The manual contains 17 short appendices. Each of these will be useful, particularly the index of trade and proprietary names and the list and addresses of manufacturers. A solubility chart is included in band on the inside of the back cover.

Each solvent is assigned a preferred name in bold caps. Regrettably, not all of these conform with accepted nomenclature. It is difficult to reconcile hexylene glycol with $(CH_3)_2C(OH)CH_2CH(OH)CH_3$. Immediately below each preferred name in brackets are listed lesser names which presumably are used in the trade. Many of these are incorrect. For example, isohexyl alcohol represents $(CH_3)_2CHCH_2CH_2CH_2OH$ and not $(C_2H_5)_2CHCH_2OH$ as given in the manual. Mention should also be made of the frequent yet improper use of the prefix iso with an alkanol such as isobutanol, isohexanol, isopropanol and others.

Some errors are present in the manual. Production of dioxan from ethylene glycol is by dehydration and not dehydrogenation as stated on page 153. Nitropropane is listed as nitropeopane in the index. Octadecadiene is misspelled on page 391.

The publishers recommend the manual as a reference book for industry, especially that concerned with paints, lacquers, varnishes, pharmaceuticals, perfumery, cosmetics, essences and flavorings, soaps and lubricating oils, dyestuffs and pigments, petroleum refining, textile processing, dry cleaning, rubber processing and plastics. The book is recommended for consideration by scientists in these fields, although usefulness of the manual will be somewhat limited particularly in view of some omissions from the list of solvents, among which are acetonitrile, dimethylformamide, dimethyl phthalate, nitroethane, nitromethane, 1-nitropropane, 2-nitropropane, tricresyl phosphate, to mention a few.

RESEARCH DEPARTMENT
R. J. REYNOLDS TOBACCO COMPANY MURRAY SENKUS
WINSTON-SALEM, NORTH CAROLINA

Tables for Predicting the Performance of Fixed Bed Ion Exchange and Similar Mass Transfer Processes. By ASCHER OPLER, Project Leader, Research Department, The Dow Chemical Company, and NEVIN K. HIESTER, Senior Chemical Engineer, Stanford Research Institute, Stanford Research Institute, Stanford, California. 1954. iii + 111 pp. 21.5 × 27.5 cm. A limited number of free copies are available and will be furnished as single copies to requestors.

This book is a competent tabulation of the Bessel solutions to the differential equation initially proposed by H. Thomas, which empirically correlates ion exchange column behavior. According to this equation

$$\left(\frac{dq}{d\gamma}\right)_v = kC_a\,q_b - \frac{k}{K_{ab}}\,q_a\,C_b$$

where k is a rate constant, γ is a time-dependent parameter, K_{ab} is a concentration equilibrium constant and C, q refer to the concentration of each species in the outside solution and that inside the resin, respectively.

The initial portion of the book is devoted to a demonstration of the applicability of the above equation to ion exchange column behavior under various boundary conditions and in general to other related phenomena such as heat transfer and adsorption of the Langmuir type. The authors obtain a series of empirical constants which they relate to such ion exchange operating parameters as flow rates, column length, void space, resin selectivities, diffusion rates, etc.

The remainder of the book is devoted to a description of the mathematical techniques used, and a tabulation of specific solutions for a wide range of operating conditions. The authors, moreover, include representative examples which are helpful in clarifying the tables. It would have been useful and pertinent, however, to have compared predicted performance with actual experiment.

As for mathematical techniques, the authors rely to a considerable extent on the $(1 - J)$ values compiled by Brinkley. They obtain the solutions of Bessel functions in part by means of an asymptotic expansion suggested by L. Onsager. An elaborate punch card system has been set up by the authors and the project is well executed. It should be noted however, that the advent of such instruments as the "Oracle"[1] should result in a considerable extension both in scope and accuracy of tabulations of this sort, because such instruments permit a direct calculation of the Bessel function.

For those who are concerned with a fundamental understanding of ion exchange column behavior, the tables are not as complete as could be desired. Although the mathematical task would have been considerably more difficult, it would have been very valuable to have determined more solutions as a function of the fractional degree of attainment of equilibrium. Moreover, the basic differential equation as applied to column performance assumes that the exchange selectivity is independent of resin composition. When one realizes that in some cases this value can change at least tenfold during experiment, considerable caution must be exercised in making such an assumption.

For the most part, the tables contain a considerable number of solutions of columns operated under "breakthrough conditions" and should prove to be highly useful to chemical engineers concerned with column design for a particular separation problem.

(1) Oak Ridge automatic computer and logical engine, an electronic digital computer.

CHEMISTRY DIVISION
OAK RIDGE NATIONAL LABORATORY B. SOLDANO
OAK RIDGE, TENNESSEE

Organic Syntheses. Volume 34. By WILLIAM S. JOHNSON, Editor-in-Chief. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1954. v + 121 pp. 15.5 × 23.5 cm. Price, $3.50.

It is said that procedures submitted to *Organic Syntheses* should involve "The preparation of compounds which are of general interest" or should "illustrate useful synthetic methods." The adequacy of this volume as to the first requirement is largely a matter of opinion (one may take heart, if one's current interests have been overlooked, in the thought that new volumes, like new theories in education, will appear at more or less regular intervals). Surely, compounds such as di-*tert*-butyl malonate, diphenylacetylene, diphenyl succinate, ethoxyacetylene, methylisourea hydrochloride, phenanthrenequinone and *o*-phthaldehyde fall within this category.

Several contributions appear to fulfill the second objective. Among these may be cited the arylation of quinone (p. 1), the conversion of an acid to its nitrile (p. 4), the conversion of an ester into its ethoxalyl derivative with subsequent decarbonylation of the latter (p. 13), the peroxide-initiated interaction of aldehydes with ethyl maleate to form acylsuccinic esters (p. 51), the Darzens glycidic ester synthesis (p. 54), the conversion of a succinate to a thiophene (p. 73), the sulfonation of an olefin (p. 85), side-chain bromination (pp. 82, 100), and the very interesting conversions of trimethylbenzylammonium salts into *o*-methylbenzylamines (p. 56, 61). Of special interest is the synthesis of *p*-tolylsulfonylmethylnitrosamide (p. 96) and its use in the preparation of diazomethane (p. 24, 99).

The present volume appears to be well up to the standards set by preceding volumes in clarity of description, freedom from typographical errors, and general excellence of printing, diagramming and indexing.

DEPARTMENT OF CHEMISTRY
UNIVERSITY OF NORTH CAROLINA R. L. MCKEE
CHAPEL HILL, N. C.