NEW BOOKS

INDUSTRIAL WAXES, H. Bennett (Chemical Publishing Company, Inc., Vol. I, Natural and Synthetic Waxes, 324 pp., 1963, $12.00; Vol. II, Compounded Waxes and Technology, 289 pp., 1963, $12.00). Books dealing with the technology of waxes exclusively can be counted on the fingers of one hand. For its avowed purpose as expressed in the title "Industrial Waxes," this two-volume compilation is outstanding. This edition is a marked improvement over the previous edition in 1956. The separation of the chemistry and physics of waxes from wax compounding and technology, lacking in the earlier editions, certainly contributes to the usefulness of these books.

Vol. I can be of considerable value to the wax technologist seeking information on the source and characteristics of commercially available waxes. The text proceeds logically starting with natural waxes handled in the order of paraffin, microcrystalline, other mineral waxes, vegetable and animal waxes. The section on synthetic waxes covers the subject well although the omission of the composition of several of them is perplexing, particularly when the information is readily available.

Vol. II contains a wealth of information for the formulator who seeks a starting point. The areas in which waxes are used in formulations appear to be nearly exhaustively covered.

Some of the information, however, carries reference dates of 20–25 years ago and one wonders if more recent information might have been available if sought. Vol. II contains some evidence of lax proof reading as well as an annoying tendency to overstress some commercial products.

These two volumes are worthwhile additions to any reference library where waxes and their uses are a matter of interest.

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INFORMATION RETRIEVAL AND MACHINE TRANSLATION, Vol. III, Part 1, edited by Allen Kent (Interscience Publishers, Inc., 686 pp., 1960, $23.00). This book contains 21 of 54 papers given at the International Conference for Standards on a Common Language for Machine Searching and Translation held September 6–12, 1959 under the auspices of Western Reserve University and the Rand Development Corp. The remainder of the papers are to be presented in Part 2. The papers included in Part 1 are not of general interest and are of value, perhaps, only to those most intimately associated with literature searching and translation as a machine function.

The first paper is an analytical review by Allen Kent, and consists essentially of an extensive compilation (211 p.) of the various groups working on information retrieval and the scope of their investigatons. The remaining papers are concerned with both theory and description of various schemes for literature analysis, organization, coding and retrieval.

This book is for the specialist in information retrieval and of little use to the practical chemist or engineer.

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PHYSICAL CHEMISTRY OF PETROLEUM SOLVENTS, by W. W. Reynolds (Reinhold Publishing Corp., 1963. $10.00). The book presents the results of a ten-year study, at the Shell Oil Company's Wood River Laboratory, of the role of petroleum solvents in their many applications. Throughout the book, practical measurements of industry are related to theoretical principles with the objective of enabling the user to make intelligent choices of solvents for particular purposes. It should be very useful to paint and petroleum technologists and also to others who find use for hydrocarbon solvents of which a wide spectrum is now available. Physical chemists should also find it revealing in the extent to which principles of solvency and rheology have been applied to practical situations and in showing the direction in which further work should be done to understand more fully the nature of the solvent behavior. The book is well-documented and well-indexed.

In the first chapter, the constitution of petroleum solvents of various classes (paraffins, naphthenes and aromatics) is discussed and the variation of their properties both with respect to molecular wt within a class and to structure is described. Solvency is here related not only to the constitution of the hydrocarbons but to their aniline points and Kauri-butanol values as well. Volatility and odor are other important properties considered here.

Solvency and the role of the solvent are further treated in the second chapter. Measures of solvent power commonly used in industry are described first and then the thermodynamics of solutions. The Hildebrand-Scatchard solubility parameter concept is applied to single solvents, mixed solvents and irregular solutions. The Flory-Huggins equation is applied to polymer solutions.

The flow properties of liquids, disperse systems, resin-solvent systems and paint form the subject-matter of the next three chapters. Methods of measuring viscosity are described and explained in detail. Properties are again related to constitution and molecular weight of both resin and solvent and the influence of the pigment in paint is taken into consideration. Practical measurements such as those of yield value and sag are related to fundamental rheological properties. The development of useful rules for solvent selection is again clearly outlined.

The evaporation rate of solvents, in Chapter 8, is shown to be described by either the Langmuir-Knudsen equation derived from the kinetic gas theory or the Gardner equation which assumes the process to be diffusion limited. Methods of measuring evaporation rate and the correlation of this property with others such as viscosity are pointed out particularly in connection with the drying of paints. The final chapter of the book deals with the influence of the solvent on the properties of the dried film of a finished paint. Solvent volatility has a critical effect on film properties and the solvent has a marked influence on film quality.

For each topic, elementary explanations are given before applications are made. Several new pieces of apparatus, devised during the course of the investigations, are described. The sense of development from theory to application and from research apparatus to tools of practical value is so well indicated that the book could well serve as an adjunct textbook for physical chemistry courses.

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MOLECULAR SPECTROSCOPY, GENERAL AND INTRODUCTORY LECTURES, FIFTH EUROPEAN CONGRESS ON MOLECULAR SPECTROSCOPY, Amsterdam, May 29–June 3, 1961. (Butterworths, London, 1962, 189 pp.). These lectures are reprinted from *Pure and Applied Chemistry*, Vol. 4, No. 1, and represent summaries of current activities in modern spectroscopic research. Among the topics covered by authoritative researchers are various modern aspects of IR and microwave spectroscopy (vibrational-rotational spectra, matrix isolation spectra, intermolecular and solvent effects, adsorption phenomena and potential functions, as well as a most complete bibliography of microwave work done in 1959 and 1960); of Raman Spectroscopy (solvent effects, resonance Raman effect and long-wave excitation); of UV spectroscopy (charge-transfer spectra, vacuum UV spectra, π-electron spectra and other applications to organic molecules including energy transfer from triplet states); and of electron-spin-resonance and nuclear-magnetic-resonance spectroscopy (C^{13}-splittings, hyperfine coupling in aliphatic free radicals and other organic applications).

In general the bibliographies of the various articles are complete through 1960. Practicing spectroscopists will find the articles significant, although somewhat out-of-date in 1964.

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