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Book Reviews

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BOOK REVIEWS

GROUNDWATER RESIDUE SAMPLING DESIGN, edited by Ralph G. Nash, EPL Bio-Analytical Services Inc., Decatur, Illinois and Anne R. Leslie, E.P.A., Mail Stop H 7506 C, Washington, D.C., 396 pages (including 80 figures, 30 tables, and a subject index of ten pages), hard cover, format 235 × 158 mm, ISBN 0-8412-2091-3, ACS Symposium Series 465, American Chemical Society, Washington, D.C. (1991).

The proceedings were developed from a symposium held at the 199th National Meeting of the American Chemical Society in Boston, Massachusetts in April 1990. The 23 contributions from American and Canadian Scientists were structured, after an overview of the approach taken by Government Agencies, into seven sections:

- Regulatory Aspects
- Statistical Designs
- Current Designs
- Groundwater Sampling
- Vadose Zone Sampling
- Soil Sampling Techniques
- Agrochemical Surface Loss Techniques.

The present state of the science of sampling designs after use of agricultural pesticides is more a strategy than a list of methods. Examples of proven methods include: aseptic sampling in unconsolidated heaving soils, the techniques used by the Rhone Poulenc Agricultural Company for collecting data necessary for registration of pesticides, the U.S. Geological Survey Delmarva Peninsula designs for regional groundwater monitoring, the U.S. Geological Survey site specific monitoring, and the minimum cost sample allocation. Topics related to agrochemicals are transport, leaching, degradation and drinking-water contamination. Particular chemicals are not included in the index, nor analytical techniques and transportation/diffusion problems.

GLOBAL CHANGE AND RELEVANT SPACE OBSERVATIONS, edited by Jean-Louis Fellous, Centre National d'Etudes Spéciales, F-75001 Paris, 270 pages (including 128 figures, 38 tables, an author index, but no subject index), paperback, format 273 × 190 mm, ISBN 0-08-041148-7, *Advances in Space Research* 11(3), Special Issue, Pergamon Press Oxford New York Frankfurt Seoul Sydney Tokyo (1991). £70.

The proceedings of Symposium 1 of the COPAR Twenty-eight Plenary Meeting in the Hague, The Netherlands, 25 June–6 July 1990 contains 35 contributions. They are structured into seven sections:

- Middle Atmospheric Change
- Detection of Enhanced Greenhouse Effect
- Large-scale Biological/Physical Processes in the Ocean and at the Ocean/Atmosphere Interface
- Global to Regional Energy and Water Balance Parameters
- Physical/Biological Processes at the Soil/Atmosphere Interface
- Space Systems' Capabilities
- Management of the Global Data Sets.

US American, German, Czechoslovakian, Bulgarian, Hungarian, Canadian, French, Argentinian, British, Finnish, Indian, Russian, Japanese, Belgian, and Dutch earth-system scientists adopted a multidisciplinary approach for better understanding of the operations of the earth as a whole. Observing systems use measurements, remote sensing, cycling studies and assessment of aerosol contamination effects.

MEASURING INDOOR AIR QUALITY, a Practical Guide, by John E. Yocom, West Simsbury, Connecticut, and Sharon M. McCarthy, Westford, Massachusetts, U.S.A., 228 pages (including 38 figures, 20 tables, references, 10 appendices, and an index of 8 pages), hard cover, format 236 × 156 mm, ISBN 0-471-90728-6, Principles and Techniques in the Environmental Sciences, John Wiley & Sons, Chichester New York Brisbane Toronto Singapore (1991), £40.

There has been a rapid expansion of interest over the past few years in indoor air quality and its contribution to total human exposure to air pollutants. This is needed since emphasis is still on air quality improvement in controlling sources of outdoor air pollution. Indoor air quality is in fact often much worse than that of outdoor pollutants. This practical guide is structured, after an introduction, into six chapters:

- Planning an Indoor Air Quality Measurement Program
- Building Dynamics: Theory and Measurement of Infiltration
- Methods for Measuring Indoor Pollutants
- Measurement of Pollutant Emissions
- Indoor Air Quality Standards and Guidelines
- Future Needs in Indoor Air Quality Measurement Programs.

The volume thus contains an extensive summary of original research conducted on various pollutants, listing methods used, environment monitored, concentrations measured, and citations. Bioaerosols, carbon oxides, formaldehyde, infiltration, lead, nitrogen oxides, odors, ozone, pesticides, radon, respirable particular matters, sulfur

dioxide, tobacco smoke, ventilation, and volatile organic compounds are for instance important terms in the index, but aluminum, mercury and silicon compounds are not mentioned, nor are asthma, carcinogens, inhalation, particle size distribution, phosphates, or resorption. Some appendices on microenvironmental field study data are however very useful.

EVALUATION OF CARCINOGENIC RISKS TO HUMANS: CHROMIUM, NICKEL AND WELDING, by an IARC Working Group under the Chairmanship of O. Møller-Jensen, The Danish Cancer Registry, DK-2100 Copenhagen Ø, 677 pages (including 117 tables (including those in the appendices), references added to the monographs, a cumulative index to IARC monographs, but unfortunately no subject index), paper board, format 238 × 176 mm, ISBN 92-832-1249-5, IARC Monographs Volume 49, World Health Organization, Lyon and Geneva (1990), SFr. 95.

In the preamble to this important volume experts explain the background, the selection of data, and the method of evaluation in such monographs, and in the general remarks the critical chemical species, and the interpretations of the terms "Solubility", "Bioavailability", "Biological Monitoring", "Availability and Reporting of Data", "Adequacy of Animal Experiments", "Genetic and Related Effects", and "Moderately Elevated Lung Cancer Rates" are discussed. At the end of the volume one finds a final evaluation with two appendices with summary tables and activity profiles. It is shown that there is sufficient evidence for human carcinogenicity of some chromium (VI) compounds, nickel sulfate, and combinations of nickel oxides and sulfides. Calcium chromate, lead chromates, strontium chromate, zinc chromates, nickel monoxides, crystalline nickel sulfides, nickel hydroxides, and metallic nickel are carcinogens for animals. There is limited evidence for human carcinogenicity of welding fumes and gases.

14 pages deal with the chemical analysis of chromium and chromium compounds, of nickel and nickel compounds, and of welding fumes and gases in various matrices, particularly avoiding changes in speciation.

TOXICOLOGICAL EVALUATIONS 2 "Potential Health Hazards of Existing Chemicals", by BG Chemie, D-W-6900 Heidelberg 1, 212 pages (including 13 figures and an index of 6 pages for Volumes 1 and 2), linen, format 210 × 140 mm, ISBN 3-540-53435-0, Springer-Verlag Berlin Heidelberg New York London Paris Toronto Hong Kong Barcelona Budapest (1991). DM 68.

The Employment Accident Insurance Fund of the Chemical Industry evaluated the toxicity of another 15 organic chemical substances under the program for the prevention of health hazards caused by industrial work substances, in cooperation with international agencies and research institutes. The documents are structured into summaries and assessment, names of substances, synonyms, common and trade names, structural and molecular formulae, physical and chemical properties, uses,

experimental results, experience in humans, and references. The evaluations are based on the scientific literature, on experimental studies, and on the experience of a scientific advisory committee. Data were critically assessed, and are the basis for governmental and industrial regulations. No information is however given on monitoring and on the analytical techniques used for the determination of the discussed concentrations. One finds however relatively complete the newest information on genotoxicity and carcinogenicity testing, if available.

AEROSOL SCIENCE (THEORY AND PRACTICE), by Michael M. R. Williams, University of London, U.K. and Sudarshan K. Loyalka, University of Columbia, Missouri, U.S.A., 446 pages (including 123 figures, 38 tables, many equations, references, and a subject index of 22 pages), hard cover, format 255 × 177 mm, ISBN 0-08-037209-0, Pergamon Press, Oxford New York Seoul Tokyo (1991), £40., US\$ 80.

The authors state optics, heat transfer, biology, meteorology, and pollution are just a few areas where the behavior of small particles suspended in a gas is of vital importance. More recently, with increasing concern about the consequences of accidents in nuclear reactors and the effects of global nuclear war, a great deal of research effort has been directed towards the disposal of radio-active aerosols, and resuspensions are discussed. Adequate definitions of descriptors also given. After a brief introduction the volume is structured into eight chapters:

- Aerosol Characterization
- The Motion of Particles in Gases
- The Dynamic Equation for the Aerosol Distribution
- Coagulation Kernels
- Methods of Solving the Dynamic Equation
- Condensation and Evaporation
- Particle Deposition and Resuspension
- Nuclear Source Term.

Six Appendices are then included, one with typical aerosol properties, indicating correlations between particle diameters, sedimentation velocities, Reynold's numbers, diffusion coefficients, particle mobilities, and relaxation times.

ENVIRONMENTAL INFORMATION AND CONTAMINATION SYSTEMS: ECOINFORMA 1, edited by Otto Hutzinger and Heidelore Fiedler, University of Bayreuth, 292 pages (including 68 figures, 41 tables, and a small index of 4 pages), hard cover, format 205 × 178 mm, ISBN 2-88124-791-1, Gordon and Breach Science Publishers, Volume Fifteen in the Current Topics in Environmental and Toxicological Chemistry Series, Philadelphia Reading Paris Montreux Tokyo Melbourne, US\$ 90.

The reviewed proceedings of an international conference and exhibition on environmental information, communication and technology transfer in Bayreuth in May 1989 is structured into seven parts:

- Environmental Databanks
- Environmental Modelling
- Remote Sensing and Geographic Information
- Environmental Biotechnology
- Specimen Banking, Environmental Monitoring and Assessment
- Case Studies
- The Environment and the Law.

It consists of 27 German, Swiss, Italian, Canadian, US American and French contributions. Of course modelling, toxicological risk assessment, monitoring and technological transfer are key topics. Quite a few contributions presented are related to polychlorinated biphenyls, dibenzodioxins and dibenzofurans. A few networks were selected, somewhat arbitrarily, and described.

ALTERNATIVE USES FOR SEWAGE SLUDGE, edited by J. E. Hall, Water Research Centre, Marlow (United Kingdom), 387 pages (including 72 figures, 115 tables, references added to the contributions, discussion reports added to the sessions, an address list of participants, but unfortunately no index), hard cover, format 235 × 152 mm, ISBN 0-08-04021-2, Pergamon Press Oxford New York Beijing Frankfurt Sao Paulo Sydney Tokyo Toronto (1991), £45, US\$90.

Twenty-four contributions by British, US American, French, German, Danish, Italian, Dutch and Canadian experts who faced problems related to sludge disposal at a Water Research Centre Conference at the University of York in September 1991. Alternative uses were discussed and the proceedings are now structured into four sessions:

- Land Reclamation
- Forestry
- Landfill and Incineration
- Other Uses, such as Compost and Resource Recovery.

It was attempted to find cost-effective and innovative solutions, whilst responding to environmental and public pressures. In "soil production", including management of mine sites, trace metal loadings for agricultural land and vine yards and effects of microbial populations were discussed, as well as the influence of nitrogen and/or organic matter contents. Also, the uptake of trace metal ions by plants and wildlife has been evaluated. Colliery spoil (crushed rock) may also be reclaimed and vegetated. Some lecturers were quite enthusiastic about fertilizing forest with sewage sludge, dried products containing less pathogens. Co-disposal of domestic sludge with other

materials in landfills has also been described, but long-term effects must be evaluated. For other uses (incineration and disposal) local factors may be critical.

AQUATIC CHEMISTRY: AN INTRODUCTION (German language), by Laura Sigg and Werner Stumm, EAWAG, Swiss Federal Institute of Technology, CH-8600 Dübendorf, 388 pages (including 128 figures, 42 tables (including 7 appendices), exercises, 2 pages of references, and an index of 15 pages), paperboard, format 230 × 160 mm, ISBN 3-7281-1729-3, Verlag der Fachvereine an den Schweizerischen Hochschulen und Techniken, Zürich (1989), SFr. 46.

The volume assists in academic lecturing, but is also a good basis for interested persons without a great training in chemistry education. It particularly helps to provide a better understanding of the dynamic behavior of pollutants. This useful book is structured into ten chapters:

- Chemical Composition of Natural Waters
- Acids and Bases
- Carbonate Equilibria
- Interactions between Waters and the Atmosphere
- Utilization of Thermodynamic Data and Kinetics
- Metal Ions in Aquatic Solution
- Precipitation and Dissolution: Activity of Solid Phases
- Redox-processes
- Organic Carbon: Interactions between Living Organisms and the Inorganic Environment
- Interface Chemistry.

STABLE ISOTOPES: NATURAL AND ANTHROPOGENIC SULPHUR IN THE ENVIRONMENT, edited by H. R. Krouse, University of Calgary, Alberta, Canada, and V. A. Grinenko, Vernadsky Institute of Geochemistry and Analytical Chemistry, Moscow, Russia, 440 pages (including 139 figures, 104 tables, references added to the chapters, a 5 page address list of participants and contributors, and an index of 10 pages), hard cover, format 235 × 157 mm, ISBN 0-471-92646-9, SCOPE 43, John Wiley & Sons, Chichester New York Brisbane Toronto Singapore (1991), £63.

This synthesis includes the results of a Workshop held in Pushchino (Moscow Region) in summer 1983, organised jointly by UNEP and SCOPE. Unfortunately the literature is thus updated only exceptionally. Variations in the abundances of stable isotopes provide an universal label for monitoring the global cycling of sulphur. Isotope fractionation can be measured and the data used to interpret natural isotope

variations. Isotopic selectivity provides information about a process. If one wants to use the isotopic composition of an element to follow its fate in the environment, isotope fractionation must be capable of being evaluated. Fortunately sulphur isotope selectivity is small in high temperature industrial processes, oxidation of H_2S , SO_2 , etc. in the atmosphere, solid phase reactions proceeding layer by layer, and assimilation of sulphate by bacteria and plants. The current volume strives to show how stable isotope abundances may be used to differentiate between natural and anthropogenic sulphur in the environment.

The book is structured, before a three page summary, into eight chapters:

- Sulphur Isotopes in Nature and the Environment: An Overview
- Oxygen Isotope Fractionation for Understanding the Sulphur Cycle
- The Isotopic Analysis of Sulphur and Oxygen
- Lithospheric Sources of Sulphur
- Sulphur Isotope Variations in the Atmosphere
- Hydrosphere
- Pedosphere and Biosphere
- Case Studies and Potential Applications.

IMMUNOASSAYS FOR TRACE CHEMICAL ANALYSIS: MONITORING TOXIC CHEMICALS IN HUMANS, FOOD, AND THE ENVIRONMENT, edited by Martin Vanderlaan et al., Lawrence Livermore National Laboratory, University of California 94550, U.S.A., 374 pages (including 101 figures, 67 tables, newest references added to the chapters, and a subject index of 12 pages), hard cover, 234 × 158 mm, ISBN 0-8412-1905-2, ACS Symposium Series 451, American Chemical Society, Washington, D.C. 20036 (1991), US\$79.95.

108 American, Australian, Japanese and Danish authors contributed to this important compendium, which is the result of a symposium of the International Chemical Congress of Pacific Basin Societies, held in Honolulu, Hawaii in December 1989. The editors state that before checking personal exposures, analytical techniques for measuring the chemical traces left in the form of DNA and protein adducts and residual chemicals stored in adipose tissue must be improved. Immunochemical methods offer one approach to the complex problems presented by trace chemical analysis and should be part of the standard repertoire of techniques used in an analytical chemistry laboratory. One goal of the book is to bring together a broad sampling of the applications of analytical immunochemistry to allow cross-fertilization of techniques among those working in the field. The 30 chapters are structured into three parts:

- Immunoassays for Chemical Residues in Food and the Environment
- Immunoassays for Natural Toxins
- Immunoassays for Monitoring Human Exposure to Toxic Chemicals.

Most of the dosimetry studies are oriented to pesticides, natural toxins and carcinogens, and molecular epidemiology is thus an important topic. Two chapters deal, for instance, with polycyclic hydrocarbon-DNA and Cisplatin-DNA-adducts.

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