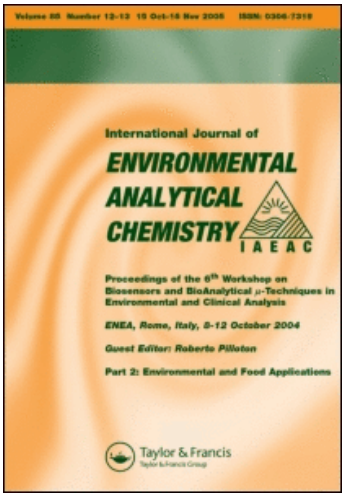

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Book Reviews

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BOOK REVIEWS

Chemicals in the Environment: Assessing and Managing Risk, edited by Roy M. Harrison and Ronald E. Hester, Cambridge, UK, RSC Publishing, 2006, 158 pp., £45.00, ISBN: 978-0-85404-206-7

This is volume 22 of the collection *Issues in Environmental Science and Technology*, which is published twice a year, with each issue addressing a specific theme or topic. Following the pattern of other volumes in the series this one includes detailed technical articles on current chemical environmental problems with others more opinion-based, covering economic, legal and political aspects.

The book begins by reviewing the current framework of legislation for the regulation of chemicals, summarising the very large volume of regulation currently in place, particularly in the UK, as well as the new proposals from the European Commission, like REACH. The chapter also includes the expert views on possible future developments. Subsequent chapters consider the evaluation of the risks that chemicals can pose to human life and the environment. Thus, the second chapter places the current procedures and new proposals into a broader context and setting out the cost-benefits of tighter regulations for the risk assessment and control of chemicals. This is followed by a chapter taking a forward view on how such regulations may develop into the future, as it appears that progression of the currently developing methods is largely inevitable. Having dealt with the legislative, administrative and societal aspects, the volume turns to technical issues and a chapter describes the means for assessing risk of chemicals to human health, while the following chapter takes a similar look but in terms of assessing risk to the environment. The last two chapters focus more upon the physico-chemical properties of chemicals and their implications in the environmental distribution and biological effects. The first gives particular attention to the importance of physico-chemical properties on risk assessment of metals since their speciation in environmental media is key to their bioavailability and associated effects. The second reviews the predictive methods used to model the behaviour of organic chemicals (partitioning and persistence) within the environment based upon their physico-chemical properties.

This volume is timely in view of the current discussion internationally over the extent to which assessment and risk management measures are required for industrial chemicals. The detailed coverage of a topic that affects many sectors of industry and society will make it popular with a wide audience of individuals from government organisations, industry or academia, particularly those in environmental chemistry sectors.

An Introduction to Pollution Science, edited by Roy M. Harrison, Cambridge, UK, RSC Publishing, 2006, 332 pp., £24.95, ISBN: 978-0-85404-829-4

The present book and its companion *Principles of Environmental Chemistry* are the result of a further development of the reference book *Understanding Our Environment* edited by the

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same author in 1999 (3rd edition) (see *IJEAC*, **76**, 152, 2000). Until recently, no clear distinction was drawn between environmental chemistry and pollution science and the two topics were taught largely hand-in-hand. Nowadays, the subjects are more clearly defined and there is consequently a need to reflect these changes in dedicated texts.

Written by leading experts in the field, the book covers, as separate components, pollution in the atmosphere (e.g., emissions, transport and fate pollutants), the world's waters (e.g., contaminants of concern, the role of analytical chemistry and causality of effects) and soil and land contamination (e.g., soil constituents and properties, contamination threats and land regeneration). Subsequent sections discuss methods of investigating the environment and the impact of chemical pollution on human health and ecological systems. These sections are particularly relevant as they cover issues of practical importance like the characteristics of a monitoring system (e.g., types of monitoring, sampling methods, duration and extent, presentation of data) and the exposure–response relationships, with a number of illustrative case studies. The final chapter deals with the technical and institutional basis of environmental management in all compartments. Each section includes worked examples and questions and is aimed at undergraduates studying environmental science, but will also prove of value to others seeking knowledge in the field.

An Introduction to Pollution Science is designed for courses within degrees in environmental sciences, environmental studies and related areas including taught postgraduate courses, which are not embedded in a specific physical science or life science discipline such as chemistry, physics or biology. The level of basic scientific knowledge assumed of the reader is therefore only that of the generalist and the book should be accessible to a very wide readership including those outside of the academic world wishing to acquire a broadly based knowledge of pollution phenomena.

Principles of Environmental Chemistry, by Roy M. Harrison, Cambridge, UK, RSC Publishing, 2007, 364 pp., £39.95, ISBN: 978-0-85404-371-2

This volume retains the structure of the reference book *Understanding Our Environment* while updating the information on the field to enhance it through the inclusion of further chapters. The book initially deals with specific chapters on the chemical processes influencing the atmosphere, freshwaters, the oceans and the solid earth, with certain common crosscutting features such as non-ideal solution chemistry, and with suitable cross-referencing. Chemicals in the environment do not respect compartmental boundaries, and indeed many important phenomena occur as a result of transfers between compartments. The book, therefore, contains subsequent chapters on environmental organic chemistry, which emphasizes the complex behaviour of persistent organic contaminants (partitioning and chemical transformations), and on biogeochemical cycling of chemicals, including major processes affecting both organic and inorganic chemical species, particularly the transfer between environmental compartments, illustrated with the case studies of the biogeochemical cycles of nitrogen and lead.

Completed with worked examples, this title is aimed at advanced undergraduate and graduate chemistry students studying environmental chemistry. The book, however, will have a broader audience, and certainly will be of interest to many eager readers willing or requiring a basic understanding of environmental processes.

Practical Environmental Analysis, **Second Edition**, by Miroslav Radojevic and Vladimir N. Bashkin, Cambridge, UK, RSC Publishing, 2006, 458 pp., £39.95, ISBN: 978-0-85404-679-9

Following the general layout of the first edition (see *IJEAC*, **76**, 152, 2000), this book aims to supplement the many existing general textbooks on environmental analytical chemistry by providing detailed, step-by-step instructions for the analysis of real environmental samples, and to illustrate the application of classical and instrumental techniques to environmental analysis. After an introduction to the environmental analysis, including sampling, storage, sample treatment, standardization and calibration and reporting data, the following chapters cover the chemical analysis of important components and pollutants in rainwater (e.g., acidity, anions, cations and trace metals), air (e.g., SO_2, NOx, O_3, NH_4^+, HCl and metals), water (e.g., hardness, alkalinity, COD, BOD, anions and trace metals), soil, sediment, sludge and dust (e.g., soluble ions, N, P, S, OM and heavy metals), and plant tissue (e.g., N, P, S, K, Na, Ca, Mg, nitrate, nitrite and heavy metals). A brief introduction explaining why a particular substance is important and describing its behaviour in the compartment and the principles behind each analytical method is given before each experiment. Easy to follow experimental procedures are then outlined. Suggestions for further study, questions and exercises, and recommended further reading, are given after each experiment. Worked examples of problems relating to analytical and environmental chemistry are also included where appropriate. Appendices cover environmental standard methods (e.g., APHA, US EPA, British Standards Institution, etc.), practical safety and laboratory practice, a list of journals with articles of relevance and useful websites.

The experiments generally require only basic laboratory equipment and instrumentation. Some of the simpler experiments may even be used by secondary school teachers of chemistry to illustrate applications of chemistry to the environment, a topic of growing concern among today's school students. It should be noted that there is a strong bias in the book towards inorganic analysis because equipment for carrying out inorganic analysis is more widely available in teaching laboratories, whereas the determination of organic compounds requires the use of instruments that tend to be fairly expensive and may not be readily available in many basic laboratories. Also, microbiological analyses, although extremely important from a public health point of view, are not included in the present volume.

The main aim of the book is to serve as an educational tool in preparing environmental chemists for the more demanding regime of a real environmental laboratory. Like its predecessor, this informative text is certain to be valued as an indispensable guide to practical environmental analysis by students on a variety of undergraduate and postgraduate courses and their lecturers.

Environmental Radiochemical Analysis II, edited by Peter Warwick, Cambridge, UK, RSC Publishing, 2003, 419 pp., £100.00, ISBN: 978-0-85404-618-6

The book is a collection of 48 refereed papers presented at the 9th International Symposium on Environmental Radiochemical Analysis held in Maidstone (UK) in September 2002. The papers provide the latest information on new methods of radionuclide analyses as well as developments and improvements in existing methods, such as

extraction chromatography, ion exchange, alpha and gamma spectrometry, neutron activation analysis, multi-collector ICP-MS, liquid scintillation counting, radiochromatographic methods, etc. Other topics covered are the assessment of the performance of gamma detectors, the comparison of methods for measuring gross alpha activity in water and sediment samples, QA and QC methods and the estimation of method uncertainties, software developments and ultrasensitive measurements in underground laboratory facilities. The mobility of humic and colloidal substances using radiolabelling techniques is also discussed. Finally, a number of field studies in different parts of the world are described, such as the spatial and temporal variation of tritium activities in the Severn Estuary (UK), Po in UK seafood, in-situ radionuclide retardation in groundwater conducting systems (CH), transport of ^{129}I in the English Channel (UK), radon in Irish domestic groundwater supplies, man-made radionuclides in cores of the Black Sea, radiological characterisation of Santos Estuary sediments (Brasil) and edible eggs of ants from a radioactive waste site in Central Mexico, and the occurrence of ^{129}I and ^{137}Cs from the Chernobyl accident in the Irish Sea.

Therefore, the book presents the latest information concerning environmental analysis of radionuclides and will be an essential reading for practising radioanalysts, as well as for professionals in academia and industry. As a minor remark, it is a pity that no email addresses of the corresponding authors are provided.

Quantities, Units and Symbols in Physical Chemistry, **Third Edition**, prepared for publication by E. Richard Cohen, Tomislav Cvita, Jeremy G. Frey, Bertil Holmström, Mozo Kuchitsu, Roberto Marquardt, Tan Milis, Franco Pavese, Martín Qnack, Jürgen Stohner, Herbert L. Strauss, Michio Takami and Anders J Thor, Cambridge, UK, RSC Publishing, 2007, 234 pp., £39.95, ISBN: 978-0-85404-433-7

This Third Edition attempts to provide a readable compilation of widely used terms and symbols from many sources together with brief understandable definitions and explanations of best practice. Tables of important fundamental constants and conversion factors are included. Most of the material is 'standard', but a few definitions and symbols are not universally accepted, so in these cases a list of acceptable alternatives is provided. The references list the reports from International Union of Pure and Applied Chemistry (IUPAC) and other sources in which some of these notational problems are discussed further.

The book has been systematically brought up to date and new sections have been added. The first chapter describes the use of quantity calculus for handling physical quantities and the general rules for the symbolism of quantities and units and includes an expanded description of the use of roman and italic fonts in scientific printing. The second chapter lists the symbols for quantities in a wide range of topics used in physical chemistry, namely space and time, classical mechanics, electricity and magnetism, quantum chemistry, atoms and molecules, electromagnetic radiation, solid state, statistical thermodynamics, general chemistry, chemical thermodynamics and kinetics, electrochemistry, colloid and surface chemistry, and transport properties. The third chapter describes the use of the International System of units (SI) and of a few other systems such as atomic units. Chapter 4 outlines mathematical symbols and their use in print. Chapter 5 presents the 2006 revision of the fundamental physical constants, and Chapter 6 the properties of

elementary particles, elements and nuclides. Conversion of units follows in Chapter 7, together with the equations of electricity and magnetism in their various forms. Chapter 8 is entirely new and outlines the treatment of uncertainty in physical measurements. Chapter 9 lists abbreviations and acronyms. Chapter 10 provides the references, and Chapter 11, the Greek alphabet. In Chapters 12 and 13, we end with indexes. The IUPAC Periodic Table of the Elements is shown on the inside back cover and the preceding pages list frequently used conversion factors for pressure and energy units. The entire text of the manual is available on the IUPAC web site, http://www. iupac.org. Corrections to the manual are listed periodically.

This is the reference guide for scientists, science publishers and organisations working across disciplines requiring internationally approved nomenclature in the area of Physical Chemistry.

Volatile Organic Compounds in the Atmosphere, edited by Ralf Koppmann, Oxford, UK, Blackwell Publishing Ltd, 2007, 512 pp., £99.50, ISBN: 978-1-4051-3115-5

This book describes the current state of knowledge of the chemistry of VOCs as well as the methods and techniques to analyse gaseous and particulate organic compounds in the atmosphere. Chapter 1 is an instructive chapter summarising the variety and the roles of VOCs in the atmosphere that will be discussed later, in more detail in specific chapters, for the individual components. The chapter includes sections on sources, sinks, atmospheric distribution, measurement and modelling tools, how organic species affect the atmosphere and open questions and future directions, supported by more than 300 references. The following chapters (2 to 9) cover the various compound classes present in the atmosphere, namely anthropogenic and biogenic VOCs, oxygenated and halogenated compounds, PAN and related compounds, organic nitrates, high molecular weight carbonyls and carboxylic acids and organic aerosols. All chapters follow a similar layout, including the sources and sinks of the compounds of concern, their distribution and chemical transformations in the atmosphere and their budgets, as well as a survey of currently used measurement techniques. Finally, Chapters 10 and 11 describe new methods to measure a large part of the VOCs family, such as gas chromatography-isotope ratio mass spectrometry and comprehensive two-dimensional gas chromatography. Hundreds of references, updated until 2005, are provided at the end of each chapter, enabling each subject to be explored in more detail.

The aim of the book, and well achieved, is to provide an authoritative review to address the needs of both graduate students and active researchers in the field of atmospheric chemistry. It may also serve as a desktop resource for experienced scientists in the field of atmospheric research that should be adequately complemented by the following title on *Analytical Techniques for Atmospheric Measurement*.

Environmental Chemistry at a Glance, by Ian Pulford and Hugh Flowers, Oxford, UK, Blackwell Publishing Ltd, 2006, 132 pp., £15.99, ISBN: 978-1-4051-3532-0

Environmental Chemistry at a Glance is a synoptical presentation of the field based on the highly successful and student friendly 'at a glance' approach. The book is structured in

nine sections covering the different environmental compartments and the occurring chemical, physical and biological processes. The first section is devoted to the chemistry of the surface environment, including the composition of rocks, minerals, clays and hydrous oxides, and the processes of weathering, flocculation and dispersion, ion exchange, adsorption, complexation and chelation, solubility, buffering and redox. The following sections deal with soil, sediments, water, atmosphere and biosphere, describing their main characteristics and the principal processes taking place in each compartment. The interaction of chemical, physical and biological processes is discussed next, followed by a description of the environmental cycles, namely the carbon, nitrogen, sulphur, phosphorus and potassium cycles. The last section covers the different aspects of pollution, like the different sources, such as pesticides, fertilizers, nitrate, organic contaminants, heavy metals and radionuclides, the environmental impacts of sewage treatment, mining and radioactivity and some issues of concern like global warming and climate change, the damage of the ozone layer and acid rain.

Each topic is presented in self-contained double page spreads of text and illustrative material, to facilitate the rapid assimilation, understanding and recall of critical concepts, facts and definitions. While the emphasis is on environmental chemical processes, the material in the book is placed in the wider context of the physical and biological sciences, giving an integrated approach to the environment from a chemist's point of view and providing background information in these other disciplines for the environmental chemist.

Students wanting a comprehensive and accessible overview of environmental chemistry will find this book an ideal source of information. In addition, the structured presentation will provide an invaluable aid to revision for students preparing for examinations.

Sampling Strategies for Natural Resources and the Environment, edited by Timothy G. Gregoire and Harry T. Valentine, Boca Raton, FL, USA, CRC Press, Taylor & Francis Group, 2008, 474 pp., £39.99, ISBN 978-1-58488-370-8

Sampling is a key step in any analytical study. The present book is aimed at providing an in-depth coverage of sampling designs and strategies for both discrete populations and continuums of natural and environmental resources that are applicable to the fields of ecology, forestry, natural resources and environmental science.

With a basic mathematical focus, the authors present common and highly specialised sampling designs. Thus, Chapter 1 introduces fundamental concepts and establishes some of the vernacular and tenets of probability sampling and design-based inference. In Chapter 2 the notion of a sampling distribution and properties of estimators based on the randomisation distribution of possible estimates is developed. Chapter 3 introduces five equal probability sampling designs applicable to discretely distributed populations, coupled with various estimators of the population mean value or total value of some attribute of the population. Examples from empirical populations are presented to illustrate the applications of these strategies. Chapter 4 parallels Chapter 3 in its presentation of sampling designs and appropriate estimators for continuums. Stratified sampling is presented in detail in Chapter 5. Related topics which deal with allocation of sampling effort, double sampling to estimate the strata weights, and post-stratification are included in this chapter. Generalised ratio and regression estimation is the topic of

Chapter 6, which deals more generally with the use of auxiliary information to improve the precision of estimation. From Chapter 7 onwards areal designs that have been applied in the fields of ecology and natural resource management are discussed. Sampling with fixed size plots and quadrats is the subject of Chapter 7 and Bitterlich sampling, widely used in forestry, is explored in Chapter 8. A fixed-population approach to line intersect sampling is presented in Chapter 9. Chapter 10 draws on the authors' work on the application of Monte Carlo integration to the sampling of continuums. In this chapter it is explained how plot sampling, Bitterlich sampling, line intersect sampling, and other areal other designs can be formulated as applications of importance. Chapter 11 follows with a brief presentations of point relascope sampling, variants of horizontal sampling, transect relascope sampling, ranked set sampling, quite adaptive cluster sampling, and 3P sampling. Two-stage sampling designs and cluster designs are considered in Chapter 12. Randomised branch sampling, a multistage design, is discussed in Chapter 13. This design conceivably is applicable to any entity that assumes a branched structure, though the design originally was formulated to estimate attributes of individual plants and trees. Finally, Chapter 14 introduces sampling with partial replacement, which is a very economical design for sampling resources on two or more occasions.

Short worked examples and graphical displays appear throughout the text, in the hope that they will provide clarity in cases where the symbolic formulas appear more difficult to understand. A website that contains data for exercises is also provided.

By presenting a conceptual understanding of each sampling design and estimation procedure as well as mathematical derivations and proofs in the chapter appendices, this text promotes a deep understanding of the underpinnings of sampling theory, estimation, and inference. Although requiring a prior knowledge of statistics the book will be of reference for scientists and professionals in biology, biometrics, ecology, environmental science, forestry and natural resources.

The Essential Handbook of Ground-Water Sampling, edited by David M. Nielsen and Gillian Nielsen, Boca Raton, FL, USA, CRC Press, Taylor & Francis Group, 2007, 309 pp., £33.99, ISBN: 978-1-4200-4278-8

Ground-water sampling methodologies and analytical techniques have improved tremendously during the past decade, following the need for accurate determination of very low levels of contaminants, sometimes below the ng L^{-1} range. The text provides a detailed discussion of every aspect of groundwater sampling from the development of a sampling and analysis plan, through sample collection, pretreatment, handling, shipping, and analysis, to the documentation, interpretation and presentation of ground-water quality data.

The first few chapters provide the reader with a detailed discussion of the factors and the processes that occur in sampling points between sampling events and during sample collection activities. The more important developments in ground-water sampling that have occurred in the past few decades are described, explanations of how new sampling methodologies and technologies can be effectively used in the field are provided, and many new ASTM standards that have been produced over the past decade to document and provide technical information on newly developed sampling protocols are introduced. The final chapters of the book are devoted to describing in detail the important aspects of a

ground-water sampling programme, including sample handling, analysis in the laboratory, quality assurance, and the organisation of data and interpretation of the results in a way that will allow hydrogeologists, regulators, risk assessors, remediation specialists and other data users to make sense of it.

All chapters are well illustrated for a better understanding of the practical aspects of the use of newer techniques. Particular attention is drawn to the economic and scientific case for adopting these new methodologies.

The information presented will be of special value for environmental and engineering professionals to make sound technological and economic decisions regarding the choice of sampling equipment, methodologies and procedures to meet their site-specific objectives and ensure the success of their ground-water sampling programmes.

Handbook of Water Analysis, **Second Edition**, edited by Leo M.L. Nollet, Boca Raton, FL, USA, CRC Press, Taylor & Francis Group, 2007, 769 pp., £150.00, ISBN: 978-0-8493-7033-5

Extensively revised and updated, this second edition provides current analytical techniques for detecting compounds in all types of water samples: freshwater from rivers, lakes, canals; and seawater, as well as groundwater from springs, ditches, drains, and brooks. Maintaining the detailed and accessible style of the original, this edition describes the physical, chemical and other relevant properties of water components, and covers sampling and preservation methods, clean-up, extraction and derivatization procedures, and enumerates different ways to measure chemicals in water. In addition, some applications of analysis of water types (potable water, tap water, wastewater, seawater) are reviewed.

Sampling as a quality-determining step is discussed in Chapter 1. Statistical and chemometrical methods, ensuring the reliability of the results, are presented in Chapter 2. Chapter 3 discusses new radioanalytical methodologies for the analysis of water and the possible health hazards. Water is a living element, housing many organisms – wanted or unwanted, harmful or harmless. Some of these organisms produce toxic substances. Chapter 4 and Chapter 5 discuss bacteriological and algal analysis. Humans consume and pollute large quantities of water. Chapters 6 to Chapter 22 cover injurious or toxic substances of domestic, agricultural, and industrial sources: halogens, sulphur compounds, phosphates, cyanides, asbestos, heavy and other metals, silicon compounds, nitrogen compounds, organic acids, phenolic substances, humic matter, pesticides, insecticides, herbicides, fungicides, PCBs, PCDFs, PCDDs and PAHs. Chapters 23 to 26 discuss in detail the separation and analysis of volatile organic compounds (VOCs), surfactants, endocrine disrupting chemicals (EDCs) and pharmaceutical and personal care products (PPCPs), and plastics residues, respectively.

By organising data into more than 300 tables, graphs, and charts, and supplementing the text with equations and illustrations, the editor distils a wealth of knowledge into a single accessible format. The book provides an essential reference on the detection of contaminants in water and may be particularly suited as a primary textbook for undergraduate students learning techniques of water analysis as well as for graduate students involved in the analysis of water.

Trace Environmental Quantitative Analysis: Principles, Techniques and Applications, **Second Edition**, by Paul R. Loconto, Boca Raton, FL, USA, CRC Press, Taylor & Francis Group, 2008, 731 pp., £66.59, ISBN: 978-0-8247-5853-0

This new and completely revised edition of the book attempts to move the reader from the soundest principles of trace environmental quantitative analysis (TEQA) to those techniques and applications currently being practiced in analytical laboratories dedicated to trace environmental chemical and trace environmental health quantitative analysis.

The book begins with an overview of regulatory and EPA methods followed by data reduction and interpretation, including calibration, verification, statistical treatment, detection limits and QA/QC practices. Chapter 3 on sample preparation techniques includes liquid – liquid extraction, accelerated solvent extraction, specific techniques for volatile organic compounds (e.g. purge & trap), column chromatographic cleanup and gel permeation chromatography, along with additional applications to biological sample matrices. Matrix solid-phase dispersion as applied to the isolation and recovery of persistent organic pollutants from fish tissue is also added. The prolific growth of SPME as evident in the analytical literature over the past 5 years has warranted an enlarged section on this technique. The principles that underline GC–MS, GC–MS–MS, LC–MS, and ICP-MS, among others, can be found in Chapter 4 on determinative techniques for measuring organic and inorganic species. The final chapter contains laboratory-tested experiments to practice the techniques appearing in the text, such as the determination of PAHs in soil, surfactants in wastewater or inorganic ions in drinking water. Beneath each chapter title is a brief 'Chapter at a Glance' so that the reader can more quickly find topics of immediate interest. Appendices include a glossary of terms used in TEQA, applications to drinking water, computer programs for TEQA, instrument designs and useful Internet links for practicing environmental chemists.

The book is specially addressed to analytical chemists, but also to organic chemists, biochemists, molecular biologists, geologists, toxicologists, epidemiologists, food scientists, and chemical and environmental engineers. Laboratory technicians of various skill and knowledge levels should also find the content of this edition beneficial.

Liquid Chromatography–Mass Spectrometry, Third Edition, by Wilfried M.A. Niessen, Boca Raton, FL, USA, CRC Press, Taylor & Francis Group, 2006, 608 pp., £100.00, ISBN: 978-0-8247-4082-5

LC–MS is a rapidly developing technique that is nowadays routinely used in many areas. The book offers a well-rounded coverage of the latest technological developments and applications of this technique for a diverse range of disciplines, giving a survey of the field for both newcomers and experienced users.

The first two chapters are devoted to concise introductions to liquid chromatography as well as mass spectrometry. A general discussion on strategies and history of LC–MS interfacing follows, with an overview on interfaces for atmospheric-pressure ionisation. Subsequently, two sections deal with small-molecules and biomolecules. Within the first, pesticides, steroids and flavonoids are specifically discussed, and applications in the environmental field (e.g., endocrine disrupting compounds, surfactants, pharmaceuticals and haloacetic acids), pharmaceutical drug discovery and development, clinical studies

(e.g., therapeutic drug monitoring, screening metabolic disorders and analysis of drugs of abuse) and food safety analysis (e.g., residues of antibiotics, steroids and aromatic amines), are comprehensively illustrated. A specific chapter is also devoted to quantitative bioanalysis, with special reference to matrix effects, sample pretreatment and sample throughput. The section on biomolecules includes detailed overviews on the analysis of proteins, peptides, oligosaccharides, lipids, phospholipids, nucleic acids and proteomics.

Illustrated with relevant examples and supported by the most relevant literature available (up-dated to 2005), each chapter examines how the strategies, technologies, and recent advances – from sample pretreatment to data processing – in LC-MS helped to shape these disciplines. Although each chapter is written as a separate unit that can be read apart from the others, extensive cross-referencing is provided. In this way, *Liquid Chromatography-Mass Spectrometry*, continues to provide scientists with a definitive guide and reference to the most important principles, strategies, and experimental precedents for applying LC-MS to their research.

Environmental Modeling: A Practical Introduction, by Mike Barnsley, Boca Raton, FL, USA, CRC Press, Taylor & Francis Group, 2007, 406 pp., £29.99, ISBN: 978-0-415-30054-4

As illustrated by the title, this book is a practical introduction to the various methods, techniques and skills required for computerised environmental modelling. The book demonstrates how to represent an environmental problem in conceptual terms, formalise the conceptual model using mathematical expressions, convert the mathematical model into a program that can be run on a desktop or laptop computer, and examine the results produced by the computational model. At the end, the book illustrates how such models improve understanding of the ways in which environmental systems function.

After a general introduction on the modelling process, the following chapter of the book describes how to visualise and process environmental data, for example creating 2D and 3D plots, running a simple program and redirecting the output to a file. Then, a wide range of environmental modelling topics are covered, including wind speed and power, solar radiation of earth's surface, vegetation canopy reflectance modelling, population dynamics, biospheric feedback on Daisy world, and modelling incident solar radiation and hydrological networks over natural terrain. A set of computer software tools and data sets required for running the various examples and exercises presented in each chapter, as well as presentational material and handouts, are described in the final annexes and in the accompanying CD for easy copying onto the user's computer hard-drive.

Equally important, the book imparts skills that allow developing, implementing, and experimenting with a range of computerised environmental models. The emphasis is on active engagement in the modelling process rather than on passive learning about a suite of well-established models. The author takes a practical approach throughout, one that does not get bogged down in the details of the underlying mathematics and that encourages learning through 'hands on' experimentation. Comprehensive and up-to-date, the book will be a valuable tool for course tutors and students and for environmental professionals and scientists.

Ecological Risk Assessment, Second Edition, edited by Glenn W. Suter II, Boca Raton, FL, USA, CRC Press, Taylor & Francis Group, 2007, 643 pp., £51.29, ISBN: 978-1-5667-0634-6

The primary purpose of the book is to provide an update of the latest advances in this discipline, which during the past decade has became a relatively mature science and practice. At present, there are standard frameworks and guidance documents in the United States and several other countries. As a result, ecological risks are more often the basis for environmental regulatory and management decisions.

Although a variety of stressors other than chemical contaminants are included in this edition, the focus is still on risks from chemicals or chemical mixtures, indicating that most ecological risk assessments are concerned with these issues. The documentation is organised in seven Parts. Delineating the process for performing an Ecological risk assessment (ERA), the book begins by defining the field (Part I), and then goes on to describe its relationship to other environmental assessment practices and its organisational framework. A chapter on ecological epidemiology and causal analysis, which has previously been treated as a type of ERA, but now is reorganised as a distinct practice itself is also included. Finally, it explores important concepts in the ERA process including variability, probability, uncertainty, scales, levels of organisation, modes of action and multiple causes, and data quality assurance. Part II is devoted to planning and problem formulation, with a discussion of the goals and objectives, agents and sources, exposure scenarios, assessment endpoints, conceptual models and analysis plans. The analysis of exposure is covered in Part III, with chapters on source identification and characterisation, sampling, analysis and assays, mathematical models of chemical transport and fate, and exposure to chemicals and other agents. Part IV deals with the analysis of effects, assessing the exposure-response relationships, tests and biological surveys, and describing extrapolation models at organism, population and ecosystem levels. Parts V and VI are focused on risk characterisation and risk management, which demonstrate how to organise and conduct an ERA, with the characterisation of the screening sites, weighing evidence, reporting and communicating ecological risks, decision analysis and the integration of legal, ethical and economical issues. Finally, in Part VII, a glossary is provided, including terms from risk assessment, ecology, toxicology and other disciplines.

In summary, the book presents a full range of useful data, models and conceptual approaches needed to perform an accurate ERA. Special emphasis is given to providing clear, scientifically sound and unbiased technical advice to environmental decision makers. The text is still aimed at practitioners and advanced students willing to become familiar with ecological risk assessment or risk assessment in general.

Ecotoxicology: A Comprehensive Treatment, by Michael C. Newman and William H. Clements, Boca Raton, FL, USA, CRC Press, Taylor & Francis Group, 2008, 852 pp., £79.99, ISBN: 978-0-849-33357-6

Integrating ecotoxicological concepts across a range of hierarchical levels, this book focuses on the paradigms and fundamental themes of ecotoxicology while presenting the details and practical applications of concepts often found in more specialised books. By synthesizing the best qualities of a general textbook and the narrower, more specific scope

of a technical reference, the authors have created a volume flexible enough to cover a variety of instructional vantages and thorough enough to bring together essential information from all levels of biological organisation, from individuals to populations, communities and ecosystems.

Building progressively from the biomolecular level toward a discussion of ecotoxicological effects on the global biosphere, the book is structured in five parts and a conclusions chapter. Part 1 introduces the fundamentals of hierarchical ecotoxicology and examines the value of different approaches to exploring ecotoxicological issues. The organismal ecotoxicology context, including effects to biomolecules, cells, tissues, organs, organ systems, and the entire organism, as well as key aspects of bioaccumulation and bioavailability, is described in Part 2. Then, in Part 3 the population ecotoxicology context is examined, including epidemiology, population dynamics, demographics, genetics and phenogenetics. The community ecotoxicology issues, including biomonitoring and community response, and the application of multimetric and multivariate approaches, are covered in Part 4. The last Part includes materials that are not conventionally covered in ecotoxicology textbooks, like the effects on the global ecosystem, by describing assessment approaches, identifying patterns, analysing relationships between species, and reviewing global atmospheric stressors. The final chapter offers an overview of the whole topic, reviewing the key concepts and drawing some concluding remarks.

Each chapter includes an overview, summary, and conclusions to integrate the concepts discussed and promote a balanced assessment of the overarching paradigms. The result is a book, highly informative, rich in details that are integrated as much as currently possible in the new science of ecotoxicology and, in summary, very pleasant to read. A milestone in the field, the book is suitable for graduate courses in ecotoxicology, environmental toxicology, ecology, biology and environmental health, as well as a reference for professionals in the field.

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