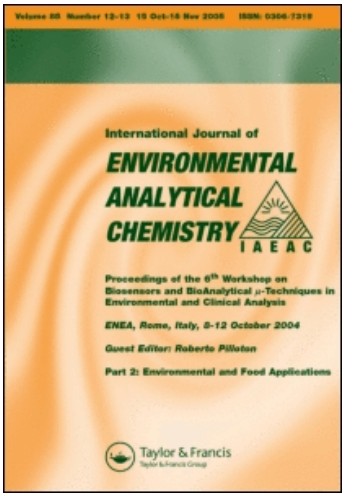

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Book Reviews

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Book Reviews

Aquatic Chemistry: An Introduction Emphasizing Chemical Equilibria in Natural Waters. Werner Stumm and James L. Morgan. Wiley-Interscience, New York, London, Sydney, Toronto 1971. XV+582 pages. Reviewed by R. P. Walser, Quality Control, Pharmaceutical Division, Sandoz Ltd., Basle, Switzerland.

This book is primarily a text book concerning methods of application of physico-chemical principles to problems of natural waters—rivers, lakes, oceans, ground-waters and water-treatment systems. The authors address the book to those scientists and engineers interested or working in the field of aquatic environments.

Chapter 2 contains a good summary of the basic kinetic and thermodynamic concepts necessary for the study of processes and reactions in solution. The next chapter gives a thorough treatment of acid-base theory, including a systematic and detailed explanation of all calculations arising during the study of acid-base reactions. Special emphasis is placed on the use of graphical methods of computation. Chapters 4 and 5 are devoted to the study of the reactions of dissolved carbon dioxide and of precipitation and dissolution reactions. An introduction to the reactions of metal ions in aqueous solution, with special emphasis on hydrolysis and complex formation, is given in Chapter 6. As in the previous chapters, several practical examples are given and the quantitative treatment of the reactions involved is explained. Chapter 7 is concerned with the equilibrium calculations of redox reactions, electrode potentials, the electrochemical cell, an introduction to the cycle of organic carbon and an introduction to potentiometric measurements. The regulation of the chemical composition of natural waters, the cycle of rocks and the course of weathering, solubility of silicates and an introduction to the buffering of natural waters are all discussed in Chapter 8. These problems are discussed using the models developed in previous chapters. Finally, the interaction between organisms and an abiotic environment is discussed briefly; a more detailed discussion of water pollution would be welcome at this point. Chapters 2–8 contain a systematic derivation of all important equations and physico-chemical relations. At the end of each chapter several problems are presented, which are most useful for the understanding of the subjects discussed. Chapter 9 contains an introduction to the solid-solution interface, and the last chapter of the book contains three case studies (phos-

phorus, iron, and manganese); these studies are included as an illustration of the methods presented in the preceding chapters.

This book, which has remarkably few typographical errors, is a good introduction to the study of natural waters and of water treatment and will be found useful by those engineers and scientists interested in these fields. It is also an excellent text book for advanced undergraduate or graduate students, and it contains a number of useful references for a more detailed study of natural waters.

Residue Reviews. Edited by F. A. Gunther, Springer Verlag, New York, Vols. 34, 38, *and* 40, 1971.

Reviewed by O. Hutzinger, Atlantic Regional Laboratory, National Research Council of Canada, Halifax, Nova Scotia, Canada.

Residue Reviews, a well-established series, has just finished its tenth year of publication. These hard-cover collections of reviews which attempt "to provide concise, critical reviews of timely advances, philosophy, and significant areas of accomplished or needed endeavor in the total field of residues of these chemicals in foods, in feeds, and in transformed food products" obviously fill a need: the publication frequency has increased from one volume in 1962 to seven in 1971.

Throughout the years, analytical methodology and background information have formed an important part of this series. Articles with analytical content and implications will be reviewed here for the three volumes mentioned above.

Determination of organophosphorus pesticide residues in fruits and vegetables on the Swedish market from 1964 *to* 1968, *by S. Renvall and M. Åkerblom* (*Vol.* 34, *p.* 1).

This article presents, on 22 pages of text, the analytical methodology used as well as results for 25 organophosphate insecticides in fruit and vegetables, both domestic and imported. After a description of methodology (extraction, clean-up, cholinesterase inhibition, gas chromatography and thin-layer chromatography) pesticide levels in different crops and for a number of countries are given and compared.

Main interest is for routine analytical laboratories and regulatory agencies.

Pesticide residue analysis in the presence of Polychlorobiphenyls (*PCB*), *by L. M. Reynolds* (*Vol.* 34, *p.* 27).

As the title implies, a portion of this timely review deals with interference of PCB in the analysis for pesticide residues and how to deal with it. Sub-

stantial sections, however, are devoted to the PCB themselves: presence in the environment, use and properties, entry into environment, toxicity and analysis.

The literature coverage is good although—not by the author's fault—out of date in certain areas, which is unavoidable in a field where new results are reported in such a rapid succession.

The only real criticism is on a minor point; in Section V, "possible modes of entry of PCB into the ecosystem" point (*c*) reads: "Although it is unlikely, some type of Ullman reaction cannot be completely ruled out . . ." I do not think the story of environmental formation of significant amounts of chlorobiphenyls needs to be perpetuated, even as a possibility.

Most reviews on PCB to date deal with the biological aspects. Reynolds' article on the analytical implications will be most welcome to workers in the field.

Development of the Food and Drug Administration's method of analysis for multiple residues of organochlorine pesticides in foods and feeds, by J. A. Burke (*Vol.* 34, *p.* 59).

This 12-page article, with a foreword by J. W. Cook, describes the development of the FDA multiresidue method, as well as methods for confirmation of residue identity (for which no definite procedure has been established). In the useful appendix, supporting data (references), recovery data and a list of chemical names of pesticides are given.

Carbamate insecticide residues in plant material: Determination by gas chromatography, by I. H. Williams (*Vol.* 38, *p.* 1).

The most important aspects of analysis of carbamates by GLC are discussed on 20 pages: GLC detectors and columns and methods of extraction and clean-up. Direct and indirect (derivatisation) methods of analysis are discussed and extensive tables give the information in an easily accessible form.

Analytical methods for the determination of fumigants, by B. Malone (*Vol.* 38, *p.* 21).

Fumigation is one of the oldest methods of pest control and this review presents an account of analytical methodology. Bromides, "other" fumigants and multiple fumigant residues are discussed as the main topics. This article is comprehensive and includes many old references. Tabular presentation could have shortened this review of almost 60 pages.

Recent applications of mass spectrometry and combined gas chromatography-mass spectrometry to pesticide residue analysis, by F. J. Biros (*Vol.* 40, *p.* 1).

Mass spectrometry is rapidly becoming an established technique in pesticide chemistry, with more and more laboratories getting access to this "sophisticated" technique.

The article by F. J. Biros, which covers both theoretical and practical aspects, is excellent. On 63 pages the following topics are discussed: the mass spectral fragmentation behavior of pesticides (organophosphorus, organochlorine, carbamate and miscellaneous pesticides); mass spectrometric technique; isolation of individual residues (standard isolation and separation, collection devices); applications of mass spectrometry to pesticide residue analysis (animal metabolism, plant and soil induced alterations, photodecompositions); combined gas chromatography-mass spectrometry (coupling techniques, other considerations); application of combined GC-mass spectrometry to pesticide residue analysis.

The reviewer feels that just the right amount of fragmentation mechanisms are introduced to allow the novice—with the aid of a standard text—to appreciate this field. Most fragments of aromatic compounds are presented as definite cyclic structures and the usual question, as to how accurately these structures represent the actual species, must be applied here.

This review was brought up to date by the addition of more than 40 references at the proof stage.