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Book Reviews

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BOOK REVIEWS

Treatment Wetlands, by Robert H. Kadlec and Scout D. Wallace, Boca Raton, FL, USA: CRC Press, Taylor & Francis Group, 2009, 2nd ed., 1016 pp., £73.80, ISBN 978-1-56670-526-4.

This book is an updated version of the former edition to reflect the impressive advances in wetland treatment technology. The authors have compiled huge information regarding multiple fields such as hydrology, hydraulics, reactor theory, applied design, implementation, cost and operation and maintenance of treatment wetland systems.

The book is organised into 25 chapters, 2 annexes and more than 2200 references, bringing together the state of the art in wetland treatment technology updated to 2006. Part I of this edition is organised in a manner that allows the reader to explore the internal mechanisms by which treatment wetlands operate. In this regard, data of existing projects and the obtained results are often presented and discussed. Internal mechanisms, their influence on treatment performance as well as the effect on system variability are explored in this part.

Part II is organised in such way to be able from the existing performance data to be analysed and used in the design process. As in the former edition, the book adopts a performance-based approach on wetland design. In addition, it provides design tools such as loading charts and scaling factors. In addition, it provides essential information that is key to getting wetlands built, including construction methods, cost information, and operation and maintenance requirements.

Fundamental aspects of wetland functioning and case studies are not repeated from the first edition, but other topics have been completely rewritten and updated as required by the vast increase in data sources and understanding of the processes since the first edition.

Therefore, this impressive book is highly recommended to all wetland practitioners, including scientists, environmental chemists, civil engineers, university professors, ecologists, and enterprises involved in the design, construction, operation and maintenance of wetlands.

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Statistics for Environmental Science and Management, by Bryan F.J. Manly, Boca Raton, FL, USA, CRC Press, Taylor & Francis Group, 2009, 2nd ed., 292 pp., US\$62.96, ISBN 978-1-4200-6147-5.

This book is intended to introduce environmental scientists and managers to the statistical methods that will be useful for them in their work, and also serves as a text suitable for a course in statistics for graduate students in the environmental science area.

The book is not intended to be a complete introduction to statistics. Rather, it is assumed that readers are already familiar with the main concepts. However, an Appendix is meant to provide a quick refresher course.

The book begins by describing the important role statistics play in environmental science. It focuses on how to collect data, highlighting the importance of sampling and experimental design as well as data handling in conducting rigorous science. It presents a variety of key statistical topics specifically related to environmental science such as monitoring, impact assessment and assessment of site reclamation, and concludes with a series of chapters on temporal and spatial data analysis, censored data and Monte Carlo risk assessment.

There are numerous books on environmental statistics. However, while some focus on multivariate methods and others on the basic components of probability distributions, most do not include the practical material that this one does. Moreover, each chapter is illustrated with selected examples to which the previous concepts are applied, and is concluded with a summary and some exercises for practice. It is the variety of coverage, not sacrificing too much depth for breadth, that sets this book apart.

Nanotechnology and the Environment, by Kathleen Sellers, Christopher Mackay, Lynn L. Bergeson, Stephen L. Clough, Marilyn Hoyt, Julie Chen, Kim Henry and Jane Hamblen, Boca Raton, FL, USA, CRC Press, Taylor & Francis Group, 2009, 296 pp., US\$89.96, ISBN 978-1-4200-6019-5.

Nanotechnology and the Environment provides the fundamental basis needed to assess and understand the life cycle of nanomaterials. It begins with a general introduction to nanoscale materials, their properties, and their uses, and describes the processes used to manufacture nanoscale materials. In order to provide a cohesive presentation of issues, six of the most common nanomaterials are considered, namely titanium dioxide, zero valent iron, silver carbon black, fullerenes and carbon nanotubes. Subsequent chapters provide information on the analysis of nanomaterials in the environment and their fate and transport, including the effects of wastewater treatment on nanomaterials. Then, the possible risks to human health and the environment are discussed and the developing regulations to manage those risks are described. The penultimate chapter of the book examines an apparent paradox given concerns over the possible risks of nanotechnology: the use of nanoscale materials to remediate environmental pollution. The final chapter discusses frameworks, such as life cycle analysis (LCA), for evaluating the balance between risk and reward as nanomaterials are manufactured, used and released to the environment, and presents brief examples.

This book offers a snapshot of a rapidly developing field. It presents the current state of the science and identifies critical areas undergoing further research. The information offered represents an initial framework for understanding nanotechnology and the environment. As this is an emerging field, a potential later edition of this book would contain much more detail and could address technical questions more fully. But the community of scientists, engineers, regulators, and the public cannot wait for the results of mature research. Given the possible risks and rewards of nanotechnology, we must explore what is known about the ramifications of nanotechnology and the environment now, an attempt that this book has successfully accomplished.

Ionic Liquids in Chemicals Analysis, edited by Mihkel Koel, Boca Raton, FL, USA, CRC Press, Taylor & Francis Group, 2009, 448 pp., US\$134.96, ISBN 978-1-4200-4646-5.

The term of ion liquids (ILs) is used loosely to describe organic salts with their melting point close to or below room temperature. This gives these materials the potential to behave very differently in contrast to conventional molecular liquids when used as solvents. ILs promise entirely new ways to do solution chemistry, which could provide novel applications in chemical analysis, based on their different chemical and physical properties.

This excellent book is an attempt to collect the experience and knowledge of experts about the use of ILs in different areas of analytical chemistry such as separation science, with specific emphasis on gas and liquid chromatography, capillary electrophoresis and countercurrent chromatography, molecular spectroscopy, Raman and nuclear magnetic resonance spectroscopy, mass spectrometry and sensors. Different extraction techniques, from the separation of gases to metals are also reviewed. In addition, there are chapters providing information on the structure and physicochemical properties, thermophysical properties and activity coefficients, phase equilibrium with other liquids, and discussion about modelling, which are essential to know beforehand, and are also useful for wider applications in analytical chemistry.

The approach in this book is that of a tutorial providing an aid to the novice to enter the area that will include both new and senior scientists. Therefore, it is not expected to give a complete coverage of the literature in the area but to help others in finding a proper area where the use of these materials could be the most advantageous.

Environmental Chemistry in Society, by James M. Beard, Boca Raton, FL, USA, CRC Press, Taylor & Francis Group, 2009, 360 pp., US\$62.96, ISBN 978-1-4200-8025-4.

The aim of the author in writing the book has been to present the chemistry of the environment in a way that is accessible to readers who have little or no science background. It relates the fundamentals of chemistry to contemporary environmental issues.

Requiring no prior experience within the field, the reader will find that the text is self-contained as it first supplies all the background information necessary to grasp the issues explored in later chapters. Thus, after a general presentation of the background to environmental problems, the book reviews in successive chapters the laws of thermodynamics and conservation of matter; the basic chemistry concepts, such as chemical bonding, acid-base theory, and oxidation-reduction; the carbon, oxygen, hydrogen, nitrogen, phosphorus, and sulphur cycles; and modern environmental toxicology topics, such as routes of exposure and classification of toxins, including organochlorine pesticides, polychlorinated biphenyls, dioxins, endocrine toxins, carcinogens, etc. The author then focuses on current environmental issues, including energy conservation, weather and climate, indoor and outdoor air pollution, acid rain, ozone depletion, global warming, water shortages and pollution, and solid and hazardous wastes. Presenting ways to combat these problems, the book explores hydrogen fuel cells, catalytic converters, the phase-out of chlorofluorocarbons, and desalinisation. Numerous diagrams and illustrations make easy the understanding of the main concepts which are strengthened with the inclusion of end-of-chapter questions.

This arrangement of material allows the instructor the freedom to cover the material in this book in a manner that can be customised to the needs of the course.

Organic Pollutants. An Ecotoxicological Perspective, by C.H. Walker, with contribution from Charles Tyler, Boca Raton, FL, USA, CRC Press, Taylor & Francis Group, 2009, 2nd ed., 304 pp., US\$58.46, ISBN 978-1-4200-6258-8.

The book, structured in three parts, describes the mechanistic basis of ecotoxicology, using major groups of pollutants as illustrative examples. It also discusses the problem of complex mixtures of chemicals and explores future prospects in the field. The book takes a bottom-up approach, describing the mechanisms by which pollutants have harmful effects on living organisms and how these effects are translated into adverse changes at the population level. This mechanistic approach supplies the basis for the development of new mechanistic biomarker assays, which in turn provide measures of toxic effect and not merely of exposure, and subsequently provide evidence of causality between pollutant levels and ecological changes.

The first part of the book deals with basic principles determining the fate and effects of organic pollutants in the natural environment. The first chapter puts this issue into evolutionary perspective. Chapter 2 is concerned with the factors that determine the distribution and toxicity of these compounds in individual organisms. Chapter 3 describes the factors that determine the distribution of chemicals through the major environmental compartments and attempts to develop descriptive and predictive models for this. Chapter 4 focuses on distribution and effects in communities and ecosystems.

The second part is focused on major groups of organic pollutants, describing their chemical and biological properties and showing how these properties were related to their environmental fate and ecological effects. Attention is given to case histories, especially to long-term studies conducted in reasonable depth and detail, which illustrate how some of these principles work out in practice in the complex and diverse natural environment. The compounds featured in this part include organochlorine insecticides, PCBs and PBBs, PCDD and PCDFs, organometallic compounds, PAHs, organophosphorus and carbamate insecticides, anticoagulant rodenticides and pyrethroids.

This third part of the book is devoted to further issues and future prospects, including the problem of addressing complex pollution problems and how they can be studied employing new biomarker assays that exploit new technologies of biomedical science. Three chapters, 'The Ecotoxicological Effects of Herbicides', 'Endocrine Disruptors' and 'Neurotoxicity and Behavioral Effects', provide examples of the study of complex pollution problems. The concluding chapter attempts to look into the future through questions such as: What improvements may there be in testing procedures having regard for ethical questions raised by animal welfare organisations? Can ecotoxicity testing become more ecologically relevant? Can more information be gained by making greater use of field studies?

It is hoped that this text will prove useful to final-year undergraduates, higher degree students, and to researchers in the field of ecotoxicology.

Environmental Assessment of Estuarine Ecosystems: A Case Study, edited by Claude Amiard-Triquer and Philip S. Rainbow, Boca Raton, FL, USA, CRC Press, Taylor & Francis Group, 2009, 368 pp., US\$116.96, ISBN 978-1-4200-6260-1.

This book describes a comparative multidisciplinary ecotoxicological study of two contrasting estuaries in France, the Seine and Authie, both situated in the French coast of

the English Channel. Based on the results of this study, the book presents interpretations of how different techniques might be applied in future similar studies assessing the ecotoxicological status of these vital coastal systems. With contributions from international experts, the book covers all aspects of estuaries from physiography to management and introduces the state-of-the-art science required to investigate the ecotoxicological problems in estuaries all over the world.

The first chapters of the book are devoted to the hydrographic and sedimentary processes in the estuarine mudflats and the quantification of organic and inorganic contaminants in the different biotic and abiotic compartments. The concept of the biogeochemical cycle is introduced to recognise the dynamism of multiple and complex processes that move, transform and store chemicals in the geosphere, hydrosphere and biosphere. These data may be useful in predicting potential biological effects, but only if contaminant levels are related to responses in biological systems. These responses (biochemical, physiological, etc.) are extensively investigated in the following chapters where the bioaccumulation and effects of contaminants at different levels of biological organisation are described. Threshold effect levels and ecological quality status are derived from different biotic indices that are reviewed. The sediment quality triad approach is proposed to assess the effects of chemical mixtures found in natural sediments. The triad approach is based on several species: the copepod *Eurytemora affinis*; the endobenthic worm *Nereis diversicolor*; the European flounder *Platichthys flesus*, along with higher taxa or functional groups (bacteria, microphytobenthos, foraminiferans, meiofauna and macrofauna) representative of the water column or the sedimentary compartment.

Although carefully focused on a specific region, this book covers a broad range of environmental issues and solutions, demonstrating how various pieces of information can be integrated into a sound assessment. The assessment techniques and an understanding of the observations may provide a benchmark for assessing, remediating and applying the latest scientific approaches to other estuaries. Therefore, the book will be of interest to both environmental scientists and policy makers.

Differential Optical Absorption Spectroscopy, Principles and Applications, by Ulrich Platt and Jochen Stutz, Heidelberg, Germany, Springer, 2008, 612 pp., EUR 139.05, ISBN: 978-3-540-21193-8.

This comprehensive text reviews the basics of atmospheric chemistry, radiation transport and optical spectroscopy before detailing the principles underlying differential optical absorption spectroscopy (DOAS) and the current state of this technique, which is an elegant and powerful analytical method to study the atmosphere, based on the relatively simple principles of classical absorption spectroscopy.

The book is divided into 12 chapters. A short review of the chemistry of the troposphere and the stratosphere is given in Chapter 2, introducing the trace gases (e.g. ozone, sulphur, nitrogen, halogen and carbon species) and concepts needed to understand the various applications of DOAS. Chapter 3 reports on the fundamentals of the interaction of molecules with radiation that form the basis of the molecular spectroscopic methods. Chapter 4 describes the propagation of radiation in the open atmosphere. A review of various analytical (spectroscopic) methods to measure atmospheric trace constituents and the selection criteria for their use is presented in Chapter 5. Chapter 6 gives a general introduction to DOAS. The technical aspects in the construction of DOAS

instruments, the mathematical basics of the analytical techniques and radiative transfer methods are presented in Chapters 7–9, respectively. Chapters 10 and 11 then present a number of examples for the application of ‘active’ and ‘passive’ DOAS in the troposphere and the stratosphere. The recent expansion of DOAS application to the imaging of trace gas distributions by ground, aircraft and satellite-based instruments are also covered. A look into the future of DOAS is given at the end of the book in Chapter 12. Two annexes for assisting in the evaluation and interpretation of spectra are included: (A) on the spectral positions of emission lines from calibration lamps and lasers and (B) on the absorption spectra of molecules measurable by DOAS.

Written for graduate students and researchers with a general background in environmental physics, this book especially addresses the needs of those working in the field of atmospheric chemistry and pollution monitoring. It will supply enough information to specialists to aid in the construction of new instruments and the improvement of analytical methods.

Principles of Environmental Sciences, edited by Jan J. Boersema and Lucas Reijnders, Heidelberg, Germany, Springer, 2009, 206 pp., EUR 160.95, ISBN: 978-1-4020-9157-5.

This academic textbook is meant to be complementary to the many existing textbooks on environmental science, in the sense that it incorporates the social sciences and even disciplines of the humanities in defining and analysing environmental problems. Right from the beginning, the students learn that the subject has not only a technical but also a cultural and historical dimension and that the underlying concepts and principles have adjacent policy measures.

The aim of the book is three-fold: to describe environmental problems in their historical context; to delineate how complex environmental problems can be analysed and tackled by using various (inter)disciplinary concepts, methods and tools; and to illustrate how solutions work out in their social context.

In line with these aims, the book is subdivided into three parts. Part I, *Stating the Problem* (Chapters 1–6), introduces the environmental sciences and gives an overview of the historical context. This is done on a large timescale, including geological and human history. It concludes with a concise description of recent developments and trends. Part II, *Principles and Methods* (Chapters 7–18), is the core of the book. It starts with two chapters on the guiding principles, followed by seven chapters in which disciplinary and multidisciplinary methods are described and explained at length. The text includes many practical examples, including evaluations of the pros and cons of each example. This part concludes with three chapters on integrative methods. Special emphasis is given to the concept of integration, modelling (both as a learning and a research tool) and integrated assessment. Part III, *Context and Perspectives* (Chapters 19–28), is designed to illustrate the way solutions work in a specific societal context. The first chapter in this part introduces the topic, which is followed by three case studies on different spatial scales. The case studies are used to emphasise that solutions need to be implemented in and/or accepted by a given society. Finally, the book offers perspectives on economic growth and on major societal sectors and the most likely course they will take in the future.

This excellent and truly multidisciplinary book is intended to be a text for courses in environmental studies/sciences. Reading the book, students will be able to improve their

ability to analyse and conceptualise environmental problems in context, to be aware of the value and scope of different methods and to learn the results and insights of previous work in this field. Moreover, the book will be of interest for professionals in the environmental field who aim to have a broader perspective of their particular interests.

Ecotoxicology of Antifouling Biocides, edited by Takaomi Arai, Hiroya Harino, Madoka Ohji and William J. Lansgton, Tokyo, Japan, Springer, 2009, 454 pp., EUR 203.25, ISBN: 978-4-431-85708-2.

The material presented in this book provides a comprehensive overview of tributyltin (TBT) in marine ecosystems and the current state of knowledge of alternative biocide booster compounds that are gaining widespread acceptance.

After a general introduction to the release of biocides from antifouling paints and the international trends in regulatory aspects, a section on the behaviour of organotin compounds and their effects on aquatic organisms is included. This encompasses a large number of contributions dealing with the distribution of organotin compounds in aquatic environments (e.g. global contamination, contamination in Asia, contamination in coastal and deep sea environments, etc.); the endocrine-disrupting effect of organotin compounds for aquatic organisms; the toxicity, immunotoxicity and genetic and physiological impacts of organotin compounds, mainly in fish; and the bioaccumulation of organotin compounds in plankton, molluscs and fish. The last part of the book is devoted to the environmental chemistry of alternative biocides, with sections on analytical methods, monitoring of alternative biocides in Europe, the USA and Asia, toxicity in aquatic organisms and the fate of alternative biocides in aquatic environments.

Although the topic of TBT in the aquatic environment has been investigated for many years, the question of antifouling biocides continues to pose the challenge of obtaining the greatest effectiveness for shipping with minimal acceptable danger to the environment. These and other findings are described in the book, providing a useful reference for experts in environmental chemistry, government organisations and students and researchers.

Reviews of Environmental Contamination and Toxicology, Volume 197, edited by Hemda Garelick and Huw Jones, New York, USA, Springer, 2009, 202 pp., EUR 99.46, ISBN 978-0-387-79283-5.

The role of this *Reviews* series is to publish detailed scientific review articles on all aspects of environmental contamination and associated toxicological consequences. Previous volumes in the series have recently been reviewed in this section of the Journal (see *IJEAC*, **88**, 674–676 and 889–900, 2008). The present volume is specifically devoted to analyse the status of arsenic pollution and consequential human exposure and to provide practical guide to available arsenic remediation technologies. The papers presented result from a project supported the Chemistry and Environment Division of IUPAC. Key points addressed in the successive contributions are:

- Health risks of arsenic contamination, with reference to the technical challenges associated with optimising arsenic remediation approaches that are acceptable to arsenic-polluted communities.

- Overview of the global status of arsenic pollution sources, both natural and anthropogenic, and behaviour of arsenic in groundwater and surface waters. Information is provided on modes of formation and release of arsenic and the corresponding implications to environmental mobility and toxicity of different arsenic chemical species.
- Effects of high spatial and temporal variation of arsenic contamination and the consequential need for cheap, quick, onsite (field kits) analytical techniques that accurately portray the degree and nature of contamination so critical to remediation efforts are discussed.
- A variety of potential remediation technologies for arsenic removal with particular emphasis in developing countries with the greatest arsenic contamination.
- Multi-criteria approaches for suitable evaluating mitigation options.

The final paper of the series shares the challenges faced by three countries with arsenic-contaminated regions in addressing and remediating sources of arsenic contamination.

This dedicated volume will be of interest not only in scientific and academic activities, but also in informing and supporting policy decisions when choosing possibilities for arsenic mitigation.

Reviews of Environmental Contamination and Toxicology, Volume 198, edited by David M. Whitacre, New York, USA, Springer, 2009, 216 pp., EUR 85.55, ISBN 978-0-387-09646-9.

Following the scope of the series, the present volume includes five reviews on different subjects related to the presence and toxicity of chemical and biological contaminants in the environment and to new tools for environmental risk assessment. The first chapter, dealing with 'The Impact of Environmental Chemicals on Wildlife Vertebrates', provides extensive information on the casual relationships between exposure and reproduction or population structure effects on different families of vertebrates, such as fish, amphibian, reptilian, birds and mammals. Evidence shows that selected species were negatively affected by certain anthropogenic chemicals, endocrine disruption being the most widely observed effect. The review clearly shows the gaps in knowledge that must be filled for the topic area addressed. Chapter 2 provides an overview on 'Biomarkers in Aquatic Plants' to assess specific xenobiotics or groups of xenobiotics in laboratory and field studies. Emphasis is placed on the predictive ability, utility, sensitivity and specificity of each biomarker (e.g. gene expression, metabolic enzymes, phytochelatins, flavonoids, stress proteins, reactive oxygen species and scavenging enzymes, photosynthetic pigments, etc.) as biomonitoring agents. The 'Human Health Effects of Methylmercury Exposure' is the subject of the next review (Chapter 3). The sources and cycling of mercury in the environment, pathways of exposure, toxicity and exposure evaluation, toxicokinetics, targeted biomarkers, and nutritional risks and benefits from fish consumption are the main issues covered. Chapter 4 deals with 'Waterborne Adenovirus'. Adenoviruses are associated with numerous disease outbreaks related to drinking and recreational waters. After a general presentation of human diseases associated with adenoviruses, the chapter describes the confirmed cases and assesses the risk and economic impact of such occurrences. The final chapter, entitled 'Haloacetonitriles: Metabolism and Toxicity', provides an overview on this particular type of water disinfection by-products (DBPs), including formation and prevalence in drinking water, general and systemic toxicity, mutagenicity, carcinogenicity, pharmacokinetics and metabolism, mechanism of action and evaluation of other toxic effects.

Reviews of Environmental Contamination and Toxicology, Volume 199, edited by David M. Whitacre, New York, USA, Springer, 2009, 170 pp., EUR 80.20, ISBN 978-0-387-09807-4.

Reviews makes available to readers, in an abridged form, the staggering volume of scientific literature existing on key environmental topics. In this volume, there is a concise assessment of the annual median discharge of over 100 pharmaceuticals to the Dutch coastal zone of the North Sea (Chapter 1, 'Assessing the Discharge of Pharmaceuticals along the Dutch Coast of the North Sea'). Calculations are based on pharmaceutical concentrations in surface-, sewage-, and industrial water in the Netherlands. The values, of several tens of tons per year, indicate that this emerging issue deserves further consideration as the human and ecotoxicological risks of these highly biologically active compounds are largely unknown. Chapter 2 is entitled 'Methods for Deriving Pesticide Aquatic Life Criteria'. The chapter explores the current state of aquatic life criteria derivations around the world. Included in the discussion are methodologies from Canada, the USA, the UK, Spain, France, Germany, the Netherlands, Denmark, OECD, etc. Rather than discussing each methodology independently, this review is organised according to critical elements that must be part of a scientifically defensible methodology, namely protection level, ecotoxicity and physical-chemical data, exposure considerations, etc. However, some of the latest recommendations for water quality criteria derivation methodologies are simply not technically feasible, at this time, because of a paucity of data or lack of agreement among experts on techniques. These gaps and needs for further research in this area are comprehensively highlighted in the chapter. Finally, in Chapter 3 an attempt is made to synthesise the literature that addresses emissions and exposure of 'Platinum Group Elements in the Environment'. The review shows that the dramatic increase of emissions of these metals, mainly from vehicle catalytic converters and hospital wastewater discharges, are particularly significant and the toxic effects on living organisms, including humans, is still in dispute and incompletely elucidated.

Emerging Contaminants from Industrial and Municipal Waste: Occurrence, Analysis and Effects, edited by Damià Barceló and Mira Petrovic, Heidelberg, Germany, Springer-Verlag, 2008, 206 pp., EUR 160.45, ISBN 978-3-540-74793-2.

This book is based on the scientific developments and results achieved within the European Union-funded project EMCO (reduction of environmental risks posed by emerging contaminants, through advanced treatment of municipal and industrial wastes). One of the key elements of the EMCO project was to provide support to the various Western Balkan countries involved in the project as regards the implementation of the EU Water Framework Directive (WFD).

The volume is structured in five chapters covering the occurrence of emerging contaminants in wastewaters, advanced methods for the analysis of emerging contaminants of municipal and industrial origin, acute and chronic effects of emerging contaminants, traceability of emerging contaminants from wastewater to drinking water, and environmental risk assessment.

Advanced monitoring analytical methods for emerging contaminants cover the use of liquid chromatography combined with tandem mass spectrometric detection or hybrid mass spectrometric techniques. It is certainly known that without these advanced mass spectrometric tools it would not be possible to investigate the fate and behaviour of

emerging pollutants at the wastewater treatment plants and receiving waters at the nanogram per litre level. Ecotoxicology is also a very relevant aspect that should be taken into consideration for emerging contaminants, and it is also covered in this book. Risk assessment methodologies will allow the critical establishment of the good performance of an appropriate wastewater treatment technology for the removal of urban, agricultural and industrial wastewaters.

It is obvious that building up and improving wastewater treatment plant performance in the public and private sectors will avoid direct pollution of receiving waters by urban and industrial activities. Overall, this book is certainly timely since the interest in emerging contaminants and wastewater treatment has been growing considerably during the last few years, related to the availability of novel treatment options together with the advanced and highly sensitive analytical techniques.

The book will be of interest to a broad audience of analytical chemists, environmental chemists, water management operators and technologists working in the field of wastewater treatment, or newcomers who want to learn more about the topic.

Emerging Contaminants from Industrial and Municipal Waste: Removal Technologies, edited by Damià Barceló and Mira Petrovic, Heidelberg, Germany, Springer-Verlag, 2008, 298 pp., EUR 223.63, ISBN 978-3-540-72909-3.

The present book is complementary to the previous one (*Emerging Contaminants from Industrial and Municipal Waste: Occurrence, Analysis and Effects*) and covers different innovative treatment options for the removal of emerging contaminants from wastewaters and drinking waters. The chapters deal with the removal of emerging contaminants in wastewater treatment: conventional activated sludge treatment; membrane bioreactor (MBR) as an advanced wastewater treatment technology; removal of emerging contaminants in water treatment; ozone-based technologies in water and wastewater treatment; removal of emerging contaminants in wastewater treatment: removal by photocatalytic processes; behaviour of emerging pollutants in constructed wetlands; input of pharmaceuticals, pesticides and industrial chemicals as a consequence of using conventional and non-conventional sources of water for artificial groundwater recharge; and advanced sorbent materials for treatment of wastewaters.

The MBR is an emerging technology based on the use of membranes in combination with traditional biological treatment. It is considered as a promising technology able to achieve more efficient removal of micro-pollutants in comparison to conventional wastewater treatment plants. Other examples reported in the book are advances in nanomaterials, also an emerging field in wastewater treatment, which are providing great opportunities in the development of more effective wastewater treatment technologies, and the use of constructed wetlands as a cost-effective wastewater alternative for small communities.

The two volumes constitute an opportune addition to the literature in proposing and anticipating solutions for an environmental issue of future potential concern.

Pharmaceuticals in the Environment, Sources, Fate, Effects and Risks, edited by Klaus Kümmerer, Heidelberg, Germany, Springer-Verlag, 2008, 3rd ed., 554 pp., EUR 139.05, ISBN 978-3-540-74663-8.

Since the publication of the first edition in 2001 (see *IJEAC*, **82**, 748–749, 2002) and the second edition in 2004, pharmaceuticals in the environment continues to be a ‘hot bed’ of interest. As it has been extensively demonstrated that the active compounds are present in the environment some of the interests in this field have moved from analysis of the compounds to more extensive fate studies in the lab and in field trials. Metabolites of human and animal metabolism are coming into focus. The same holds for products of transformation of parent compounds and metabolites in the environment, such as dead-end transformation products of biodegradation, oxidation or photolysis. The question of mixture toxicity has gained more and more attention. The significance of antibiotic resistance in the environment is still not clear. The long-awaited guideline for environmental risk assessment for human pharmaceuticals in the European Union has been in force since December 2006, so more work has been done in the area of risk assessment and risk management.

Accordingly, the third edition has been largely changed in comparison with the previous ones to address these new issues. Like the previous editions, this one highlights the most important questions and findings related to the presence of pharmaceuticals in the environment. Research needs are addressed within each chapter.

This edition contains four major parts. In the first part, specifics of pharmaceuticals that distinguish them from ‘classical’ micro-pollutants are addressed. In the second part, new findings on sources, occurrence and fate of pharmaceuticals in the environment are presented. In the third part, an overview of the current state of knowledge of effects of pharmaceuticals in aquatic and terrestrial environmental is given. New, promising approaches to the study of the effects of pharmaceuticals in the environment are described. The fourth part addresses risk assessment issues starting with the EU guideline and practical experiences of its application. Shortcomings of the EU guidelines are discussed in several contributions. A brief description of the state of regulation of chemicals in Japan is also included. The final part is dedicated to risk management. As advanced STP effluent treatment as a management approach has already been addressed in the second edition and no generally new findings have been published since this time, only a little space has been devoted to it. Instead, mainly non-technical approaches are presented here that are also of importance and are often overseen.

As a result, the third edition is not only a revised and updated one but an additional new volume in a ‘series’ of pharmaceuticals in the environment. In summary, this is an invaluable reference for those who are interested in contributing to this new area of research, for those concerned with water management and for environmental regulators who all have to become watchful to this new environmental stress.

Oil Spill Response: A Global Perspective, edited by Walter F. Davidson, Keneth Lee and Andrew Cogswell, New York, USA, Springer, 2008, 388 pp., EUR 74.85, ISBN 978-1-4020-8564-2.

This book is part of the NATO Science for Peace and Security Series devoted to assess emerging risks to the environment and society that could cause economic, cultural and political instability. The book is a direct outcome of the Third Oil Spill Workshop sponsored by the NATO Committee on Challenges of Modern Society (CCMS) held in Dartmouth (Canada) in October 2006.

A focal point of this workshop was a special session on oil spill response countermeasures for use under Arctic conditions. Summarised under Part 1 of the book, this session outlined the environmental challenges that must be addressed in oil spill response operations, such as harsh cold water conditions, changes in the physico-chemical properties of the oil, the lack of waste disposal sites, ice cover, detection of oil under ice, etc. An overview on new state-of-the-art response technologies under development is provided.

Part 2 of the book focuses on the application of oil spill countermeasure strategies for use in north-temperate waters. This section describes advances in containment strategies such as the deployment of towed boom arrays, pumping systems, etc. A number of chapters are devoted to the study of factors which control the effectiveness of chemical dispersants for oil spill response at sea.

In Part 3, chapters are devoted to the effects of contaminant petroleum hydrocarbons on the organisms living within sediments as well as fish. Biological (toxicity test assays) and chemical (oil fingerprinting and spill source identification) methods are described.

The development of numerical models for the prediction of the fate and transport of oil spilled at sea is summarised in Part 4. The output of such models may be used for the guidance of oil spill response operations and environmental risk assessment studies.

The last section of the book is focused on operational needs for the future, including risk assessment, contingency planning, operational response and policy developments. A comprehensive overview of emergency response strategies for several nations and regions are provided. Methods of risk analysis and decision making tools for the selection of oil spill response tools are described. It is evident from this book that future improvement of oil spill response strategies will be an international effort as the issue is not defined by national boundaries.

Contaminated Sediments, edited by Tarek A. Kassim and Damià Barceló, Heidelberg, Germany, Springer-Verlag, 2009, 197 pp., EUR 133.70, ISBN 978-3-540-88013-4.

Sediments have been described as a sink for pollutants and as a source for contaminants to be introduced into the aquatic environment. The book does not provide an overview of the topic as the title could suggest but a series of brief contributions dealing with secondary aspects. Covered in six chapters are the following issues the influence of contaminated sediments on the sustainable use of the Planet; the fate and behaviour of some sediment pollutants such as polycyclic aromatic hydrocarbons (PAHs) and chlorinated and brominated organic pollutants, with a study on the effect of static vs. tidal hydraulic conditions on the degradation of PAHs; the application of marine sediment toxicity identification evaluation (TIE) protocols; the use of nucleic acid-based techniques for studying the diversity of bacterial communities present in contaminated sediments; and the modelling of the migration of contaminants in sediment caps.

The book can be of interest as ancillary material in courses on environmental chemistry, toxicology or microbiology, as well as for those people already working in or planning to enter this field.

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