

Book reviews

Encyclopedia of Antarctica and the Southern Oceans edited by B. Stonehouse (John Wiley and Sons, 2002), ISBN 0-471-98665-8. \$579.

This single volume encyclopedia of 391 pages is a useful new edition to Antarctic literature as an easy reference source for topics set out in alphabetical order. The format is quarto with two columns per page, except for large tables or figures. There is also a three page fold-out map of the Antarctic at a scale of c. 1:11 million with halves of the map on opposite sides of the fold-out pages. There is also a separate one-page larger scale map of the Antarctic Peninsular region.

The Editor (Bernard Stonehouse) states in the Introduction that 'The function of an encyclopedia is to reflect lasting values within current understanding rather than the ephemera of latest findings. The business of the compiling editor and advisory editors has been to sort one from the other – a difficult task when new information on the region accumulates daily'. This statement provides a guide to the approach taken by the editors. There were six Advisory Editors, all well-known specialists in their fields, covering the areas of Earth Sciences, Politics and Political Geography, Glaciology, Historical Geography, Climate and Atmosphere, and Life Sciences. In addition there is a list of 28 specialist Contributors. For the alphabetically listed articles (quoted as over 1300) the contributor source, if not the editor, is indicated.

After the alphabetically listed articles, which go to p. 297, there are five Appendixes (33 pp.), a list of Further Reading (5 pp.), eight Study Guides (33 pp.), and an alphabetical listing of the entries (14 pp.). The Appendixes give the texts of the Antarctic Treaty and the various Treaty Conventions, Agreed Measures, and Protocols for the following: Conservation of Antarctic Fauna and Flora, Conservation of Antarctic Seals, Conservation of Marine Living Resources, and Environmental Protection.

The list of Further Reading contains 221 references, which includes the following specialist sources for the atmospheric, oceanic and glaciological sciences: Schwerdtfeger (1985), King and Turner (1997), Deacon (1984), Drewry (1983), Wadhams (2000).

The Study Guides cover the following: Climate and Life, Exploration, Geography, Geology and

Glaciology, Information Sources, National Interests in Antarctica, and Protected Areas under the Antarctic Treaty.

Finally the alphabetical listing of the entries gives page numbers for the entries but does not include items which appear within the entries yet are not entries themselves. A more comprehensive index would be useful to assist finding items not included in the alphabetically listed items. For example the various characteristic Antarctic ocean water masses such as the Circumpolar Deep Water, or Antarctic Bottom Water, are found within the entry for Southern Ocean. The size of entries varies from two or three lines for some place names to four or five pages for many topics such as Southern Ocean, which includes a number of subsections. There is a similarly long article for Climatic Zones which includes diagrams and tabulated temperature data for a collection of Antarctic and Southern Ocean stations.

For atmosphere and ocean specialists it may appear that the material covering their areas of expertise are rather rudimentary and limited, such that direct consultation of the reference works above might be preferable. By contrast it might appear that other topic areas, such as Geography, History and Politics, are more extensively covered. However, for specialists in these topics the reverse might seem the case. As an example, although many place names are included as entries, a limited number of the most prominent could be selected, and references could be made to more comprehensive gazetteers which are available.

The main value of a work of this kind of encyclopedia is to contain in a single volume a broad range of Antarctic material which is a ready source of information, particularly outside the reader's own speciality.

Since the International Geophysical Year of 1957-58 the scientific literature for the Antarctic has expanded greatly. This encyclopedia does not aim to cover this large amount of material in more than a limited summary fashion. The list of Further Reading and Study Guides give references to more appropriate publications for this information. For the earlier exploration and historical, geographical and political information the encyclopedia is much more comprehensive and provides a ready reference for material spread over a wide range of other literature.

In summary, I believe the *Encyclopedia of the Antarctic and Southern Ocean* would be a useful library source for a wide range of Antarctic information, particularly for the earlier historical period. For

the individual researcher, or Antarctic enthusiast, the relatively high cost of the volume, for its size, could be a considerable discouragement.

W.F. Budd

Bill Budd retired in July 2003 as Professor of Meteorology and Director of the Antarctic Cooperative Research Centre, and is now an Associate of the Institute of Antarctic and Southern Ocean Studies, at the University of Tasmania. His primary research interests include Antarctica and global climate change.

References

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Atmospheric Pollution: History, Science and Regulation by Mark Z. Jacobson (Cambridge University Press, 2002). ISBN 0-521-01044-6. 399 pages. \$79.95 (paperback).

This book by Prof. Jacobson, who is an Associate Professor of Civil and Environmental Engineering at Stanford University (USA), aims 'to discuss the history and science of major air pollution problems, the consequences of these problems, and efforts to control these problems through government intervention', an endeavour in which it succeeds admirably. It is an introductory textbook, primarily intended for students in the environmental, earth and atmospheric sciences. There are few mathematical equations in the book and knowledge of higher maths is not needed. Some knowledge of chemistry is, however, required, as there is an inclination in the book to describe the chemistry of air pollution in greater detail. To help the reader in this regard, an introductory chemistry section is presented at the beginning of the book.

The book consists of twelve chapters, covering most facets of air pollution. Chapter 1 on 'Basics and History of Discovery of Atmospheric

Chemicals' begins with some essential definitions, and subsequently presents a brief historical account of important atmospheric elements and compounds, coupled with the structure, reactivity and lifetimes of selected ones.

Chapter 2 entitled 'The Sun, the Earth, and the Evolution of the Earth's Atmosphere' includes historical facts and an introduction to the spectra of solar radiation.

Chapter 3 on 'Structure and Composition of the Present-Day Atmosphere' introduces the structure of the atmosphere in terms of pressure, density and temperature, and their linkage via the equation of state. Characteristics of important gaseous constituents/pollutants and aerosols, such as sources and sinks and health effects, are discussed. Lead is discussed in detail, but particulate matter is left to Chapter 5.

Chapter 4 on 'Urban Air Pollution' starts with a history and early regulation of urban air pollution and includes a historical account of photochemical smog. The rest of the chapter presents, in good detail, the chemistry of background troposphere and photochemical smog, and ends with a brief description of pollutant removal mechanisms.

'Aerosol Particles in Smog and the Global Environment' (Chapter 5) addresses particle size distribution, sources and composition of primary and secondary particles, and processes affecting particle size. Removal mechanisms, morphology, shape and health effects of particles are briefly discussed.

'Effects of Meteorology on Air Pollution' (Chapter 6) introduces topics including major forces driving winds, horizontal wind types, global circulation, large-scale pressure systems and vertical and horizontal transport of air pollution, vertical atmospheric stability, and the influence of local meteorology (e.g. sea-breeze) on pollution transport and dispersion.

Chapter 7 deals with 'Effects of Pollution on Visibility, Ultraviolet Radiation, and Atmospheric Optics', in which the interaction of solar radiation with gases and particles in the atmosphere through processes such as absorption, scattering, diffraction and reflection, and the consequences of this interaction, including visibility issues, are discussed.

While Chapter 4 briefly described air pollution regulation mainly in the United Kingdom and United States for pre-1940 periods, Chapter 8 elaborates on 'International Regulation of Urban Smog since the 1940s'. The focus is primarily on the regulation in the United States, but the status of regulation in other major developed countries (including Australia) and important developing countries is briefly included.

Chapter 9 on 'Indoor Air Pollution' touches briefly on sources, health effects and regulation. This is the smallest chapter of the book (11 pages), and, in my

opinion, should have been devoted more space. There has been a big push towards research in indoor air pollution in recent times, motivated by the far greater human exposure to indoor pollution than to outdoor pollution (on average, people spend more than 85 per cent of their time indoors).

'Acid Deposition' is addressed in Chapter 10, including its history and effects, types and sources of acids, acid neutralisation, regulation and control.

Chapter 11 on 'Global Stratospheric Ozone Reduction' discusses the structure of the current stratospheric ozone layer, interaction of stratospheric (i.e. natural) ozone with UV radiation, chemistry of the ozone layer and recent changes to it, effects of chlorine and bromine on global ozone reduction, Antarctic ozone depletion and regeneration, effects of UV-B radiation, and regulation of CFCs.

Chapter 12 entitled 'The Greenhouse Effect and Global Warming' starts with a discussion on the earth's temperature without the greenhouse effect, and then covers topics including the greenhouse effect and global warming, observed temperature trends, feedback and other possible factors for global warming, possible results of global warming, and regulation and control.

Important historical accounts are given throughout the book. Each chapter ends with a summary and a number of student problems; in a few chapters, example problems and their solutions are presented.

Care has been taken to ensure that presentation of the book is a top priority. The book is beautifully formatted and well organised, with the quality of figures and tables being high. Important terms and names are highlighted with different fonts and colours. There are more than 200 photos and colour illustrations spread right through the book, including images of some of the famous researchers whose works are pertinent to air pollution.

The author has ensured that the book contains an extensive and up-to-date bibliography: of the 350 references cited, about 60 per cent were published since 1990. The index at the end of the book is comprehensive and nicely organised.

There are probably more advanced books available that would cover the topics addressed in this book in much greater detail. However, the uniqueness of this book is to introduce in a single, compact and beautifully-formatted volume, all the important components of air pollution, incorporating up-to-date research findings.

The book is moderately priced at \$79.95, and is an excellent source of introductory material on air pollution. It would be of interest to undergraduate and graduate students studying air pollution, its chemistry and regulation, or to anyone who wants to acquire a greater understanding of air pollution in general. It

would also make a good reference for researchers for obtaining elementary and general information about aspects of air pollution.

Ashok Luhar

Ashok Luhar is a Senior Research Scientist in the Air Quality and Health Team of CSIRO Atmospheric Research at Aspendale (Victoria). Over the last 18 years, he has been conducting research in air pollution meteorology, turbulent dispersion, regulatory modelling of air pollution and advanced Lagrangian models.

Climate Affairs: a Primer by Michael H. Glantz (Island Press, 2003). ISBN 1-55963-919-9. US \$18.95 (paperback).

A dictionary definition of a primer is that it is a text that instructs in the basic skills or rudiments of a subject. *Climate Affairs: A Primer* achieves its goal well. This book is a primer whose goal is to argue the case for a multidisciplinary study framework to be introduced, and to provide the rudiments (framework and concepts) for a more focused discipline in environmental science to be called 'Climate Affairs'.

The book is written for just about everyone – teachers, students, government officers, planners, policymakers, assessors and even activists. It contains a useful discussion on the timescales with which societies must cope and shows just how complex the interactions can be.

The book has chapters on:

- What is climate? – very much a descriptive and user-friendly answer to this question;
- Climate and society – outlining the various ways that society and climate interact, that society is impacted by climate, and that humans have the potential to alter the climate;
- Climate and geography – this chapter is a roundup of real and potential examples of the complex interactions between local/regional climate and the societies that live there;
- Use of climate information in decision making – covering the various uses of climate information (including forecasts) and examples of both use and misuse of the information;
- How we know what we know – presenting some concepts for understanding, evaluating and getting a realistic perspective on the level of climate-society interactions;
- Conclusion – the conclusion brings into focus the

challenges of matching policy with the scope and level of uncertainty in the climate problems.

The book also has an appendix with pointers to sources on 20th century climate events and anomalies. The references are very wide ranging and should be useful for interested physical scientists.

In the introduction, the author advises that historic, contemporary and futuristic examples will be provided throughout the book, in order to integrate the various components of climate affairs (affairs: the interactions between climate, human activities and the workings of the planet). This goal is admirably achieved for the sections on climate science and climate impacts. The challenge is larger for climate policy and law, climate economics and climate ethics and equity. The spread of historic, contemporary and futuristic examples is less apparent for these components.

There are only a few small and insignificant irritations, generally to do with expression, for example the following: 'downward motion of the atmosphere (e.g. subsidence)', where 'i.e.' would be preferable to 'e.g.'. The book provides an interesting and at times thought-provoking read. It is an intriguing book, containing several sections that leave you pondering.

Michael Glantz has been working at the climate-society coalface for well over a decade. His book brings to the public eye, his view (based on that long experience) of how we should be tackling the challenges at that coalface. It argues for much stronger interactions between climate/environment/impacts specialists and the policy community. It also argues for exposure to 'Climate Affairs' for a broad range of society workers (those working in and for their societies).

I recommend this book to anyone interested in the environment (not just climate), anyone grappling with policy, or their own stance on climate issues, and anyone teaching any branch of atmospheric or earth system sciences.

Mary Voice

Mary Voice, currently consulting and teaching in climate, was formerly head of the National Climate Centre in the Bureau of Meteorology.