

BOOK REVIEWS

Practical Environmental Analysis

BY MIROSLAV RADOJEVIC AND VLADIMIR N. BASHKIN

xx + 466 pp., 60 figs., 24 × 16 × 2.7 cm, ISBN 0 85404 594 5
paperback, £32.00, Cambridge: Royal Society of Chemistry, 1999

Having taught environmental chemical analysis myself for 30 years, I really liked this book, and could totally empathize with what the authors were trying to achieve (and indeed succeeded very well in achieving) in a modestly sized and priced volume. The quality of the content reflects pooled years of practical experience, and much careful consideration of what students moving into this area of science really need to know and understand if they are to produce decent and meaningful analytical data. The book starts with a discussion of the nature of the environment and of environmental analysis, introducing the reader to the complexity of the systems being studied without making the topic too complex. The following chapters cover rainwater analysis, air analysis, water analysis, soil, sludge, sediment and dust analysis, and plant analysis. This is followed by a set of appendices on safety, good laboratory practice, environmental standards, recommendations for groundwater and leachate monitoring for landfill sites, and statistical tables.

The authors do an excellent job throughout in scene setting, explaining what needs to be determined and why, before going on to discuss methodology for sampling and for analysis. Many useful practical determinations are described with full practical details, in a very user-friendly style. The diagrams are clear and helpful. I am sure this book is destined to become a course text for many university courses, a bible for undergraduate and M.Sc. research projects, and even a key text in more enlightened high schools. While more expensive methods of analysis are introduced by the authors, there are a wealth of experiments described which could easily be performed in modestly-equipped establishments. The text also contains numerous worked examples of typical calculations. Here too the authors have achieved a user-friendly, non-patronising style.

It is important for intending purchasers to realize that this is intended to be, and is, a high quality, informative introductory text. It is by no means a comprehensive encyclopaedia of instrumental methods of environmental analysis, nor could it possibly be at this size and price. Eventually, practitioners of a particular analytical technique will undoubtedly need to dip into a more specialized monograph. But I strongly urge academics in chemistry, botany, biology, soil science, geography and environmental science departments to give it serious consideration as a course text at the introductory level. At the very least, there should be multiple copies on most universities' library shelves.

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Hormonal Chaos – The Scientific and Social Origins of the Environmental Endocrine Hypothesis

BY SHELDON KRIMSKY

xiii + 284 pp., 2 figs., 4 tables, 16 × 23.6 × 2 cm, ISBN 0 8018
6279 5 hardcover, £23.00, Baltimore, US: The Johns Hopkins
University Press, 1999

This book traces in great detail the history and scientific basis behind the contentious and controversial issue of what has become known as the environmental endocrine hypothesis. The central thesis of this hypothesis is that *in utero* exposure to certain environmental chemicals that are weak endocrine agonists (predominantly oestrogen agonists) may give rise to a number of adverse effects in exposed offspring. The book begins by recounting the scientific developments which form the underpinnings of this issue, from McLachlan's early work on diethylstilbestrol (DES) as a potent xenoestrogen, the ongoing controversy concerning environmental contributions to breast cancer and falling sperm counts, to Colburn's publication of *Our Stolen Future* which brought all of these issues to a wider audience. This chapter is followed by a comprehensive account of the twists and turns through which the endocrine disruptor hypothesis has passed on its journey into the public and regulatory consciousness. The chapter on uncertainty, values and scientific responsibility vividly illustrates how an issue of this complexity, with potential implications of staggering import, leads to polarization, conjecture, and apocalyptic speculation. Sound science occasionally comes up short in this contentious milieu. The chapter on the virtually irresolvable policy conundrum surrounding this issue is a good one, touching on both sides of the debate concerning possible societal responses. It illustrates the dilemma facing society when the risks might be substantial, but impossible to define, much less quantify.

The book is well researched with numerous citations to the published literature. *Hormonal Chaos* should appeal to potential readers who desire to get up to speed on the origins and controversy concerning the environmental endocrine hypothesis. The book is well written and its central thesis is logically and chronologically presented.

However, due to the complexity of the subject matter, *Hormonal Chaos* suffers from a number of shortcomings that undermine somewhat the take-home messages intended by the author. Notably missing from the treatment of the environmental endocrine hypothesis is a cogent discussion of the practical risk assessment concerns unique to this issue. While there is no consensus on how risk assessment on endocrine active compounds might be accomplished, whatever approach is ultimately taken must account for a number of critical factors not adequately considered in *Hormonal Chaos*. These include the combined additive effects of many synthetic compounds with minimal potency against a background of naturally occurring compounds with greater potency. The extensive and unfortunate DES experience offers a paradigm that may be useful in placing the environmental endocrine hypothesis in a more manageable perspective. While beyond the scope of this book, readers may wish to pursue the wealth of data demonstrating that *in utero* exposure to certain maternal doses of DES did not result in adverse effects in offspring (Golden *et al.* 1998).

The author's concerns that scientific research is somehow less credible if funded by industry is somewhat disingenuous given the vast sums of money provided by environmental groups to spread awareness about the environmental endocrine hypothesis. The failure of several large, industry-sponsored studies to confirm vomSaal's low-dose findings should have been noted since these data were available well in advance of the publication of *Hormonal Chaos*. Similarly, the weight of the evidence has now shifted overwhelmingly toward the conclusion that organochlorine compounds are not risk factors for breast cancer; most of these studies were also available prior to publication and should have been included (Ahlborg *et al.* 1995; Houghton & Ritter 1995; Lopez-Carrillo *et al.* 1997; Van't Veer *et al.* 1997). For many (and perhaps most) of the issues at the heart of the environmental endocrine hypothesis, a weight-of-the-evidence approach is likely to be the only way to achieve anything approaching resolution of these complex issues. This requires that all relevant data be dispassionately considered and rigorously assessed. For all concerned, this will need to be accomplished with integrity and scientific objectivity.

While the environmental endocrine hypothesis is certainly within the realm of biological plausibility, there is a large gap between plausibility and reality. The intensity of the scientific debate attests to the legitimate concerns of many reputable scientists with opinions on both sides of this issue. However, in reading *Hormonal Chaos*, you are left with the impression that the author has concluded that the environmental endocrine hypothesis has passed the threshold of proof and is no longer a hypothesis, but rather a fact of modern life. This is far from being the case, as illustrated by the following rather definitive statement from the Environmental Protection Agency of the USA (EPA) buried on page 125, 'a causal relationship between exposure to a specific environmental agent and an adverse effect on human health operating via an endocrine disruption mechanism has not been established.'

In short, the environmental endocrine hypothesis raises the provocative question of whether a series of possibilities add up to a probability. Based on the data available to date, the best answer to this question must still be that we simply do not know. The challenge in the next few years will be to determine, using the most rigorous science, whether the environmental endocrine hypothesis is a plausible idea with no practical consequences or a call to arms to address a very serious issue.

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Technology and Social Change

BY ARNULF GRÜBLER

x + 452 pp., 23 × 18 × 2.3 cm, ISBN 0 521 59109 0 hardback, US\$49.95, Cambridge, UK: Cambridge University Press, 1998

This is a very important piece of work, being the first attempt at an exhaustive assessment of technology's effects on society and the environment over the last two centuries or more. As one who has been involved in debate about the long-term differences 'belief-systems' and ideologies may make towards either environmental conservation or debilitation, it has been a working hypothesis that vastly improved (and therefore attractive) technologies have been the major reason for global environmental stress. Grübler provides more confirmation than anyone that this is indeed the case. He analyses the situation from a macrohistoric perspective, tracing the coalescences of 'technological clusters' to result in highly useful products, and the steady diffusion of successfully applied technologies from the Industrial Revolution (1750) onwards. He has a solid diachronic grasp of industrialization (especially the effects of mass production) and of the consequences of global marketing of 'modern technology products.' In a concluding chapter, he has also skilfully assessed the balance of the evidence as to whether technology can be as much a remedy for social change as it has been a source of problematic transformations.

Grübler has to handle a great complexity of materials. He realizes technological innovation does not simply occur in a linear fashion and with singular impetuses. Hence he is strong on technological clusters and the coalescing of compatible techniques into a breakthrough development, as with the aeronautical industry. He realizes that some technologies have direct, but others indirect, effect on the environment, and that in our current situation industry reliant on large amounts of material is fast being supplemented by knowledge-based (dematerializing) activity, namely through Information Technology. He realizes how, while technological advance has resulted in impacts such as pollution and global warming, applied technology has also been able to hold back the worst prospective outcomes and in some cases offers genuine remedies. Grübler's figures and diagrams seem to indicate that he has access to, and has effectively digested, vast amounts of data, and that the International Institute of Applied Systems Analysis at Laxenburg will play a crucial future role in monitoring global environmental conditions and humanity's capacity to solve agricultural, industrial, demographic and biospheric crises.

In his summary, Grübler rightly points out that the key problem of the future lies with expanding human wants. Human desire to accumulate ever more items could bring intolerable burdens to bear on the global environment, especially when disadvantaged parts of the world

try following the pattern set by affluent nations. Throughout his book, however, Grübler nowhere shows any awareness of socio-psychological theories that address this problem of the cargo, namely the attractiveness of the new mass-produced, internationally-marketed commodities. It has already been well put by Vice-President Albert Gore that those who possess these goods dare not even think about separating themselves from such beneficence. The nub of the problem really has to do with the states of consciousness, then, and especially humanity's response to technology as fulfilling desires and increasing controls, not just meeting basic needs. But Grübler gives few ideas as to how collectively responsible attitudes can make a difference, and curtail overproductivity or overcapitalization. He thus says virtually nothing about the necessary harnessing of collective ethics in religions and socio-political movements.

Grübler, in fact, is more hopeful about the prospects of technology helping to solve its own problems than his many charts and considered assessments justify. Concerning agriculture, he believes technology will solve future problems of crop shortfalls and food shortages. But one is suspicious that the technology he has in mind is the hybridization of seeds, a process hitherto always played out to the favour of capitalists and rich nations and inimical to the preservation of plant diversity. New hope for world food resources may now seem to lie in genetic engineering, which places a new priority on preserving old seed banks, but Grübler leaves this area undiscussed together with any ethical issues which get raised en route when such sensitivities as cloning come into the picture. He is also not very good on handling the incredible diversity of agricultural contexts, and thus the differences in applying technological solutions, let us say, between the cultivation of the Ganges Delta and that of the salinisation-threatened wheat belt in central New South Wales.

As for industrial technology, Grübler is very good on some issues such as global warming and ozone depletion, but not sufficiently equipped or convincing on others. He has little sense of the chemical revolution of the twentieth century. By 1898, as the famous Bristol meeting of the Association for the Advancement of Science illustrates, physicists and biologists had to admit that they had little in their repertoires to solve newly-mounting problems for humanity. They looked in hope to the chemists; despite extraordinary achievements in engineering and electronics, the greater balance of both technological innovation and problematics over the last hundred years had lain more with applied, industrial chemistry than other techno-scientific activities. Pharmaceuticals have been the key to longer life spans and decreased infant mortality rates. The petrochemical industry has produced the Second Industrial Revolution of the automobile and air transport. Plastics have emerged as the favourite, most easily moulded packaging presentation of almost every desired commodity item. Other items, such as the very book Grübler has published, involve bleaching techniques. What an informed reader wants to learn from this is more than Grübler tells us, namely about medicines and population pressures; oil spillages and the alternatives to petrol; the prospective toxification of soils by plastics and the possibilities for biodegradability; and the dangers of dioxins in waterways and oceans.

In spite of what has been left out or only partly treated, though, this book is a mammoth effort, and deserves careful attention of academic and activist environmentalists alike.

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Killer Algae: the True Tale of a Biological Invasion

ALEXANDER MEINESZ

20.9 × 15.9 × 2.8 cm, ISBN 0 226 51922 8 hardback, US\$25.50,
 Chicago, USA: University of Chicago Press, 1999

This book by Alexander Meinesz perhaps could be more aptly titled 'Space Invaders' since it tells of the invasion of sublittoral habitats around the Mediterranean coasts of France and Italy by an alien green seaweed, *Caulerpa taxifolia*. Although this seaweed has some toxic properties, it is its vigorous growth and inexorable colonization of suitable habitats that have been this plant's most menacing attributes. This attractive seaweed appears to be a cold-tolerant clone of a tropical ornamental species that arose in the tropical aquarium in Stuttgart. It was distributed to major aquaria in Europe (and subsequently more widely amongst aquarists) as an ornamental alga for decorating tropical fish tanks.

This book not only documents the invasion of the Mediterranean coast of France by an alien plant, but also gives a telling insight into how conflicts of interest and local governmental politics all conspired to frustrate attempts to halt the spread of this invader! This story is told from the perspective of one of the major players in this story, Alexander Meinesz, who was a phycologist who had studied the biology and taxonomy of the Caulerpales during his doctoral studies and had subsequently worked on seagrass ecology. The story revealed in this book illustrates, yet again, how politics and personalities can distort the decision-making processes associated with sensitive environmental issues. The complexity of the story which unfolds is illustrated by the need for two pages in the Appendix documenting the acronyms of the largely governmental agencies involved in studying and formulating a control policy for this alien, and the inclusion of a one-page flow chart explaining the bureaucratic workings of the French government! Above all the *C. taxifolia* story illustrates that science is not always as objective as most of us would like to think it is, and that scientists are just as affected by pride, prejudice and personality conflicts as any other branch of human endeavour.

The political infighting documented in this book arose because of the apparent 'escape' of this alien species into the Mediterranean which could be directly traced to the Oceanographic Museum of Monaco in the early 1980s. The director of this prestigious institution at the time of the escape was none other than the famous Jacques Cousteau himself. By the late 1980s, nearly a hectare of seabed in front of the Museum had been colonized by the alga. Meinesz began studying the biology of this alien species and expressing his concerns as to the likely devastating biological consequences that the spread of this alga would have on the native algal seagrass communities and their associated fauna. His first paper on the subject was published early in 1991, and quickly brought him into direct and bitter conflict with the then director of the Oceanographic Museum, Monaco, Dr Doumenge. This individual cast doubt on the origin of the alga, naturally not wanting it to be associated with his institution, questioned the taxonomic distinctiveness of the new colonizer and even suggested that it could be a beneficial colonizer of sterile benthic environments. A considerable proportion of the book is taken up with documenting at length the ensuing acrimonious dispute between the author and the politically-influential director and his allies. Meinesz portrays events as something of a 'David and Goliath battle' between himself and his more politically-influential detractors. It is clear that little love was (and is) lost between the main protagonists in this story, and it seems clear the first edition of the book was the subject of litigation between the two.

Although the narrative at times gets rather bogged down in excessive detail, and certainly lacks the immediacy and gripping narrative of, say, James Watson's account of the discovery of DNA, this book, nevertheless, sustains interest. One of the later chapters describes some recent experiments by the author into using sea slugs as a potential biological control of this alga. However, the dilemma of introducing sea slugs into the Mediterranean waters to control this alien invader has not been lost on Meinesz and, at present, it seems unlikely to be sanctioned by the authorities. There is also an interesting chapter towards the end of the book where the author attempts to discuss the wider lessons to be learnt from the unhappy *Caulerpa* story, and in a useful appendix, the biology of the organism is described.

It would have been nice if a book such as this could have included some facsimiles of cuttings from local press articles (I realize they would have been in French, but they would have helped illustrate the impact of the story on the local communities) and some photographs of the main protagonists. Most of the book's illustrations are rather poor quality (largely due to the paper the book is printed on) photographs of the alga. Whilst the title may be misleading, and the account rather too detailed in places, it is nevertheless an interesting tale. Overall, this is a book that I enjoyed, found informative and can recommend.

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Water Technology: an Introduction for Environmental Scientists and Engineers

BY N. F. GRAY

xii + 548 pp., 218 figs., 24 × 17 × 3 cm, ISBN 0 340 67645 0
 paperback, £15.99, London: Arnold Publishers, 1999

The management of water quality is increasingly difficult as demands upon finite water supplies constantly escalate. Engineering technology for treatment of water for human consumption, as well as treatment of wastewater following utilization, requires detailed integration of scientific underpinnings in biology, chemistry and microbiology. *Water Technology* is an introductory textbook into the rudiments of freshwater characteristics and pollution, generic aspects of drinking-water supply and treatment, and the treatment and disposal of wastewater.

The text begins with highlights of European Union legislation on freshwater pollution control and drinking-water standards without any significant discussion of rationale for these tenets. Several ensuing brief chapters attempt, unsuccessfully, to evaluate the basic characteristics of hydrology and hydrobiology of river, lake, reservoir, and groundwater ecosystems. The overviews of physical, chemical and biological characteristics are classical in concept and most superficial in terms of both description and particularly functional interactions. For example, assumptions that abiotic controls regulate the distribution and production of biota fail to recognize the marked advances in our understanding of biotic interactions in freshwater ecosystems that have occurred in the past three decades. Microbiological discussion is directed toward oxygen consumption and a good treatment of biochemical oxygen demand.

The summary of water pollution and assessment is a reasonable initiation to the problems of water-quality management. The emphasis on the importance of diffuse sources of pollution as a major contemporary problem in most developed countries is most laudable, although few remedial solutions are provided.

The strengths and primary thrusts of the book emerge in the summary of water-treatment processes and water distribution systems. Contemporary technologies for treatment of water with various problems of chemical and microbiological contamination are evaluated in overview. Wastewater treatment processes are introduced with discussion of treatment facility designs and the importance of pretreatment of industrial waste waters. Modelling based on simple kinetics is used to summarize, in a series of succinct brief chapters, the basis of secondary treatment of waste water. Fixed-biofilm reactors, activated sludge, stabilization ponds, wetlands, nutrient removal systems, and anaerobic treatment processes are briefly discussed. The text also emphasizes a number of physical and chemical processes that have been used in water treatment, including equalization, coagulation, sedimentation, flotation, chemical precipitation, adsorption, ion exchange and membrane filtration. Discussion also opens the knotty problems associated with disposal of nutrient-rich, and often toxic, sludge in landfills. A final chapter sketches the basic design of individual home facilities for sewage treatment.

The author highlights the fact that the text was designed both as a simple introduction to major areas of water technology and as a reference book. The former objective is accomplished excellently in the areas of water treatment for human use and of wastewater treatment. However, vast areas of water technology, such as those associated with irrigation, hydropower, and many others, are not treated at all. Discussion of water treatment is at the generic level with emphasis on modelling under optimal conditions of operation.

The attempts to interface basic characteristics of hydrobiology and lake, reservoir and river ecosystems to water treatment in the first nine chapters are so superficial that they provide quite inadequate background both for engineers and, certainly, environmental scientists. The evaluations of lake, reservoir and river ecosystem characteristics and metabolic relationships are simply inadequate conceptually. Specifically, they fail to provide the interdisciplinary insights essential to societal needs to progress, from present piecemeal consumption of water resources to integrated ecosystem water-resource protection, utilization and recycling. For example, water treatment and wastewater processing are discussed in relation to regulatory requirements and economics, rather than additionally in relation to long-term sustainable water-resource availability at an acceptable and economically viable level of water quality.

The author's second objective of the book serving as a reference source in the complex modern field of water technology was not achieved. The book is an overview of common treatment technologies and is an excellent summary of major aspects of the field for non-specialists. However, specialists, particularly civil engineers entering the discipline of water technology, require much more thorough understanding of the interdisciplinary aspects that should impact modern water use and treatment for human applications. If such essential progressive, comprehensive and integrated training is not provided, emerging students with a general overview are destined to receive on-the-job training largely from individuals with outdated concepts and technologies of the past. As in the medical profession, society deserves practitioners of water use and treatment who are thoroughly cognizant of the 'physiology' of processes and ecosystems that they manipulate and regulate. The problems are

biological and chemical, and such understanding is required for effective management, application and development of modern technologies.

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Parks In Peril: People, Politics and Protected Areas

EDITED BY KATRINA BRANDON, KENT H. REDFORD AND
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xv + 519 pp., 22.9 × 15.3 × 3.0 cm, ISBN 1 55963 608 4
 paperback, US\$30.00, Washington, DC, USA: Island Press, 1998

Parks in Peril is one of the best books on protected areas to come out in recent years. It is based around case studies from nine protected areas in the Neotropics, with the case studies written by people who were actually involved in managing the protected areas concerned. Each was the subject of considerable investment through the 'Parks in Peril' programme led by The Nature Conservancy in the USA, but working through partner non-governmental organizations in Belize, Bolivia, Costa Rica, the Dominican Republic, Ecuador, Guatemala, Mexico and Peru. The Parks in Peril programme is an outstanding example of a collaborative partnership amongst national, international, public and private organizations. The Nature Conservancy works with its partner organizations in Latin America and the Caribbean to build their capacity as independent and self-sustaining conservation organizations, giving them a running start with direct grants. The case studies were selected from amongst the 60 sites that TNC and its partners have identified as 'parks in peril' in 18 countries, together covering over 30 million hectares. Each of the case studies is accompanied by a clear and useful map, and the figures are easy to understand and well-labelled. Each is followed by a postscript that typically covers the time between 1995 and 1998. I found these postscripts to be especially interesting, because they demonstrate that virtually all of these protected areas are under constantly changing sets of challenges. Thus one central message is that protected area management needs to build the capacity to adapt to these continuous site-specific changes.

The case studies are preceded by three chapters setting the context, explaining how Parks in Peril works, its ecogeographic perspective, and the social issues it addresses. The book concludes with four chapters of synthesis, comparing the case studies, providing the social context of threats, discussing the political implications of the case studies, and reaching conclusions on how to move ahead. The references are complete and up to date, but are presented in a references section for each chapter rather than consolidated.

The book presents itself as an antidote to the current mainstream of protected areas thinking as presented through the 1982 IIIrd World Parks Congress in Bali and the 1992 IVth World Parks Congress in Caracas. These meetings were based on the premises that conservation can best be accomplished if people build sustainable relationships with the resources upon which their welfare depends, and that protected areas need to be woven into the fabric

of society rather than being 'set aside'. The book criticizes 'sustainable development' as simply a slogan and stereotype that prevents innovative action to conserve habitat. It calls for actions to protect parks that are based on 'a level of conceptual rigour that moves beyond slogans and stereotypes'. This is fair enough, but unfortunately the book does not itself have such conceptual rigour. On the one hand, it bemoans the perils of sustainable use, while at the same time arguing that the perspective must be from protected areas outward into areas where people are living and using resources.

The book complains that 'biological diversity' is open to various definitions, but I could only find one passing mention in one of the case studies of the Convention on Biological Diversity (CBD), which contains a definition of biological diversity that has been ratified by nearly 180 governments. The book contends that protected areas are being required 'to carry the entire burden for biodiversity conservation', when in fact the CBD argues for much more comprehensive approaches covering the entire landscape.

On the one hand, the book quite rightly points out that issues such as farming and grazing techniques and changes in those techniques, infant mortality, local rates of population increase, local settlement patterns, local tenure security, access to markets, technical changes, and changes in consumption or standard of living, are all relevant to protected area management, but then it objects when mainstream protected area management is expected to address such complex issues rather than focusing on the relatively straightforward issues of managing plants and animals within the protected areas involved.

On the one hand, the book is deeply worried about the idea that protected areas should be open to human use; indeed, many 'protected' Neotropical forests are 'empty', in the sense that all large animals have been hunted out, and surely this illustrates non-sustainable use. But 'use' need not be destructive; for example, watershed protection that delivers clean water supplies to residential or industrial users is a valuable contribution from protected areas. And many tropical countries are utterly dependent on tourism, which is a form of use that can be managed to be non-destructive, and helps to convince local people of the value of not hunting the large animals that tourists wish to see.

The book laments that protected area managers today are unrealistically expected to manage their sites so that they benefit local peoples, the region in which they are found, and even the entire country; indeed, some extend these expectations to the entire globe. This seems overwhelming to the editors, but in fact is not nearly as daunting as they believe. For example, the book itself points out that the case studies illustrate that protected areas 'can bring strong benefits to local people, benefits that would not otherwise be made available to these people' (p. 459). Managing a protected area to ensure a clean supply of water to a city can be entirely consistent with managing the area for plants and animals, and it adds a degree of political relevance that could help enable a site to survive demands for alternative uses. The name 'national park' implies that a site contributes to national objectives; managing a protected area to conserve its biodiversity is contributing to global biodiversity objectives as outlined in the CBD. Many of the parks in peril are listed as part of various global programmes, including 14 as UNESCO Biosphere Reserves, seven as Wetlands of International Importance, and 11 as World Heritage Sites. Thus, the Parks in Peril programme already is achieving what its advocates consider an overwhelming task!

The editors argue that the book arises from the tension between the mainstream of protected area management thinking in remote

capital cities and those who are working diligently on the ground. But this 'tension' is far more imagined than real. The editors state that it is impossible for protected areas to be managed so that local communities, the nations involved, and the world community all benefit. But as indicated above, this is precisely what the protected areas in the case studies are accomplishing.

Despite these quibbles about conceptual clarity, the book is an extremely useful overview of an excellent and useful regional protected areas programme. The book will be read with advantage by all those interested in protected area issues in any part of the world. In short, this book successfully describes the outstanding and innovative Parks in Peril programme, and reaches important general conclusions. But it misses entirely the importance of the CBD, and weakens its impact by seeking to denounce the current protected area management mainstream to which it has just made an important contribution.

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Stewardship Across Boundaries

EDITED BY RICHARD L. WRIGHT AND PETER B. LANDRES
 371 + xi pp., 22.7 × 15.2 × 2.3 cm, ISBN 1 55963 516 9
 paperback, US\$29.95, Washington, DC, USA: Island Press, 1998

Increasingly, writings about nature conservation and management of protected areas attempt to adopt a new scale of approach, taking into account the complexity of wide areas managed for conservation. *Stewardship Across Boundaries* takes a clear interdisciplinary perspective on land management at a landscape scale, emphasizing that policies and actions have consequences beyond the area they are applied in. The central idea of boundaries dividing up the landscape is explored in a number of chapters written by experts in each field, enriched by five case studies.

The idea of boundaries is first introduced through a chapter written by Eric Freyfogle based around Robert Frost's poem *Mending Wall*, which is best remembered for its famous line 'good fences make good neighbours'. The book as a whole goes beyond wondering whether this is the case, and explores aspects of regional stewardship and cooperation between the various stakeholders, users and individuals responsible for the land on either side of man-made 'fences'. Boundaries are thus initially understood to be 'lines demarcating and dividing an area into units' (p. 1), imposed on a landscape for administrative purposes, fragmenting it and 'disrupting the ebb and flow of individuals and ecosystem processes' (p. 1). However, the argument only deals with boundaries within a country, in this case the USA.

Following on from the literary meditation of the first chapter on bounded land, the book proceeds in a series of chapters to portray the ecological, social and legal aspects of cooperating across boundaries in land management. The chapter on 'Ecological effect of administrative boundaries' (p. 39), written by Peter Landres, Richard Knight, Steward Pickett and M. Cadenasso offers a theoretical discussion of the intentional and unintentional ecological effects of applying different land-use practices across the landscape. It leads the authors to suggest a basic conceptual model of the major

ecological effects caused by boundaries, concluding that two approaches are needed to reduce negative impacts, namely that management goals and actions must be compatible across administrative boundaries, and internal management borders within protected areas must follow ecological boundaries. The main quality of this particular chapter is the step it takes in linking up writings on ecological boundaries and ecotones (natural boundaries) and reflections on the effects of man-made lines on a map. Indeed, throughout the whole book, the distinction between natural and anthropic boundaries is explored, and the idea that administrative and social boundaries can reshape and sometimes even create ecological boundaries is vividly demonstrated.

Striving to integrate several outlooks into one book, Mark Brunson's chapter on 'Social dimensions of boundaries' (p. 65) introduces the social science perspective into a field often dominated by natural scientists. It focuses on behavioural and attitudinal aspects of cross-boundary relationships, and the intricacies of the human relationship with territory and territoriality. One original 'boundary' that is explored is that lying between the various government departments and public agencies managing the landscape, in this case in the USA, thereby widening the initial definition of 'boundary' given in the introduction. The boundary in this case is a symbolic one, but Brunson makes a convincing case of comparing the defence of a physical territory with that of defending the particular management culture prevalent in a given agency.

The chapter on 'The laws and institutions in cross-boundary stewardship' written by Errol Meidinger (p. 87) describes the legal context for cross-boundary cooperation within the USA. It also attempts to define what might be understood by the term stewardship, stating that cross-boundary cooperation requires coordinated behaviour which implies creating a shared understanding and common values.

The third part on 'Types of administrative boundaries' is perhaps the least interesting for non-American readers since it dwells more at length on specific examples, without introducing any new key points. 'The framework for solving boundary problems in recreation' (p. 150), for example, contains general advice such as 'identify the problem' and 'identify the stakeholders'; these are hardly specific boundary-related points, however relevant they may be.

The well-researched case studies such as 'The Big Cypress National Preserve' (p. 193), 'The Adirondack Park as a Model Bioregion' (p. 279), or 'The Greater Yellowstone Ecosystem' (p. 237) illustrate the main points shown throughout the theoretical chapters, pointing to the various ways in which individuals, organizations and agencies have found ways of planning across boundaries in creative ways. In the Yellowstone area, for instance, this translates practically into getting 25 federal, state and local agencies to collaborate, in addition to the boundaries of thousands of private landowners. A challenge indeed. Although it is explained in the introduction that no mention will be made of cooperation between countries across international boundaries, the argument for transcending boundaries does suffer from its absence. By introducing a section on stewardship in an international context, some of the conclusions might have gone beyond applied common sense. In addition, since cooperation between countries in protected areas originally started along an American border with the creation of the Glacier/Waterton Peace Park with Canada in 1932, it might have made sense to mention it, while still sticking to an American context.

However, the book remains a good reference and starting point for managers or researchers. More than a recipe book, the series of

chapters highlights the challenges ahead, ending as it started with a poem. 'Come, I will make the continent indissoluble... ', wrote Walt Whitman in 1892 in *Leaves of Grass*.

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Coastal Seas. The Conservation Challenge

BY JOHN R. CLARK

134 + ix pp., 24.4 × 17.2 × 0.9 cm, ISBN 0 632 04955 3
 paperback, £14.95, Oxford, UK: Blackwell Science, 1998

John R. Clark is at the Mote Marine Laboratory on Ramrod Key in Florida. He has prepared a practical manual for addressing the contemporary issues in conservation and management of the coastal zone. In his own words: '... The book is intended to satisfy a world-wide demand for a succinct technical reference on coastal zone resources management ... to provide ... ideas, management formats, and tools and materials needed to manage coastal natural resources and shoreline developments.' He suggests that it is most needed and will be most useful in developing tropical nations.

There is little here for scholars. The book is a compendium of definitions and elaborations that make pretty dull reading for most biologists. The treatment suggests that coastal zone management, identified throughout as CZM, has reached a high degree of maturity that moves it from a desirable purpose into a new, if still immature, profession. The new profession requires codification for legitimacy and this manual provides it.

John Clark obviously has abundant experience, and probably more than a modicum of personal frustration and exasperation, that has led to this comprehensive effort at offering a simple and succinct basis for constructive management of the coastal zone. In much of the world the management falls to inexperienced but well-intentioned agents of government or unpaid conservationists who need simple guidance and written authority. This little book provides just that, complete with a selection of examples from around the world.

My own personal perspective is that the greatest need, even amongst the world's practical managers, is a need for a vision as to how the world works and can be made to work, a useful model of the world, a world view that stands as a testing ground for all actions nominally in the public interest. This book does not provide that intellectual experience but turns immediately to rules for management that may or may not be universally applicable. But it is far better to have them than not and all appreciate the effort on the part of this experienced and vigorous scholar, who is reaching out to all managers of coastal resources around the world, in terms that they can master and use.

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Chance and Change. Ecology for Conservationists

BY WILLIAM HOLLAND DRURY JR. EDITED BY JOHN G.T. ANDERSON WITH A FOREWORD BY ERNST MAYR

223 + xxiii pp., 23.5 × 15.7 × 2.1 cm, ISBN 0 520 21155 3
 clothbound, US\$24.95, Berkeley, CA, USA: University of California Press, 1998

I never met William Drury, although we shared New England and ecology, and were only miles apart throughout much of our lives. I knew about him from undergraduate days at Dartmouth in the late 1940s when he was already well respected and distinguished as a naturalist. Drury died in 1992 at 71, having made much progress on this gentle, scholarly book which was finished by his wife, Mary, students and friends under the editorship of colleague and friend, John Anderson.

Drury went to Harvard and seems never to have recovered. He was a botanist by training and an ornithologist and naturalist from childhood. His experience as a student of ecology at Harvard in a time when ecology was largely scorned there left him scarred and agnostic as far as the central tenets of ecology at that time. He sought fieldwork with Hugh Raup in geographic botany in the immediately post-war years because at Harvard '... the only acceptable study of bird behavior would involve laboratory studies of endocrinological mechanisms or the physics and anatomy of sound detection.'

The book is lightly autobiographical, but the personal experiences frame an extended discussion of his perception of ecology following the arguments of Gleason, who saw in the primacy of the individual a virtual denial of any community or communal function. He gained that experience in the field in Alaska with Raup, and subsequently through 20 years as a naturalist and teacher for the Massachusetts Audubon Society. Drury's experience as an astute and devoted observer of nature confirmed for him the intellectual traps of preconceived notions as to how nature works.

Drury is hard on succession and climax as concepts in ecology. He is equally hard on biodiversity as currently used as an organizing principle. He thinks those concepts misleading and inappropriately applied in conservation and has many examples from his experiences with birds, especially gulls and terns off the coast of Maine. He embraces the view that humans are a part of the landscape, as they obviously are, and that the biota will adapt in response to the human presence. His world is complex, and his approach to conservation is also complex but permissive by comparison with the current tide in science.

I find myself attracted to Drury, an obviously thoughtful, careful observer and scholar. But I am at the same moment discouraged, even frightened, by the resurgence of arguments that seem to ignore the massive accumulated experience showing the extent and costs of biotic impoverishment on land and sea. The arguments against the reality of interdependence, the reality of community, succession and climax are interesting but seem a bit precious in a world beset by great biotic failures that can be cured only by major efforts at restoring the primacy of nature in maintaining a habitable Earth. If there is another way, as Drury seems to argue, it is time for its proponents to start making it work.

Alas, we shall not have the chance to argue it through with Drury, but his book is a scholarly delight.

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