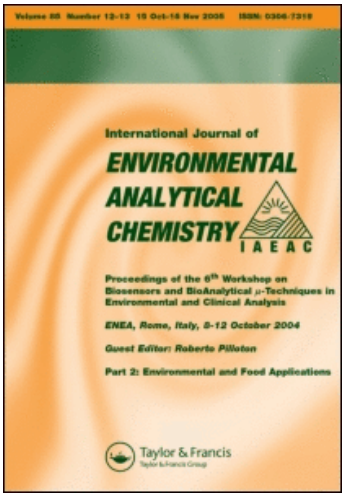

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Book Reviews

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Book Reviews

ANALYTICAL METHODS IN HUMAN TOXICOLOGY, Part 1, edited by A. S. Curry, Reading, U.K., 319 pages (including 91 figures, 28 tables, references added to each chapter, and a subject index of 19 pages), hard cover, format 242 × 160 mm, ISBN 3-527-26284-9, Verlag Chemie GmbH, Weinheim, Deerfield Beach (Florida), and Basle (1985), DM 148.00, US$ 65.00

Sophisticated techniques are applied in life-saving or post-mortem analytical toxicology in order to localize, identify and measure extremely small quantities of foreign material in the human body. Emphasis must thus be laid to ensure purity of all handling preparations at all stages. The techniques now available cover the whole spectrum from the disintegration of molecules in mass spectroscopy to the immunological properties of the body. In forensic medicine and in pharmacology analytical toxicology does not stop when a particular compound has been traced and its metabolism followed in the body. Some of the modern advances concern toxicology at the cellular level (for instance also the entry of chemical substances into the genetic pathways is being tracked by analytical techniques described in the volumes).

The collection of contributions is structured into ten chapters, written by 12 British and one Greek experts. Some chapters are more related to drugs. Others are also related to environmental research, or are excellent discussions of technologies which may also be applied in other fields than pharmacology. In a chapter on histochemical procedures one finds for instance also information on affinity chromatography, fluorescence and immunoenzyme techniques. In a chapter on clinical toxicology chromatographic and non-chromatographic techniques and quality assurance are discussed, besides drugs also for instance for pesticides, chlorinated aliphatic

compounds, ethanol, iron (colorimetric method), lithium (AAS), and solvents. In a valuable table of 8 pages "normal" concentrations in plasma of 138 substances (including heavy metals, some pesticides, methanol, ethanol, and toluene) are compared with toxic concentrations. In a chapter on solvent abuse retention times of benzene, chloroform, toluene, etc. are discussed. A special chapter deals with mass spectrometry, another with indirect atomic absorption (for nometal or organic analysis). A special chapter is also devoted to capillary column gas chromatography, in which types of columns, injection systems, stationary phases, characterization, care of columns, and derivatization are discussed in detail. Examples are for instance presented for aromatic and heterocyclic nitro compounds, malathion, and contaminated cooking oils.

E. MERIAN

TOXICOLOGY AND BIOLOGICAL MONITORING OF METALS IN HUMANS (INCLUDING FEASIBILITY AND NEED), by Bonnie L. Carson (Midwest Research Institute, Kansas City, Missouri), Harry V. Ellis III (PRC Engineering, Chicago, Illinois), and Joy L. McCann (Midwest Research Institute, Kansas City, Missouri), 328 pages (including one table on human low-level exposure to metals: exposure levels, biological effects, concentrations in biological media; including also references for each of 69 metals and a valuable index of 24 pages), hard cover, format 236 × 161 mm, ISBN 0-87371-072-X, Lewis Publishers, Inc., Chelsea, Michigan 48118 (1986), £45.95

The volume tries to bring toxicological, exposure, and monitoring information about metals and metalloids together in a brief, uniform format. Midwest Research Institute is assisting the Environmental Protection Agency in developing protocols for the monitoring of selected metals and organic compounds in the blood level of the general U.S. population. The monitoring will enable evaluation of changes in the blood over time and any trends associated with instituted control measures. The review is intended to help EPA select the metals to be included in the monitoring effort based on toxicity, relative exposure, and the ability of blood measurement to

reflect exposure. The information presented is based on secondary references (EPA reports, EPA and NIOSH criteria documents), and recent primary references (identified from a computer search of toxic substances in human blood; analytical chemists rated the quality of the analytical methodology).

Fifty-three profiles are presented in comparably structured form. For each metal and metalloid one finds thus information on occurence, uses and chemical and physical properties in an introduction. Then three sub-chapters deal with exposure and exposure limits (oral, inhalation, dermal, total body burden and balance information), toxicokinetics (absorption, distribution, excretion), and effects (acute and other short-term exposure, chronic exposure, and biochemistry). Each profile ends with recent references, which are useful as such. Because the formats are indeed very brief (which has the advantage to get rapidly an overview) only very limited information (normally about 2 figures from 2 references) is given under each heading, so that in some cases this selection happens to be somewhat arbitrary. One finds also for instance practically nothing about speciation (which chemical species are taken up, are transformed, reach critical organs, or are responsible for effects). Especially the information on carcinogenicity are collected arbitrarily. For instance in the chapter "chromium" in some subchapters there is a differentiaion between chromate and chromium(III), but it is said that Cr(III) has been implicated in lung cancer cases, and that gastric cancers, presumably from excessive mouth breathing or from swallowing inhaled dusts, have also been reported. This is probably not correct. The book thus gives useful first guidelines, for definite conclusions some criticism is necessary. An advantage is the difficult to find information on rarer metals.

E. MERIAN

PHOTOMETRIC METHODS IN INORGANIC TRACE ANALYSIS (Comprehensive Analytical Chemistry Volume XX), by Endre Upor, M. Mohai and Gy. Novàk, Mecsek Ore-Mining Enterprise, Pécs, Hungary (translated and revised), 404 pages (including 9 figures, 44 tables, a list of 50 pages (appendix) of the most

important reagents, and an index of 6 pages), cloth, format 229 × 157 mm, ISBN 0-444-99588-9, Elsevier Science Publishers, B.V., Amsterdam and Akadémiai Kiadò, Budapes (1985), hfl 300.00, US$ 111.00.

The book summarizes the authors' experience gained in developing and improving methods for the determination of trace elements in ores, rocks and other natural inorganic materials. It presents the theoretical bases of photometric trace analysis, and describes the analytical procedures, the elimination of disturbing effects, and the possibilities of the separation of disturbing substances. The volume is structured into six chapters:

—Some Questions on the Application of (spectro)photometric methods (e.g. the Position of Photometric Methods in Trace Analysis)
—Planning, Elaboration and Control of Analytical Methods
—Methods suitable for Separation of Interferences, and Concentration Possibilities
—Preparation of Samples for Analysis
—The most important Factors influencing the Accuracy of Determination. Error Sources
—Determination of the Individual Elements: One hundred and forty analytical procedures are given for forty-four elements.

E. MERIAN

CONCEPTS IN MARINE POLLUTION MEASUREMENTS, edited by Harris H. White, National Oceanic and Atmospheric Administration, Rockville, Maryland 20852, 743 pages (including 153 figures, 51 tables, references added to each paper, and an index of 7 pages), cloth, format 236 × 162 mm, ISBN 0-943676-18-5, Maryland Sea Grant Publication, College Park, Maryland 20742 (1984), US$ 12.50

A Workshop on "Meaningful Measures of Marine Pollution Effects" was convened in Pensacola, Florida in April 1982. The authors were asked to comment on the strong as the debilitating features of whole

categories of techniques. The 43 papers have gone through rigorous peer review, and reflect now the most recent developments. Since many experiments published over the last thirty years have in fact been based on inadequate conceptual approaches, it was often not possible to realistically assess the impact of thousands of pollutants flowing into marine waters. The book now argues that any useful assessment of pollution impact depends on holistic conceptual approaches and suites of measurements that require coordinated team planning. In their "Summary and Synthesis" the authors present a number of issues that must be seriously considered if environmental science is to develop a realistic groundwork for understanding the dynamics of the marine environment, so that we can have more effective controls for protecting the health of that environment. In fact many of the papers include hopeful suggestions for remedying present weaknesses.

The volume is structured into eight chapters:

—Toxicity Tests (including verifying predictions of environmental safety/harm)
—Laboratory Microcosm
—Bioaccumulation Tests
—Community Parameters and Measures of Community Impact
—Chemical Measurements and Effects Criteria (Transition Metals, Organic Pollutants)
—Anomalies in Field Specimens (with valuable information on the use of bio-indicators (especially microbial organisms are discussed) and problems involved)
—Mesocosms and Field Enclosures (different experimental designs, tracer studies)
—Field Monitoring Programs (natural variations and their causes, significance of observations, experimental prospective approaches and observational retrospective approaches are complimentary, possibilities to implement integration)

The valuable book thus does not give simple recipes how to measure. It rather is a challenge to think about improvements and to avoid recognized errors. Meaningful end points must be chosen, statistics must be properly used, inadequacy of diversity indices must be recognized, verification is needed, appropriate rates of toxicity testing (playing only an initial step in hazard assessment) must be

evaluated, significance of chemical parameters must be estimated (difference between total amounts and bioavailable amounts, difference between analytical chemistry results and their biological significance), bioaccumulation measurements must be interpreted, utility of micro- and mesocosms studies must be explained, and long-term studies and the development of holistic strategies are required.

E. MERIAN

DETERMINATION OF ORGANIC SUBSTANCES IN WATER, VOLUME 1, by Thomas Roy Crompton, 560 pages (including 260 figures, 167 tables, references added to the four chapters, and an index of 12 pages), hard cover, format 236 × 161 mm, ISBN 0-471-90468-6, John Wiley & Sons, Chichester, New York, Toronto, and Singapore (1985), £49.95

The aim of the book is to discuss in a systematic manner the occurrence of pollutants in water, the methods of analysis used to trace these, and the value of the resulting information. It was thus tried to draw together and systematize the body of information (each chapter deals with a particular type of organic substance occuring in water) available, and to present detailed procedures, covering the major instrumental techniques now available. The volume is structured into four chapters: Hydrocarbons, Detergents, Pesticides and PCB's (PCDD's and PCDF's are not included), and Herbicides. In Volume 2 organometallic compounds, oxygen compounds, nitrogen, phosphorus and sulphur compounds, halogen compounds, miscellaneous compounds and ozonization products, and natural pigments in water will be discussed.

It is perhaps a new approach to structure information on analytical chemistry in relation to chemical substance groups, and within them in relation to subgroups and to individual chemical substances, and not in relation to methods. One finds thus for a great number of chemical substances indications, how they have been sampled, how they have been concentrated, and how they have been separated and analysed. The book illustrates a great number of sample data (the selection of which may be somewhat arbitrary), and in the excellent

figures principles of equipments, calibration curves, spectra, and especially chromatograms (gas, liquid and thin layer chromatograms) are explained. With the index it is relatively easy to find appropriate analytical techniques for problem solving.

E. MERIAN

MARINE AND ESTUARINE GEOCHEMISTRY, by Anne C. Sigleo, U.S. Gelogical Survey, Reston, Virginia, and Akihiko Hattori, Ocean Research Institute, University of Tokyo, 331 pages (including 121 tables, 60 figures, references added to each chapter, and an index of 3 pages), hard cover, format 235 × 160 mm, ISBN 0-87371-007-X, Lewis Publishers, Inc., Chelsea, Michigan 48118 (1985), £35.90

These proceedings of an International Chemical Congress of Pacific Basin Societies (Honolulu, Hawaii, December 1984) cover geographically the Pacific, Atlantic and Antarctic oceans, and major estuaries from Tokyo Bay and the Keum Estuary (Korea) in Asia to San Francisco Bay, Chesapeake Bay, and the St. Lawrence Estuary in North America. Transport processes, and nutrient and metal distributions by depth and regionally are discussed, using state-of-the-art sampling techniques and a wide range of analytical methods. Especially effects of anthropogenic activities play an important role. The book thus discusses organic (including biogenic compounds, PCB's, silicones and the pyrolyate styrene) and inorganic geochemistry (fluxes in the water columns are subject to seasonal fluctuations). Special attention is drawn to organometallics, and thus also methyl iodide producing them. The authors also stress the importance of differentiating between chemical species, rather than simply handle concentrations. The 22 contributions are structured into three sections:

—Isotope (especially ^{15}N enrichment) and Organic Geochemistry (including also diagenesis of proteins to amino acids, and surface-active organic films)
—Nutrient Cycles and Transport Processes (dealing with phosphorus, nitrogen, and other element cycles, and sediment fluctuations)

—Organometallics and Trace Metals (besides methylation (especially of tin and mercury), and uptake by aquatic plants and plankton. In two special chapters by K. Takayanagi, Department of Fisheries and Oceans, Quebec G1K 7Y7, and by Chr. E. Cowan, Pacfic Nortwest Laboratory, Richland, Washington 99352, aquatic speciation of selenium and silver are discussed, respectively. In the case of selenium selenite conversion plays a role, whereas in the case of silver biotoxicity depends on $AgCl^{-}$, $AgHS^{0}$ and other organic complexes).

E. MERIAN