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## BOOK REVIEWS

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**Modern Instruments in Chemical Analysis.** First Edition. BY FRANK M. BIFFEN, B.Sc., F.R.I.C., Research Specialist, Johns-Manville Corporation, and WILLIAM SEAMAN, M.S., Ph.D., Research Fellow, American Cyanamid Company. McGraw-Hill Book Company, Inc., 330 West 42nd St., New York 36, N. Y. 1956. ix + 333 pp. 16 X 23.5 cm. Price, \$7.50.

The announced objective of the authors is to provide information for the general analytical chemist, and for others, regarding many of the leading physical principles and the instruments that are very frequently employed in chemical analysis. In spite of the somewhat different purposes and orientation, this book compares very favorably, as to scope and manner of treatment, with the three leading books of similar character that are more specifically aimed toward instruction in university courses.

The authors have concentrated their attention primarily upon photometric methods, electrical techniques and radioactive measurements.

After a brief consideration of the electromagnetic spectrum, chapter 1, the succeeding seven chapters deal, respectively, with: 2. Emission spectrographic methods. 3. Flame photometry. 4. Visible and ultraviolet absorptiometric methods. 5. Infrared spectroscopy. 6. Raman spectroscopy. 7. Mass spectrometry. 8. X-Ray diffraction. Five of the remaining chapters deal with electrical methods: 9. Survey of electroanalysis. 10. Polarography and amperometric titrations. 11. Potentiometric analysis. 12. Conductometric analysis, including the high-frequency method. 13. Coulometric analysis. The concluding chapter is: 14. Radioactivity.

Some topics that might have been expected have been omitted, as for example, fluorimetry as applied to solutions and solids, thermal methods such as enthalpy (thermometric) titrations and thermal conductance measurements. The latter topic has become of great importance in connection with vapor-phase chromatography.

In general, each chapter and each major topic is treated briefly and clearly, with generous use of line drawings and photographs of major features of the instruments. A good selection of reference books and selected journal articles is included in a rather extensive bibliography at the end of each chapter. This feature will enable the technical man to go fully into the more detailed aspects of any of the subjects that are treated.

The book is very readable, and the general composition is very good and quite free from misprints and other defects of manufacture.

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**Ion Exchange and Its Applications.** Papers read at the Conference in the William Beveridge Hall, London University, 5th-7th April, 1954, with the discussions that followed. Society of Chemical Industry. The Macmillan Company, 60 Fifth Avenue, New York 11, N. Y. 1956. 173 pp. 22 X 28 cm. Price, \$7.50.

This book is a set of some twenty review papers, each on somewhat different aspects of the field and written by different authors, with apparently no or little editing. Inevitably then, one encounters a considerable amount of duplication; the space allotted to each topic is often not commensurate with its extent or importance, and the contributions are of rather uneven quality.

The first section on *theoretical aspects* begins with a paper on the synthesis and general properties of resins; this is the best, short discussion of the topic this reviewer has seen. The paper on ion-exchange equilibria appears to skim over the more fundamental concepts, concentrating too much on the more formal but less informative contributions. Little information is given for the reader interested primarily in practical applications. Ion-exchange kinetics are discussed briefly and in general terms. The paper on column

operations is essentially a review of the elegant contributions of its author, but does not mention the more simple treatments of other authors which lead to equally good values for calculated theoretical plate heights. The practical aspects of rate phenomena are, unfortunately, ignored.

The section on *industrial applications* includes two papers on water treatment and demineralization, both of which are so vague and general as to be of little practical value. The following two papers on the recovery of copper and on metallurgical applications contain interesting information, but are too brief and too general in nature.

The section on *inorganic and analytical applications* contains an introductory paper on analytical aspects, one which is entirely vague and often misleading. An article on the recovery of gold from cyanide solution is excellent. It shows how to attack the problem of the separation of a complex system, going from the laboratory through the pilot plant to plant operation. An article on the use of resins for concentrating traces of dissolved metals for analytical purposes is interesting, but its subject matter is so limited that it does not merit the accorded space. This section continues with an excellent review of continuous ion-exchange processes, presented in an authoritative and well documented manner. The subsequent article on the use of resins in the study of complex ions, where the resin is used either as a sorbent for an ion or for one of its complexes, is similarly authoritative. A much too brief summary of the use of membranes for desalting purposes concludes the section.

The section on *organic and biochemical applications* starts with a contribution dealing with amino acids, peptides and proteins, one which summarizes the older work well but devotes only a short section to the recent and most successful methods. Two brief and excellent reviews of applications to the wine industry and to medical practice follow. The summary of cation-exchange processes in soils does not attempt to relate these phenomena with other, related topics in the book.

This section is concluded with three papers: the first an excellent review on the separation of nucleic acid degradation products; the second a short description of dye purification processes making use of the "sieve" effect; the third a résumé of ion-exchange methods for the separation of alkaloids.

Each paper is followed by its discussion. It is here that the lack of editing is particularly felt, because so much of the discussion centered on questions to which there was no answer.

These papers understandably stress British contributions in this field, but space limitations mean that this is often done at the expense of equally valuable work by others. Further, most of the contributors devote entirely too much space to historical introductions and to material covered by other papers, with the result that about one-third of the available space is wasted. This being the case, the price of this book seems too high.

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**Tables of Chemical Kinetics, Homogeneous Reactions.**

National Bureau of Standards Circular 510, Supplement 1. National Bureau of Standards, Office of Technical Information, Washington 25, D. C. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. xiv + 472 pp. 23 X 29 cm. Price, \$3.25.

This present supplement to "Tables of Chemical Kinetics" covers work up to 1953 on Rearrangements, Isomerizations, Condensations and Solvolyses, including much work published prior to 1951 but not presented in the original volume. Exhaustive search of American and British journals only is claimed, but since articles cited in these are also included, the coverage is actually much wider. To each table is appended a section of comments which amplify and explain the data given in the table. These com-