

reactors that most suited to the situation in which considerations of by-products, purification, complexity, cost availability and difficulty of maintenance all play a part. The remainder of the text is in two long chapters covering the basis of the chemical engineering principles and the design approach. The chemical engineering principles are covered in about 170 pages and include such topics as stoichiometry, equilibrium, kinetics on the chemical side and fluid dynamics, mass transfer and heat transfer in the engineering fields. This is a quick survey, but is quite sufficient to indicate the range of problems in an introductory text and sufficient references are given to lead the reader further. The hundred pages on design of reactors deal with homogeneous and non-homogeneous systems under steady and unsteady conditions. The section on flow reactors and cascade reactors is very useful as an indication of the problems of associating mass and heat transfer with the reaction.

This book provides a useful outline of the German background and the translation by Diener and Weaver will undoubtedly form a useful addition to the texts in this field. The text has good references, but would be improved for the reader and student by the addition of more problems, as it is in seeing the solution that the real methods are properly explained. J. M. COULSON

## ORGANIC CHEMICAL ANALYSIS

### Titrimetric Organic Analysis

By M. R. F. Ashworth. Part 2: Indirect Methods. (Chemical Analysis: a Series of Monographs on Analytical Chemistry and Its Applications, Vol. 15, Part 2.) Pp. xix+1023. (New York and London: Interscience Publishers, a Division of John Wiley and Sons, Inc., 1965.) 245s.

THIS book completes Prof. Ashworth's comprehensive survey of organic volumetric analysis; it catalogues methods in which an excess of reagent is added, and either the excess or a reaction product is titrated. The volume is in three sections: a brief introduction, a survey of the literature (mostly between 1925 and 1963 or mid-1964), and two indexes, the first to compound classes or functional groups, the second to individual compounds, covering both Part 1 and Part 2. The literature survey is in 115 tables, each dealing with one reagent, and preceded by a brief review of the reactions concerned. Under each entry there are very concise notes on "materials titrated", "reagent and reaction conditions", "subsequent treatment and final titration", and the reference. There are about 6,000 references, so the quantity of information included is enormous; even so, the author has been unable to include all references to widely used reagents and has omitted all references to vaguely defined materials (such as sewage or "solids not fat" in milk) and to polemical papers.

The author has succeeded in compressing so much information between the covers of one volume that it may seem ungracious to cavil, or to suggest that his scheme has disadvantages, but the plan of listing reagents, rather than functional groups or compound types, makes the book difficult to use. For example, "halogen reagents in determination of unsaturation" is a summary table with seventeen entries, but it gives no cross reference to "bromine reagents", "iodine reagents" and others commonly used in the determination of unsaturation. The two chief reagents used for determining hydroxyl groups—acyl anhydrides and acyl chlorides—appear in different tables, under "anhydrides" and "halides (active)", respectively. But "halides (active)" is a most heterogeneous collection, including acyl chlorides, alkyl iodides, chloramine T, *p*-toluene sulphonyl chloride, and 2:4-dinitrochlorobenzene. The indexes are not always a help; there is, for example, no entry under "hydroxyl com-

pounds", not all of which can be found under "alcohols", "phenols" or "carbohydrates". Again, the index entry under "1:2-glycols" only records "many references"; but a newcomer to the subject might not know that in the table "Periodates and Periodic Acid" he would find fifty-one references to *vic*-dihydroxy-compounds.

Some time ago I began to question the advisability of producing these massive but incomplete and uncritical surveys of the literature of analytical chemistry. I know very well the hours of grinding toil that the authors must spend, and I question whether the return in usefulness is commensurate. In particular, for whom are included the references to old methods, never very good and now hopelessly obsolete? As a practising analyst I know almost nothing of the present-day requirements of academic institutions. But the busy analytical chemist will turn to a critical survey, such as is published in important European or American analytical journals, and he will not want to be restricted to one technique such as volumetric analysis, because in the event he is just as likely to have recourse to some physical technique, such as spectrophotometry or mass spectrometry.

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## RADIOACTIVE POLLUTION

### Colloque International sur la Pollution Radioactive des Milieux Gazeux, Saclay

12-16 Novembre, 1963. (Radioactive Pollution of Gaseous Media.) Tome 1: Pp. 288. Tome 2: Pp. 289-563. (Gif-sur-Yvette: Centre d'Etudes Nucléaires de Saclay; Paris: Presses Universitaires de France, 1965.) n.p.

THESE books contain sixty-five papers presented at the Colloque International sur la Pollution Radioactive des Milieux Gazeux, most of them from the United States, France and Germany, with smaller numbers from other European countries. The papers are divided into five sections, and of the total, thirty are in English and the remainder in French. Volume I contains: (1) contamination of the atmosphere by fall-out and natural radioactivity; (2) the influence of meteorological factors on atmospheric contamination; (3) problems caused by accidental releases of radioactivity; and part of section (4), air cleaning methods and equipment. Volume II contains the remainder of section (4) and (5), methods and instruments for measuring atmospheric contamination.

As might be expected from such a wide range of subject-matter, the coverage is somewhat patchy and the consequent absence of many active workers led to a rather sparse and sterile discussion (reported verbatim in French), much of it generated by the absence of preprints for the participants. I found most informative the section on the size and composition of fall-out particles and that on the properties of particulate aerosols likely to be encountered in laboratories handling radioactive materials.

Most of the United States work has been reported elsewhere and the interest for English-speaking readers will lie largely in the continental papers; a certain amount of parochialism by some of the continental authors suggests that the converse ought also to be true. Certain national tendencies are apparent: the Germans, for example, are much concerned with fall-out measurements and they show a preference for environmental monitoring networks at nuclear sites in which the results are continuously telemetered to a central control point; at the other extreme a Belgian paper describes a system in which village constables are required to switch on air samplers on receipt of instructions by telephone. The French seem much preoccupied with the problems of extremely small particles.

Since the majority of the papers or similar versions of them have been published elsewhere either before or