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Book Reviews

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Book Reviews

BIOLOGICAL MONITORING, MARC Report Number 32, by Dr. M. A. S. Burton, King's College London SW10 0QX, England, 247 pages (including 30 figures, 95 tables, references added to each chapter, conclusions on 4 pages, and a species listing (algae, bryophytes, lichens, fungi, pteridophytes, gymnosperms and angiosperms), but unfortunately no index), paper board, formate 234 × 157 mm, ISBN 0-905918-29-0, Monitoring and Assessment Research Centre London and United Nations Environment Programme Geneva (1986), US\$ 30.00, UK£ 20.00.

The very useful and complete review on biological monitoring of environmental contaminants (plants) is a timely source of information in an area of rapidly growing importance. The volume thus discusses in detail the use of plants to monitor present-day chemical emissions and environmental levels, and evaluates possible pollutant effects on the plants. The data have been assembled on the basis of habitats to provide the reader with an overview of the more common features associated with the different environmental media. Although conclusions arise from individual plant species, it is emphasized that plants normally grow in complex communities. With an understanding of species diversity and of growth, differentiation and reproduction cost-effective biological monitoring techniques may have advantages over direct environmental monitoring. It is thus possible to assess relevant environmental levels to living organisms, and it may be easier to monitor plant samples than very low concentrations in remote areas. The well structured hand-book contains besides the introduction and the conclusion three parts:

- Terrestrial Environment (metal pollutants, organic compounds (especially halogenated organic compounds), gaseous pollutants, and (natural and fall-out) radionuclides are discussed, experiences with various groups of species)

- Freshwater Environment (again metal pollutants, organic compounds, radionuclides)
- Marine Environment (again metal pollutants, organic compounds, radionuclides).

The advantages to monitor metal pollutants with mosses (bryophytes), lichens, and (accumulating) fungi are discussed in detail—for instance also as a basis for geographical maps with isopleths, whereas the use of bracken fern (pteridophytes) and higher plants (gymnosperms and angiosperms) has rather merits to monitor in the vicinity of point sources of emissions (smelters, power stations, and roads).

ERNEST MERIAN

GROUNDWATER CONTAMINATION, Studies in Geophysics, by a Panel under the Chairmanship of John D. Bredehoeft, U.S. Geological Survey, 179 pages (including 58 figures, 24 tables, references added to the contributions, but no index), paper board, formate 277 × 216 mm, ISBN 0-309-03441-8, National Research Council, and National Academy Press, Washington, D.C. 20418, U.S.A. (1984), £22.25.

The study addresses the current scientific understanding of groundwater contaminant transport (by theory and by investigation of contaminated aquifers), and looks also at many fundamental questions and uncertainties (that require additional scientific research). The preliminary scientific findings of the authored chapters were presented at an American Geophysical Union symposium in San Francisco in December 1981. In completing their chapters, the authors had thus the benefit of discussion at this symposium as well as the comments of several scientific referees. After an overview and recommendations the useful handbook is structured into five parts:

- Background (Extent of Groundwater Contamination in the United States)
- Processes (Movement of Contaminants in Groundwater, Chemical Processes)
- Methods of Waste Disposal (Shallow Land Burial, Deep Burial)

- Examples (DIMP (diisopropylmethylphosphonate), DCPD (dicyclopentadiene), and organo-halogen and organo-sulfur compounds at Rocky Mountain Arsenal, Colorado; low-level radioactive waste-disposal sites; a flow modeling study of the Love Canal Area, New York; nitrate, metals, organic solvents, and pesticides contaminations on Long Island, New York; dissolved inorganic (also oxygen) and organic compounds in a hydrogeochemical study (leachate!) at a landfill in Delaware; potential for radionuclide migration from a nuclear explosion cavity; groundwater restoration with *in situ* uranium leach mining)
- Institutional Aspects (Regulatory Responsibilities, Risk Assessment).

ERNEST MERIAN

ASBESTIFORM FIBERS (Nonoccupational Health Risks), by a Committee under the Chairmanship of Lester Breslow, School of Public Health, University of California, Los Angeles, 334 pages (including 20 figures, 31 tables, references added to each chapter, 9 appendices (on natural and synthetic fibrous substances, on biological effects (animal experiments, human epidemiology), on a conceptual model of fiber exposure, and on risk assessment), but no index), paper board, formate 277 × 216 mm, ISBN 0-309-03446-9, National Research Council, and National Academy Press, Washington, D.C. 20418, U.S.A. (1984), £25.85.

Asbestiform fibers, for the purposes of this report, include natural materials (such as abestos) and synthetic materials (such as fibrous glass). The Committee discusses the difficulties of effects occurring only many years after exposure began, of vast distribution of materials, of interactions with other factors (especially cigarette smoking), and of replacement by substitutes with some similar physical properties. The Committee evaluated influences of up-take from drinking water and from outdoor and indoor air (by inhalation), and the resulting report summarizes hard and persistent work during two years (since August 1982). After an executive summary and an introduction the volume is structured into six parts:

- Asbestiform Fibers: Historical Background, Terminology, and

- Physicochemical Properties (e.g. respirability, size, durability, composition, surface charge)
- Assessing Non-occupational Exposures to Asbestiform Fibers
 - Measurement of Exposure to Asbestiform Fibers (collection, characterization)
 - Effects of Asbestiform Fibers on Human Health (evidence, epidemiology)
 - Laboratory Studies of the Effects of Asbestiform Fibers (e.g. mechanisms)
 - Risk Assessment (e.g. mathematical models, lifetime estimates, comparisons).

ERNEST MERIAN

TOXICITY TESTING, STRATEGIES TO DETERMINE NEEDS AND PRIORITIES, by a Committee under the Chairmanship of James L. Whittenberger, Southern Occupational Health Center, Irvine, University of California, 382 pages (including 16 figures, 60 tables, many references, 19 appendices on 675 substances, on testing for various situations, on reference protocols, on conceptual issues concerning interpretation of results, on priority-setting systems, on mathematical modelling, on treatment of uncertainty, on analysis of structure-activity relationships, and on costs of misclassification, unfortunately no index), paper board, format 277 × 216mm, ISBN 0-309-03433-7, National Research Council, and National Academy Press, Washington, D.C. 20418, U.S.A. (1984), £25.85.

This volume should be used by all scientists and administrators involved in toxicity testing, and interpretation of the results. Unfortunately the important information is presented in a somewhat confusing way, and the reader needs some time to understand the structure of the contents and of the many appendices. In fact this final report summarizes conclusions of four committees. It is said that it took substantial thoughtfulness and computer work to select study samples and models. From a “select universe” of 65,725 substances of possible concern, 675 substances covering seven major

intended-use categories (including 375 chemicals in commerce with known or unknown production data) were selected. An in-depth examination of 100 of these substances leads to the conclusion that enough toxicity and exposure information is only available for a small fraction of the samples. The volume presents criteria for selecting substances, provides estimates for determining toxicity-testing needs, and describes criteria for assigning priorities for toxicity testing. The report is thus divided into two parts:

- Toxicity-Testing Needs in the Select Universe (Sample Selection, Operating Policies for Identification, Acquisition, and Organization of Data, Data Evaluation, and Results), and
- Setting Priorities for Toxicity Testing (Design of the Priority-Setting System, Briefly Following a Chemical through an Illustrative System of 4 Stages, Detailed Description of this System, and Future Development, Implementation, and Refinement of the System).

The committees observed that of 100 substances 42 were considered to involve widespread exposure, and 20 had physicochemical properties which led to a high concern about potential adverse human health effects. There was no relation between the amount of testing that had been performed and the degree of concern about a substance based on physicochemical information. Among the chemicals in commerce (besides pesticides, cosmetic ingredients, drugs, and food additives) the authors analysed for instance more carefully the situation for 2-nitro-9H-fluorene, 1,2,3,5-tetramethyl-benzene, difluorodimethyl-stannane, terbium oxide, hexanoic acid-2-propenyl ester, germanium, 1-methylpropyl-lithium, ferrocene, gallium oxide, tungsten carbide, C.I. Pigment Green 7, and tert. dodecanethiol.

ERNEST MERIAN

PRINCIPLES AND METHODS OF TOXICOLOGY, Student Edition, by A. Wallace Hayes *et al.*, Toxicology Department, Rohm and Haas Company, Spring House, Pennsylvania 19477, 750 pages (including 149 figures, 94 tables, and a subject index of 18 pages), hard cover, formate 261 × 184 mm, ISBN 0-89004-470-8, Raven Press, New York City 10036, U.S.A. (1984), US\$ 50.00.

The volume has been designed primarily as a textbook for courses dealing with an evaluation of toxicology data. It thus describes current testing procedures, offers guidelines on data interpretation, and discusses major areas on controversy. The book is said to be also a valuable resource to select from the many representative approaches available, especially after understanding the principles underlying each method. 41 U.S. American experts have written 23 contributions. The first section covers a basic toxicologic testing methods and includes most of the testing procedures now required to meet regulatory standards. The second section deals with specific organ systems and contains chapters on kinetics, metabolism, and effect on cellular organelles and target organs. Each method or procedure is discussed from the standpoint of technique and interpretation of data. Of special value are also the lists on references added to each contribution. Information not only allows persons to perform experiments or test protocols, but the chapters also provide insight into the rationales behind experiments. For environmental research for instance the chapters on chronic toxicity studies (by Kent R. Stevens *et al.*, Berlex Laboratories, Inc., Cedar Knolls, New Jersey 07927), on testing for carcinogenicity (by J. F. Robens *et al.*, Dept. of Agriculture, Beltsville, Maryland 20705), on inhalation toxicology (by Gerald L. Kennedy *et al.*, Du Pont, Newark, Delaware 19711), on genetic toxicology (by David Brusick, Litton Bionetics, Inc., Kensington, Maryland 20795), on techniques in membrane toxicology (by Timothy D. Phillips, Texas A&M University, College Station, Texas 77843), and on extrapolation to man (by Michael D. Hogan, N.I.E.H.S., Research Triangle Park, N.C. 27709) are of special interest.

ERNEST MERIAN

ECOLOGICAL KNOWLEDGE AND ENVIRONMENTAL PROBLEM SOLVING (CONCEPTS AND CASE STUDIES), by a Committee under the Chairmanship of Gordon H. Orians, Institute for Environmental Studies, University of Washington, Seattle, 388 pages (including 15 figures, 3 tables, 19 pages of references after part I, additional references added to the case studies, and a good index of 14 pages), paper board, formate 228 × 153 mm, ISBN 0-309-03645-3,

National Research Council, and National Academy Press, Washington, D.C. 20418 (1986), £28.60.

The useful book concentrates on ecological knowledge—broadly conceived to include theories, models, data, and concepts—and on case histories (to illustrate in concrete ways how ecological information has been used). The first part on “Kinds of Ecological Knowledge and their Applications” thus includes 10 chapters on individuals and single populations, on population interactions, on community ecology, on materials and energy, on scales in space and time, on analog, generic, and pilot studies and treatment of a project as an experiment, on indicator species and biological monitoring, on dealing with uncertainty, on the special problem of cumulative effects, and on a scientific framework for environmental problem-solving. Part II on “Selected Case Studies” contains 13 contributions, structured in comparable ways (introduction, environmental problems, approach, uses of knowledge and understanding, sources of knowledge and understanding, references, and committee comment). Thus for instance North Pacific halibut fishery management, biological control of the citrus insect California Red Scale, experimental control of malaria in West Africa, conserving a regional spotted owl population, optimizing timber yields in New Brunswick forests, and control of eutrophication in Lake Washington are discussed in the details. The volume ends with studies of the ecological effects of nuclear radiation, forest clearcutting, and of DDT. The latter assessment is for instance an example of the interplay between laboratory analyses, field tests, and conceptual developments in ecology and toxicology.

ERNEST MERIAN

ENVIRONMENTAL IMPACT OF WATER RESOURCES PROJECTS, by Larry W. Canter, Environmental and Ground Water Institute, Norman, University of Oklahoma, 352 pages (including 2 figures, 21 tables, many references, 16 appendices on impacts, transport and fate of pollutants, environmental indices, methods for predictions, methodologies for trade-off analyses, public participation in planning, measuring impact mitigation, and related

issues (such as acid rain, and post-eis audits), and an index of 6 pages), hard cover, formate 243 × 164 mm, ISBN 0-87371-015-0, Lewis Publishers, Inc., Chelsea, Michigan 48118, U.S.A. (1985), £36.75.

The important book summarizes information from key technical literature related to environmental impact studies for water resources projects (such as dams and reservoirs, channelization, and dredging). Hundreds of publications are not only listed, but also reviewed and critically commented, which makes the bibliography extremely useful. After an introduction the book is structured into four chapters:

- Environmental Impact Studies for Dams and Reservoirs
- Environmental Impact Studies for Channelization Projects
- Environmental Impact Studies for Dredging Projects
- Environmental Impact Studies for other Water Resources Projects.

34 references, summary comments and abstracts are for instance related to impacts of nonpoint pollution (e.g. nutrients, consequences of urbanization, industrialisation, and agriculture, transport models), whereas 7 references, summary comments and abstracts deal with the transport and fate of pollutants (petroleum hydrocarbons, phenolics, pesticides, heavy metals, etc.) in the water environment, whereby the authors miss broadly applicable analytical techniques of adequate sensitivity for elemental speciation.

ERNEST MERIAN

GASCHROMATOGRAPHIE, by G. Schomburg, Grundlagen, Praxis, Kapillartechnik, 1987, XI, ISBN 3-527-26461-2, DM 59.00.

Gas chromatography (GC) is a widely used technique in the field of separation methods, and especially, the use of capillary GC has strongly extended the range of applications. The book from G. Schomburg gives an excellent overview on the area of gas chromatography. The first edition came out ten years ago, but the recent developments in GC are very well incorporated in this second edition. The book is very useful for education purposes and for

people who are going to work with (capillary) GC. The accent is laid on the equipment and the practical impact of capillary GC.

After a (too) detailed table of contents, the author deals with the theory on GC. This part is relatively easy to understand, but in some cases, e.g., with the discussion of the Van Deemter equation, some more detailed information would be useful.

In Chapter 5, parts and parameters of gas chromatographic systems are discussed. This chapter gives a good overview on injection systems, columns and detectors which are used in GC. Some critical remarks are that the moving needle and head-space injection systems are hardly discussed (or discussed in another chapter) and that several of the schematic figures added to the text are not very clear.

In Chapter 6, the qualitative and quantitative aspect of GC analyses are clearly discussed. After this part, two short chapters are dedicated to special methods in GC, e.g., automatization and multi-dimensional GC, and trouble shooting. In only half a page is discussed the use of derivatization methods in GC, which is observing the practical use of derivatization in GC.

Chapter 9 is a totally new part of the book (compared with the first edition), in which 40 chromatograms are given of a large variation of compounds and capillary GC systems. It is a very interesting part with a lot of technical data in it which is especially useful for the practitioner. It is only a pity that no references are added to this chapter.

Summarizing, it is a very well written book with a lot of information given in 160 pages. The price of the book is very low and recommendable to all people who are fluent in German, and who are interested in gas chromatography.

F. A. MARIS