

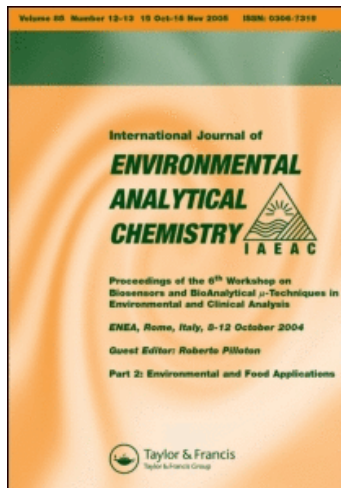
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BOOK REVIEWS

ERNEST MERIAN

Im Kirsgarten 22, CH-4106 Therwil (Switzerland)

REVIEWS OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, Volume 98 with the four Contributions

- ATTENUATION OF POLYCHLORINATED BIPHENYLS IN SOILS, by D. S. Sklarew and D. C. Girvin, Battelle, Pacific Northwest Laboratories, Richland, Washington 99352
- MALEIC HYDRAZIDE RESIDUES IN TOBACCO AND THEIR TOXICOLOGICAL IMPLICATIONS, by Susan A. Meyer, T. J. Sheets and H. Seltmann, North Carolina State University, Raleigh, North Carolina 27695
- FATE AND PERSISTENCE OF AQUATIC HERBICIDES, by K. H. Reinert and J. H. Rodgers, Environmental Laboratory 3M, St Paul, Minnesota 55133
- ORGANOPHOSPHORUS PESTICIDE RESIDUES IN FRUITS AND VEGETABLES IN THE UNITED KINGDOM AND SOME OTHER COUNTRIES OF THE EUROPEAN COMMUNITY SINCE 1976, by Nigel A. Smart, Ministry of Agriculture, Harpenden Laboratory, Hatching Green, Hertfordshire AL5 2BD, UK,

166 pages (including 1 figure, 52 tables, 1 appendix, references added to each contribution, and a subject index of 6 pages), hard cover, ISSN 0-387-96448-7, Springer-Verlag New York, Berlin, Heidelberg, Paris, London and Tokyo (1987), DM 92.00.

Reviews of Environmental Contamination and Toxicology contains basically detailed review articles concerned with any aspects of chemical contaminants, including pesticides, in the total environment with their toxicological considerations and consequences. The contributions conclude with summaries. In the first chapter soil thin layer chromatography, soil column studies, and microcosm studies are for instance discussed to study the mobility of PCB's in various systems. Transport models describing PCB migration must include adequate descriptions of sorption, desorption, volatilization, etc. Quantitative predictive models and the requisite data for describing attenuation processes for PCB's are currently not yet available. The second contribution deals with maleic hydrazide used as a growth regulator to control lateral bud growth, or suckers, on most tobacco grown in the United States.

Of special interest to analytical chemists, to environmental chemists, and to ecotoxicologists are the two latter reviews: K. H. Reinert and J. H. Rodgers ranks herbicides according to their persistence in aquatic environments (potable water,

irrigation water, river water, lakes, etc.). For instance copper and Fenax are very persistent, but copper salts and their complexes have relatively nonstringent after-treatment water use restrictions. In spite of numerous gaps and great data variability QSAR is able to help estimate some values. Nigel A. Smart discusses briefly biological action of organophosphorus pesticides and analytical methods used for the determination. The incidence of samples having residues exceeding recommendation maximum residues limits is outlined (which concerns about 0.4 to 0.8% of the fruit and vegetable samples). Occasionally found are for instance azinphos-ethyl, chlorfenvinphos, chlorpyrifos and ometthoate, especially in lettuce, apples, and citrus fruit.

CHEMICALS AND SAFETY, A GUIDE TO THE NEW CHEMICAL AGE, by Hugh D. Crone, Personnel Protection Group, Materials Research Laboratories, Melbourne, Australia, 245 pages (including 49 figures, 28 tables, some references added to the chapters and an index of 5 pages), paper board, format 215 × 137 mm, ISBN 0-521-31359-7, Cambridge University Press, Shaftesbury Road, Cambridge CB2 2RU, England (1986), £8.95, US\$14.95.

The booklet appeals to anyone who is concerned about the impact of technology on society and the environment, and in particular to anyone with a professional or educational interest in the handling and use of chemicals. It tries to provide an accessible account of the benefits and risks arising from the use of chemicals in society. Particular examples are studied in detail to illustrate the complexities of the issues involved. Starting with information on toxicity, dosage points, and uptake of chemicals by the body, the Author discusses some analytical principles, looking also at byproducts, such as dioxins in 2,4,5-T. Necessary steps in the work of sampling are explained to non-specialists. H. D. Crone stresses that talk of quantity leads to the involved topic of chemical analysis. He wants to ensure that all legislation concerning chemicals is based on sound chemistry, and not in need of interpretation. A broad strategy is needed also taking into account of the bulk of slightly toxic chemical products. But the author wants to educate the reader that he acquires the information to draw his own conclusions, and to get independent of those who want to convert him to a particular belief. According to the booklet the main problem is the question of chemical disposal, the broad problem of the mass of material of low toxicity which nevertheless can slowly gum up our environment.

ANALYTICAL METHODS IN HUMAN TOXICOLOGY, Part 2, edited by A. S. Curry, Reading, UK (for Part 1 see for instance Intern. J. of Environm. Analyt. Chem. 28, 317 (1987) and Toxicol. and Environm. Chem. 13, 287 (1987)), 354 pages (including 63 figures, 44 tables, references added to each chapter, and a subject index of 10 pages), hard cover, format 242 × 160 mm, ISBN 3-527-26285-7, Verlag Chemie GmbH, Weinheim, Deerfield Beach (Florida) and Basle (1986), DM 170.00.

While part 1 concentrated rather on the most recent developments in analytical

techniques and equipment, part 2 rather considers the application of these techniques to particular poisons and drugs. The additional collection of nine new chapters has again been written by 13 British experts. The valuable book starts with a good review of analytical methods (including information on ligand assays and sample preparation approaches). Other contributions are related to the use of high pressure liquid chromatography in human toxicology, to fluorescence analysis, to radioimmunoassays in analytical methods in human toxicology, to pharmacokinetics and patient care (dealing also with bioavailability and clearance), to drug analysis in a department of forensic medicine and toxicology, to the analysis of narcotics, to fire gases and to therapeutic drug monitoring. One finds for instance interesting references to cadmium and mercury compounds by HPLC (according to Bushee *et al.* (1982)), to urea herbicide analysis using TLC (Scholten *et al.* (1979)), to metal analysis in forensic work, to nitrogen oxides in fire, to organophosphorus compounds analysis by cholinesterase inhibition, to the identification of polymer pyrolysis products, or to screening for toluene by GLC/FID (according to a method described by Paterson and Sarvesvaran (1983)).

ANALYTICAL CHEMISTRY IN THE EXPLORATION, MINING AND PROCESSING OF MATERIALS, edited by L. R. P. Butler, Council for Scientific and Industrial Research, Pretoria, Republic of South Africa, 254 pages (including 141 figures, 67 tables, references added to each contribution, but no index), cloth, format 280 x 196 mm, ISBN 0-632-01532-2, Blackwell Scientific Publications Ltd., Osney Mead, Oxford OX2 0EL (1986), £22.50.

The proceedings of the Second International Symposium on Analytical Chemistry in the Exploration, Mining and Processing of Materials, held April 1985 at the Conference Centre of the Council for Scientific and Industrial Research near Pretoria (with nearly 350 delegates from 22 countries) include 13 analytical review lectures and 8 applications. The lecturers came mainly from the United States and from South Africa, but also from the Federal Republic of Germany, Canada, the United Kingdom, Belgium, the Republic of China and Switzerland. Inductively coupled plasma atomic emission spectrometry, X-ray fluorescence spectrometry, atomic absorption spectroscopy, neutron activation, ion beam analysis, pulse voltammetric techniques and laser excited atomic fluorescence spectrometry are preferred methods described. Pattern recognition, wet-chemistry and separation techniques, analytical chemistry applied to processing, the use of gases in geochemical exploration and chemical and physical analysis of core material (for advanced high temperature reactors) are also discussed in detail. Of special interest are the determination of platinum group metals, silver, tantalum, thorium and uranium in geological materials with a poly(dithiocarbamate) resin separation, the analysis of ferrous materials and the analytical chemistry of elementary constituents of coal. In the latter study various working mines for hard coal in the Federal Republic of Germany were compared and lead concentrations varied between 0 and 390 mg/kg (50% about 10 mg/kg), uranium concentrations between 0.25 and 2.2 mg/kg (26% together about 0.85, 0.45 and 1.4 mg/kg). Most frequent values of arsenic are 4 ppm, of beryllium 1.1 ppm, of cadmium 0.1 ppm.

SAFETY EVALUATION OF DRUGS AND CHEMICALS, edited by Dr W. Eugene Lloyd, Iowa State University, Shenandoah, Iowa, USA, 487 pages (including 128 figures, 77 tables and appendices and a good subject index of 19 pages), linen, format 243 × 164 mm, ISBN 0-89116-352-2, Hemisphere Publishing Corporation, Washington, New York and London (1986), US\$59.95.

31 recognized experts from the United States have compiled four broad areas—basic considerations, testing procedures, interpretation of safety tests and philosophical or regulatory interpretations as they now exist in the United States. The 30 chapters are based on papers presented at a symposium sponsored by the American Academy of Veterinary and Comparative Toxicology and the Veterinary Diagnostic Laboratory of Iowa State University. The excellent proceedings are method-oriented and deal with toxicokinetics. Comparative biochemistry (e.g. to predict toxicity of halogenated hydrocarbons; enzyme induction by PBB's being discussed in more detail; porphyria induction by lead), interpretation of laboratory animal studies, nutrient effects on toxicity and carcinogenicity, testing for possible mutagenicity, teratogenicity and carcinogenicity, measurement of immunity, brain damage and skin toxicity testing, test atmosphere generation and inhalation (e.g. of cadmium, asbestos and cotton dust), hazard evaluation programs for the aquatic environment, wild avian species hazards, behavioral measures in toxicology screening, quality assurance (good laboratory practice), and risk assessment. Ecotoxicology is discussed in relation to algae, daphnia, fish, birds, etc. Effects on dogs, monkeys and humans are distinguished. One finds also critical comments to analytical chemistry and to the analysis of diets, of carcinogens, of survival analysis and of statistical analysis. The volume thus is a good introduction for students and non-experts, but does not give very detailed critical advice, all the more most literature references are not very new.

APPLIED GEOCHEMICAL ANALYSIS, Volume 88 of the Chemical Analysis Series, by C. O. Ingamells, Rainbow Lakes, Dunnellon, Florida and by Francis F. Pitard, Gy and Pitard Sampling Consultants, Broomfield, Colorado, 733 pages (including 98 figures, 71 tables, some not very new literature references added to the chapters and a subject index of 13 pages), linen, format 236 × 162 mm, ISBN 0-471-83279-0, John Wiley & Sons, New York, Chichester, Brisbane, Toronto and Singapore (1986), £86.00.

The authors say that much material has been drawn from lifetime experience and that the book should assist geologists, mining engineers, geochronologists and geochemists as well as inorganic chemists and instrumentalists to perform excellent quality work with limited budgets (which is often the case in developing countries). Nevertheless it is mentioned that innovations have been carefully selected as far as sampling and chemical and instrumental analysis of rocks, ores and minerals, including also theory and their real-world applications. The volumes is structured into seven chapters:

- Sampling
- The Art of Chemical Analysis (informing on tools, reagents, instrumentation and dissolution procedures)
- The Classical Rock or Mineral Analysis; and—The Elements
- Rapid Chemical Methods
- Basic Calculations and Recommendations
- Guidelines for Preparation of Geochemical Standards

HANDBOOK ON TOXICITY OF INORGANIC COMPOUNDS, edited by Dr Hans G. Seiler, Dr Helmut Sigel and Astrid Sigel, Institute of Inorganic Chemistry, University of CH-4002 Basle, 1069 pages (including 58 tables, 12 figures, 19 pages with concluding remarks and summary tables (threshold limit values), abbreviations and definitions, an author index of 81 pages (giving also references to the literature cited at the end of each chapter), and a good subject index of 130 pages), hard cover, format 260×189 mm), ISBN 0-8247-7727-1, Marcel Dekker, Inc., Madison Avenue, New York, N.Y. 10016, USA (1988).

84 international experts have contributed to an easy to use excellent handbook (information is found very easily because of the structure and via the index), covering 103 natural and anthropogenic elements. For each of them appropriate information on bioavailability for humans, on the metabolism in humans, on toxicity to humans, and on (clinical) analytical chemistry is presented. It is an advantage that also rarer elements are discussed, on which it is normally difficult to find evaluations in handbooks. In some chapters unfortunately one does not find newer literature references (one misses for instance citations of the scientific contributions of J. Kägi regarding metallothioneins, of G. L. Bronzetti regarding chromium bioavailability, of D. N. Skilleter regarding beryllium biochemistry and of G. Winneke and H. W. Schlipköter regarding lead effects, as well as of Fr. H. Kemper regarding thallium exposure. In most chapters one finds little information on speciation and on effects on microorganisms, plants and animals. All chapters are structured the same handy way into seven subchapters: chemistry, technology, physiology, detoxification, levels of tolerance, ecotoxicology (which subtitle is somewhat misleading because most co-authors discuss only human exposure by the elements from environmental sources), and analytical chemistry. The latter sub-sections are rather related to clinical analytical chemistry, for instance sampling and determination of body fluids and tissues. The volume is very valuable for analysts, toxicologists, veterinarians, teachers, scientists (involved with occupational health care or starting new research) and administrators.

ANALYSES OF HAZARDOUS SUBSTANCES IN BIOLOGICAL MATERIALS, Volume 2, by Jürgen Angerer, Central Institute for Occupational Medicine, D-2000 Hamburg 76 and Karl-Heinz Schaller, University Institute for Occupational and Social Medicine, D-8520 Erlangen, 247 pages (including 35 figures, 56 tables and an address list of Members and Guests of the Working Subgroup "Analyses of Hazardous Substances in Biological Materials" of the DFG Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area (Chairman: Dietrich Henschler, University of D-8700 Würzburg)), linen,

format 245 × 176 mm, ISBN 3-527-27012-4, VCH-Verlagsgesellschaft, D-6940 Weinheim (1988), DM 108.00.

We refer to the book review of Volume 1 (see for instance Intern. J. Environ. Anal. Chem. 26, p. 83/84, 1986 or Chemosphere 16(4), N72/73, 1987). It is really fortunate that this valuable series has been continued. The excellent description of analytical methods for biological monitoring have the great advantage that they are reliable. Although the selection is again governed by the general principles of occupational medicine—and deals with sampling and analytical chemistry of body fluids and tissues—the book can be highly recommended to analytical and environmental chemists in industry, government agencies and universities, safety guards, (eco)toxicologists and specialists in forensic and industrial medicine. Without the missing subject index, it is easy to find the facts one looks for.

In this 2nd volume one finds especially exact information on atomic absorption spectrometric, inductively coupled plasma—atomic emission spectrometric and inverse voltammetric techniques for the determination of antimony, barium, strontium, titanium, cadmium, chromium, cobalt, mercury, selenium and lead in blood and/or urine. Hydrazine and erythrocyte porphyrins are determined with fluorimetry, fluoride with ion-selective electrodes, cyanide, phenols and aromatic alcohols with gas chromatography and aromatic carboxylic acids with high pressure liquid chromatography.

CHEMICAL CARCINOGENS, Some Guidelines for Handling and Disposal in the Laboratory, by Dr Marcel E. Castegnaro, IARC, F-69372 Lyon and Dr Erich B. Sansone, NCI-Frederick Cancer Research Facility, Frederick, Maryland 21707, USA, 97 pages (including 2 figures, 11 tables, 8 pages of acknowledgements with 45 addresses of experts, 17 pages with 193 literature references, no index), soft cover, format 205 × 135 mm, ISBN 3-540-16719-6, Springer-Verlag Berlin, Heidelberg, New York, London, Paris and Tokyo (1986), DM 19.80.

The booklet is devoted to the research community, medical staff and safety officers involved with the handling, storage and transport of chemical carcinogens. The minimum requirements of installing a room for storage and handling are also reviewed, as well as problems of degradation of these substances either in the wastes before disposal or in the case of spillage treatment. After the introduction (in which the IARC monographs, seven industrial exposures, 23 human carcinogens, 61 probably human carcinogens, and 64 other chemicals are listed) two chapters deal with

—Hazards in Handling Chemical Carcinogens

—Methods for Disposal of Chemical Carcinogens and Spillage Treatment.

The information thus instructs how to keep a chemical laboratory safe (also to avoid gory injuries and nasty fires). One finds necessary indications on labelling, protective clothing and methods for disposal specific substances, too. Polycyclic aromatic hydrocarbons are for instance oxidized, haloethers may be destroyed with aqueous ammonia and nitrosamines may be denitrosated by various tech-

niques. Of special interest are described methods for the decontamination of glassware. For residues one should test with several strains of *Salmonella* with and without metabolic activation.

DICTIONARY OF SURFACTANTS (English–German and German–English), by Kurt Siekmann, D-4330 Mülheim/Ruhr, 160 pages, soft cover, format 204 × 135 mm, ISBN 3-540-17555-5, Springer-Verlag Berlin, Heidelberg, New York, London, Paris and Tokyo (1987), DM 64.00.

3200 keywords used in a comprehensive survey of the chemistry, technology and application of surfactants in consumer products are provided in English and German (chemical nomenclature is based on the latest IUPAC rules). A suitable word processing program was helpful for the development of the dictionary. One finds many useful chemical, physico-chemical and production and process oriented descriptors, as well as some for equipments, but only very few related to analytical chemistry or to biological effects. Foam generation, degradability and related descriptors are of course included, but not for instance speciation or bioavailability in the otherwise useful dictionary.

TOXICOLOGY OF METALS (Clinical and Environmental Research), edited by Stanley S. Brown, West Midlands Regional Health Authority, Birmingham, UK and Yasushi Kodoma, University of Occupational and Environmental Health, Kitayushu, Japan, 448 pages (including 126 figures, 104 tables, references added to each contribution, an author index of 4 pages and a subject index of 6 pages), hard cover, format 246 × 172 mm, ISBN 0-7458-0016-5, Ellis Horwood Ltd. Publishers, Chichester, West Sussex PO19 1EB, England (1987), £50.00.

The valuable volume stems from an IUPAC Symposium organised July 1986 at the University of Occupational and Environmental Health in Kitayushu, Japan. The proceedings contain texts of 17 invited lectures and of 112 other presented papers. The authors deal with some general aspects of the role of trace metals in health and disease, and discuss also monitoring and analysis. Chemical and experimental studies of specific metals and their compounds are other topics. The book is thus structured into seven chapters:

- Essentiality and Toxicity
- Interactions (e.g. by selenium, zinc and proteins)
- Monitoring and Analysis (including monitoring at the early stages of life cycle and simplified methods by acid deproteinizing or digestion; specific techniques used are ICP, X-ray, fluorimetry, AAS, NAA and their application in biological samples, including hair and food)
- Aluminium and “Light” Elements (including lithium)
- Lead, Cadmium and “Heavy” Elements
- Chromium, Nickel and Transition Elements and
- Platinum, Gold and “Noble” Elements.

Toxicologists, biochemists, nutritionists, analytical chemists, environmental chemists

and occupational hygienists find newest research results in the well edited book. But as usual in proceedings the collection of contribution is not very homogenous and therefore the reader must find out himself what is important to him. Highlights are for instance selenium biochemistry, biological monitoring (parallels with the multi-channel profile in clinical chemistry, which are technically efficient and commercially viable, but poor in uncovering disease, are discussed), new facts on cadmium-binding proteins and on mercury biotransformation and interactions of soluble platinum and gold compounds.

TEXTBOOK FOR ECOLOGICAL CHEMISTRY (in German), 2nd edition, edited by Prof. Friedhelm Korte, GCF, D-8042 Neuherberg, 353 pages (including 71 figures, 54 tables, a glossary of six pages, a subject index of 30 pages), soft cover, format 190 × 121 mm, ISBN 3-13-586702-1, Georg Thieme Verlag, D-7000 Stuttgart 30 (1987), DM 44.00.

The handy pocket book is a good introduction to students and other persons interested in the principles of ecological chemistry. The author insists besides the scientific and statistic background also on global reflections and foresighted perspectives. The paperback, which can be recommended is structured into seven chapters:

- Introduction and Definitions
- Substance Related, Media Related, Compartment (incl. Waste) Related and Effect Related Concepts and Criteria
- Assessment Principles
- Practical Methods (here some short information on analytical chemistry, including the use of isotopes, are presented)
- Substance Related Case Studies (cadmium, phthalate, pentachlorophenol and polychlorinated dibenzodioxines and dibenzofuranes are discussed; this chapter is however not updated: for instance on page 259 one finds the information that pulmonary uptake of cadmium in animals can be neglected and the important studies by G. Kazantzis, H. Oldiges, M. Stoeppler and G. Oberdörster are not even mentioned. Regarding PCDD's and PCDF's one should perhaps in a new edition better distinct between tetra/pentachlorinated compounds (with higher bioavailability and toxicity) and hepta/octachlorinated compounds. Also paper industry emissions and newer literature (O. Hutzinger!) could be noted).