

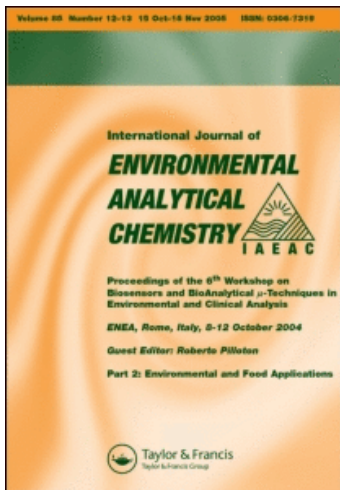
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BOOK REVIEWS

TRANSPORT AND CHEMICAL TRANSFORMATION OF POLLUTANTS IN THE TROPOSPHERE, edited by P. Borrell and P.M. Borrell, 474 pages, Springer, Heidelberg (2000). ISBN 3-540-66775-X. DM 269, US\$ 159.

A major environmental concern is the increasing burden on all scales of photo-oxidants, acidifying substances and potential nutrients in the troposphere. These lead to episodes of summer smog, and appreciable damage to eco-systems both on land and at sea. Underlying the environmental effects is the complex scientific problem of linking the man-made and biological emissions to the myriad of chemical reactions that transform the pollutants as they are transported to and deposited in the surroundings and also in pristine areas remote from the sources.

The present book overviews the scientific results obtained in the inter-disciplinary project EUROTRAC, carried out by more than 150 research groups in some 20 countries to tackle the above problems. The first chapter explains how the project was organized and run. The following chapters include sections on Photo-oxidants, Research on Clouds, Surface Exchange, Chemical Transfer and Transport Modelling, Instrumentation, Field Measurements, Biosphere-Atmosphere Exchange, Laboratory Studies, Modelling and Emissions and Instrument Development. In nearly every chapter there is an evaluation of what has been achieved with an indication of the uncertainties remaining and many suggestions for future work. Throughout the book there are extensive references to the work described in the other volumes of the series, reporting the results of the different sub-projects and already reviewed in previous issues of the Journal.

This is, without any doubt, the most comprehensive effort carried out in Europe to contribute to the understanding of the transport and fate of pollutants in the troposphere.

BIOREMEDIATION OF CONTAMINATED SOILS, edited by D.L. Wise, D.J. Trantolo, E.J. Cichon, H.I. Inyang and U. Stottmeister, 903 pages. Marcel Dekker, New York (2000). ISBN 0-8247-0333-2. USD 235.00

Environmental remediation is a rapid growth area mature for technological applications and innovations. Over 150 experts provide in this volume an

in-depth treatment of this interdisciplinary domain, from the governmental, industrial and academic perspectives. The book focuses on innovative bioremediation techniques and applications for the cleanup of contaminated media and sites, including quantitative and design methods that elucidate the relationships among various operational parameters, and waste chemistry that defines the cost effectiveness of bioremediation projects. The book contains 48 contributions divided into four parts. It begins with the presentation of general engineering issues and the regulatory, ethical and technical framework within which these processes are managed. The text then introduces specific case studies in hydrocarbon remediation. The following parts balance presentations of traditional and emerging technologies in soil remediation, with special attention to exciting developments in bioremediation and phytoremediation.

In summary, this volume provides an updated source of technical information relating to current and potential remediation practices.

HANDBOOK OF ENVIRONMENTAL MANAGEMENT AND TECHNOLOGY, 2nd edition, edited by G.H. Burke, B.R. Singh and L. Theodore, 806 pages. Wiley-Interscience, Chichester, UK (2000). ISBN 0-471-34910-0. UK £ 80.95

This is one of the few books to highlight the different aspects of environmental management and control. It offers to the reader a historical perspective on pollution problems and solutions as well as an introduction to the specialized literature in this area.

The book is divided in ten chapters. Chapter 1 provides an introduction to background issues such as regulatory approaches and international concerns. In the following chapters, the management of air pollution, including indoor air quality, municipal and industrial wastewaters, solid, radioactive and hazardous wastes (e.g. asbestos, metals and oils) are covered. Chapter 6 addresses methods of pollution prevention, including domestic and architectural considerations, waste reduction and energy conservation. Chapter 7 is primarily devoted to issues faced daily by management, regarding electromagnetic fields, worker training and safety, and economic considerations. Chapter 8 introduces three new technologies for pollution control: bioremediation, solid vapour extraction and biofiltration. Chapter 9 discusses risk-related topics. The last chapter looks into four new environmental topics: the ISO 14000, environmental audits, ethics and justice.

This book is primarily intended for engineers, industrial hygienists, health and safety officers, and plant engineers and managers. However, an attempt has been made to offer material to individuals with a limited technical background at a

level that should enable them to better cope with some of the complex problems encountered in environmental management today.

PRINCIPLES OF TOXICOLOGY. ENVIRONMENTAL AND INDUSTRIAL APPLICATIONS, 2nd edition, edited by P.L. Williams, R.C. James and S.M. Roberts, 603 pages. Wiley-Interscience, Chichester, UK (2000). ISBN 0-471-29321-0. UK £ 58.50.

This fully updated and expanded edition of "Industrial Toxicology", first published in 1985, provides health protection professionals as well as environmental scientists with precise practical information on how to apply the science of toxicology in both the occupational and environmental settings. Through contributions from leading experts the book features clear explanations of the fundamentals necessary for an understanding of the effects of chemical hazards on human health and ecosystems.

The book is organized in three parts. Part I discusses basic concepts in toxicology such as absorption, distribution and elimination of toxic agents from the body. Then, the effects of these agents on specific physiological organs or systems (e.g. blood, liver, skin, lungs, etc.) are discussed. Part II addresses specific areas of concern, including reproductive toxicology, mutagenesis and carcinogenesis, and the properties and effects of toxic agents such as metals, pesticides, organic solvents and natural toxins and venoms. Part III is devoted to specific applications, covering the risk assessment of toxic hazards, and occupational medicine and epidemiological issues in the modern workplace. A comprehensive glossary of toxicological terms and an extensive subject index are included at the end of the book.

The book is indicated for industrial hygienists, occupational physicians, safety engineers and directors, and environmental health practitioners, who need toxicological information and assistance beyond that of an introductory text in general toxicology, yet more practical than that in advanced scientific works.

HYDROLOGICAL AND LIMNOLOGICAL ASPECTS OF LAKE MONITORING, edited by P. Heinonen, G. Ziglio and A. Van der Beken, 372 pages. J. Wiley, Chichester, UK (2000). ISBN 0-471-89988-7. UK £ 75.00.

The book addresses the most important problems currently impacting lake resources, like eutrophication, water acidification and its impact on biodiversity and metal cycling, and the presence of harmful substances, as well as new approaches on monitoring and quality assessment. The different sections cover abiotic processes in lakes (hydrology, water fluxes, nitrogen leaching,...), bioce-

nosis in evaluation of the ecological state of lakes (phytoplankton, toxic cyanobacteria, zoobenthic communities, botanical aspects and fish), the presence of harmful substances in sediments and biota (organochlorine compounds, mercury, etc.), the integration of different approaches in monitoring, including remote sensing, quality assurance for water chemical and microbiological analysis, and finally the management of monitoring results (water modelling and classification). Although the book is strongly focused on Nordic lakes, because of the specific interest and sensibility developed by these countries on lake quality monitoring and management, the concepts and strategies discussed are of broad interest.

This book is an attractive reading for all analytical chemists and environmentalists working in the field, and is a reference source for postgraduate students on environmental sciences.

DICTIONARY OF ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 3rd edition, by A. Porteous, 707 pages. John Wiley, Chichester, UK (2000). ISBN 0-471-63470-0. UK £ 15.99

Environmental problems are essentially multi-faceted and demand at least a nodding acquaintance with many different disciplines. Almost 10 years after the first edition of this dictionary the present one contains over 4000 entries covered in depth with extensive-crossreferencing that nicely brings together additional or related information. The items are easy and pleasant to read, and many of them are illustrated with figures or schemes and case studies. The dictionary is designed for a multi-access approach on the part of the reader and is a valuable addition to the environmental bookshelf. Indeed, it provides a good reference to all those concerned with the world's environment, particularly students and professionals, and is a positive contribution to environmental literacy.

ENCYCLOPEDIA OF ANALYTICAL CHEMISTRY, edited by R.A. Meyers. John Wiley & Sons, Chichester, U.K. (2000). ISBN: 0-471-97670, UK £ 3750.

The Encyclopedia of Analytical Chemistry, is now the most comprehensive analytical chemistry reference source available presenting thorough and integrated coverage of theory, instrumentation and techniques all in a single work. Providing a definitive professional level reference source the EAC comprises 15 volumes, approximately 14,000 pages, over 600 extensively referenced articles and more than 6,500 illustrations. All articles, written and independently reviewed by specialists from their individual fields of expertise, are extensively cross-referenced, feature extensive bibliographies and end with a "Related Arti-

cles" listing to ensure fast and effective navigation around information on the field of analytical chemistry.

The first 10 volumes of EAC comprise 25 alphabetically organised Applications Sections, three of them dealing, specifically, with trace gas monitoring, field portable air and vapour measurement, and water and waste. A further 4 volumes in 16 sections cover Theory and Instrumentation, while the final volume contains general articles applicable to all areas of analytical chemistry. Organic and inorganic analysis, biomedical, pharmaceutical, environmental, industrial, polymers, petroleum and food science are the fields covered. The final volume also details the entire contents of the EAC in its index.

Compiled by more than 800 authors, co-ordinated by 42 internationally renowned section editors, the EAC presents a high quality, highly accurate and relevant reference source to enable any chemist, biochemist, molecular biologist, physicist or engineer to fully analyse any analyte in any matrix for any purpose or application.

ENVIRONMENTAL ANALYTICAL CHEMISTRY, 2nd edition, edited by F.W. Fifield and P.H. Haines, 490 pages. Blackwell Science, Oxford, UK (2000). ISBN 0-632-05383-6. UK £ 24.99

The thoroughly revised edition of this book sets out the background to analytical chemistry and covers the principles of its most important techniques. This is done in part I where the assessment and interpretation of analytical data as well as the general principles of separation (e.g. GC, HPLC, GPC, SFC and CE) and spectrometric (e.g. absorption, atomic and molecular) techniques are presented. Electroanalytical techniques, thermal methods of analysis and the detection and measurement of radiation are also discussed. Finally, a chapter on biological indicators is included.

Links to environmental uses are indicated in broad terms in part II, and then exemplified in more detail by accounts of specific and important environmental problems. This part includes chapters on speciation, the analysis of atmospheric and water samples, trace elements, organic compounds and radiation. The subject of environmental toxicology is also introduced. At the end of the chapters further reading and self-study exercises are included. The book ends with a glossary of terms and a comprehensive subject index.

Written for students of chemistry, environmental science and related disciplines, the book may also be useful to non-specialists who require an understanding of the techniques employed to collect data in their disciplines.

ENVIRONMENTAL ANALYTICAL CHEMISTRY, by D. Pérez-Benedito and S. Rubio, 876 pages. Elsevier, Amsterdam, NL (1999). ISBN 0-444-82205-4. US\$ 279.00

The investigation and modelling of environmental systems, together with the implementation of laws and regulations, has led to a demand for a large number of environmental measurements, many of which are made by techniques falling within the broad range of analytical chemistry. Therefore, one of the most challenging ventures for this basic discipline is nowadays environmental analysis. The present volume represents an exceptional effort to provide the most systematic, comprehensive and up-dated collection of environmental analytical issues.

The fourteen chapters of the book follow a logical sequence of sample matrices and analyte types. The first six are of paramount importance, as they lay the foundation for a basic, yet comprehensive coverage of the subject in the others. Following the required introduction to environmental chemistry. Chapters 2 to 6 deal sequentially with environmental quality assurance, quality control fundamentals and practical aspects of environmental sampling, the preconcentration of environmental samples and environmental control standards. Chapters 7 to 12 are concerned with the analytical control of inorganic and organic pollutants in air, water and soil. Finally, the last two chapters are devoted to speciation and chemometrics in environmental analysis. Each chapter presents the state-of-the-art of the environmental topic covered, and illustrates it with a wealth of practical examples. Overall, the book contains about one hundred tables, almost two hundred figures and more than 1700 references.

The book is intended to be useful both as an academic text for the burgeoning number of undergraduate and postgraduate courses on the subject, as a reference book for those starting work in the environmental field and as a source of first-hand information on environmental science and its practical laboratory aspects.

SEAS AT THE MILLENIUM: AN ENVIRONMENTAL EVALUATION, edited by C. Sheppard, 2415 pages. Elsevier, Amsterdam, NL (2000). ISBN 0-08-043207-7. US\$ 915.50

This impressive work provides a comprehensive review of the many environmental issues that should be taken into account, at global and regional levels, for a successful and sustainable use of our seas in the decades to come. In three volumes and along 135 chapters, more than 350 authors describe, sea by sea and region by region, the present conditions of our marine habitats, the ways in which they are being impacted and the main challenges for the future. The

emphasis is on the coastal zone, the crucial area of man's interactions with the seas and their biological and physical systems.

The first two volumes are devoted to about 100 marine regions, from north to south and east to west, with only few areas unfortunately missing (e.g. the Western Mediterranean). For others, the information is really relevant as they have been almost ignored from the environmental standpoint in the open literature. These regional chapters include a description of the general physical and biological variables of coastal and continental shelf waters, the natural habitats and resources, the development and use of the coast, the anthropogenic influence, principally derived from the urban and industrial activities but also from fishing, and future threats and protective measures to be considered.

Following the regional chapters are nearly 30 on global issues. These chapters cover major habitats (e.g. seagrasses, mangroves and coral reefs) and species groups (e.g. sea-birds, turtles and cetaceans). Fisheries are discussed in the individual sections but also here as a major environmental and social issue. A series of chapters deal with remote sensing techniques and with effects on coastal systems, including climate change, dry deposition, antifouling paints, oil spills, mine tailings and eutrophication. Finally, educational programs, legal instruments, coastal management and socio-economic aspects are specifically addressed in this section.

The editorial aspects have been carefully handled. Comprehensive maps for each region, updated statistics and references (until the year 2000) and a very extensive subject index (about 100 pages) are provided. This is, in summary, an invaluable source of information for academics both as a reference and teaching tool, and for all researchers and policy makers with an interest in marine environmental sciences, oceanography and marine engineering.

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ENVIRONMENTAL TECHNOLOGIES TO TREAT SULFUR POLLUTION. PRINCIPLES AND ENGINEERING edited by P.N.L. Lens and L. Hulshoff Pol, 547 pages, IWA Publishing, London (2000). ISBN 1-900222-09-4. UK £ 85.00

This book provides a broad and detailed discussion of state-of-the-art environmental technologies to treat sulfur pollution of wastewater, off-gases, solid wastes, soils and sediments. Special attention is given to novel bioremediation techniques that have been developed over the last decade.

It presents the fundamental knowledge on the biogeochemical cycle of sulfur and a variety of environmental technologies to abate its pollution. In Part I, an

introduction to the geochemistry of sulfur compounds and the organisms involved in their biotransformation. Part II describes possibilities for avoiding pollution by desulfurisation of resources, i.e. oil, coal, and minerals. Subsequently, environmental engineering aspects of techniques to treat waste waters (Part III), off-gases (Part IV), and solid wastes and soils (Part V) are presented. In these chapters, chemistry microbiology and process technology of various treatment options are presented. Particular attention is given to some biotechnological processes which allow a complete removal of sulfur from waste streams by its conversion into insoluble elemental sulfur which can be reused.

The transformations occurring in the sulfur cycle are not restricted to conversions involving the elemental sulfur. The sulfur cycle can also be utilized for the degradation of organic matter and the removal of heavy metals or nitrogen from waste waters, soils and sediments which is covered in Part VI. Potential adverse effect of sulfur compounds (i.e. mechanisms of process failure) are described in Part VII and the remediation techniques to overcome the various effects are also given.

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ENVIRONMENTAL SYSTEMS AND PROCESSES. PRINCIPLES, MODELING AND DESIGN, by W.J. Weber, Jr. 556 pages. John Wiley & Sons, New York, USA (2001). ISBN 0-471-40518-3, UK £ 64.50

Quantitative methods for ecosystem modeling have become an increasing demand from environmental managers and legislators. However, environmental ecosystems are very complex and when a researcher or a manager tries to model or quantify a specific phenomena, is overwhelmed by the myriad of processes taking place and the multimedia character of the problem. Therefore, the most often approach to attack the modeling of environmental systems and processes is to reduce it to single processes and from them try to reconstruct the real system. This is the objective of the present book. This is a shorter and simplified version of the book entitled "Process dynamics in environmental systems" by W.J. Weber and F.A. DiGiano, also published by John Wiley & Sons. As a result of this, the present version of the book is more suitable as a reference material for the student and the nonspecialist than for the expert.

The first three chapters of the book deal with general definitions of systems, process reduction and introductory coverage of all the physical-chemical processes of environmental interest. After that, each chapter covers one of these processes, such as, phase equilibrium, process rates, interphase mass transfer, etc.

The author try to apply the knowledge acquired from engineering systems, such as those from waste water treatment plants, to the natural environmental systems, such as a lake. This approach enable the author and the reader to treat mathematically some important issues such as phase equilibria and rate constants, which are the topics of expertise of the author. However, this simplification of the modeling effort overlook a wide range of biogeochemical processes that have been proven to be very important for the understanding of the fate and sinks of pollutants, such as phytoplankton uptake, vertical sinking of pollutants associated to fecal pellets, and many more. furthermore, the book would also be benefited from a more comprehensive coverage of the literature. From all these considerations, "Environmental systems and processes" may be useful as a textbook for undergraduates or as an introductory reference for the researchers.

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