by running the chart speed faster rather than the indicated procedure of using a magnifying glass (why this obvious fact seems to continue to elude chromatographers is a mystery). The symbol t_M is used for t_A ($t_M = jt_A$) which should be measured from the peak maximum and not from the peak leading edge (the differences will, however, be slight). "Phase" is mispelled as "phrase" frequently. The symbol k is used for k′ and will cause some confusion ($k = 1/k'$ as originally defined by van Deemter, *et al.*). The term *vida infra* is used far too frequently in the text and should wherever it appears be replaced by a section or page number. Chapter two introduces glass-capillary GC columns with a welcomed section on surface pre-treatments (those after drawing but prior to coating) while chapter three details various methods of deposition of stationary phases. Contrary to the opinion expressed on pp. 46–47, user-made columns (at least in the laboratory of the reviewer) exhibit higher efficiencies than those available commercially. Indeed, if it is true as stated that commercial columns are cheaper and better what, then, is the point of writing a book about the subject? Chapter four provides a discussion of inlet systems while chapter five offers hints as to column installation. Chapter six, measuring column efficiency, correctly points out that currently-popular methods of assessment of the merits of this or that system are only variants of methods of measurement of resolution between two peaks. Most of chapters seven (treatment of retention data) and eight (temperature programming and carrier flow considerations) should be deleted; those aspects peculiar to open-tubular columns can then be expanded upon. Chapter nine, special analytical methods, is far too brief to be of much use while chapter ten (column stability) could have been placed earlier in the book. Chapter eleven, column selection, offers virtually no help in choosing a stationary phase, nor are the problems associated with deposition of selective phases (e.g., cyanosilicones) onto glass treated with any authority. Chapters twelve (sample preparation), thirteen (analysis of non-volatile materials), and fourteen (weak discussion of instrument conversion) offer nothing for those who would presumably use this text and so should be deleted. Chapter fifteen (examples of applications) is undoubtedly the most informative in the text; numerous chromatograms are presented which illustrate the scope of separations possible with open-tubular columns of high efficiency. Chapter sixteen (fault diagnosis) is again far too brief to be of any use. The work is concluded with four appendices (nomenclature, a list of liquid phases, retention data with porous polymer adsorbents—why included is a mystery—and silylation procedures which have been covered in much greater detail elsewhere), none of which are of any use, and an index.

Although intended to be pedagogic, this book fails to offer much other than a brief taste of all that is involved in the construction and use of glass-capillary GC columns. The