

elled at some of the authors of individual chapters, and it relates to the general lack of consolidation and intercomparison of experimental results. Experimental data on almost any relevant physical parameter (for example, the PMR emissivity of a particular ice type at a certain frequency and viewing angle) can be found in different places in various chapters of the book. Such data will, of course, reflect the local conditions prevailing at the time and location of the particular experiment, but, if they are to be useful to the rest of us, we need to appreciate to what extent they are characteristic of conditions in general. To the extent that the authors have not felt able to provide this contextual information (and there are some who have succeeded notably), the book can be regarded more as a sourcebook than as a textbook. But as a sourcebook it does collect many of the relevant data in one place, and provides plenty of references to the recent literature, so that specialised researchers may begin to carry out the task of review and consolidation for themselves.

In summary, then, this book is not perfect, and maybe other editors would have constructed it differently. But I believe it represents just about the best coverage of an important and rapidly developing field that is currently possible. It is well produced, and the price should put it within the reach of individual researchers as well as institutions. (Gareth Rees, Scott Polar Research Institute, University of Cambridge, Lensfield Road, Cambridge CB2 1ER.)

INTERNATIONAL LAW AND THE ANTARCTIC TREATY SYSTEM. Arthur Watts. 1992. Cambridge: Grotius Publications (Hersch Lauterpacht Memorial Lecture Series 11). xiii + 469 p, hard cover. ISBN 1-85701-007-8. £58.00; US\$120.00.

An expanded version of a series of three lectures delivered in February 1992 at the University of Cambridge in memory of Sir Hersch Lauterpacht, this book provides a wide survey of the legal framework that governs human activities in Antarctica. The aim of the author, whose involvement in Antarctic affairs goes back to 1961, is to explore ways in which the Antarctic legal regime contributes to the development of certain areas of international law.

Before starting his analysis, the author rightly points out the unique physical characteristics of Antarctica that, in many cases, are the determining factor in the application of the relevant legal rules. Unlike the great amount of literature that contemplates the Antarctic Treaty System in a historical perspective, this work is divided into 11 chapters covering the main legal questions arising out of the Antarctic Treaty regime. Chapters 2 and 3 deal with the constitutional evolution of the system: the author gives an accurate description of the institutional structure that has been established under the different elements of the Antarctic Treaty System. He ends these two chapters by showing that the emergence of a full-scale organisation has an impact on the position of the states claiming sovereignty over parts of Antarctica, even if their legal positions remain protected by Article IV of the Antarctic

Treaty. Chapter 4 concerns dispute settlement and describes the particular procedures adopted to cover disputes arising under each convention. Chapter 5 examines the territorial question, a topic related to the diverging positions of the states over sovereignty, and that underlies all that is done in this region. The 'non-solution' of this issue provided by Article IV of the Antarctic Treaty, and the similar provisions found in the other parts of the Treaty System, is well known. The author examines the many questions related to the problem and comes to the conclusion that these provisions 'have afforded all the States concerned an unparalleled opportunity, despite deep-seated differences about a matter so politically sensitive as territorial sovereignty, to cooperate closely in Antarctica in (as the preamble to the Antarctic Treaty puts it) the "interest of all mankind"' (page 140).

The different views on territorial sovereignty have their implications at sea as well as on land. In chapter 6 the author surveys the main questions related to the Antarctic seas: the first concerns their landward limits and the difficulties created by ice shelves and sea ice in identifying these limits; the second deals with the outer limits of these seas. The requirement of an ecologically sound marine living-resource conservation regime and the necessity to make the mineral regime established in 1988 by the Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA) applicable to activities taking place on the continental shelf of Antarctica have considerably complicated the setting of these limits. The third major question discussed in this chapter relates to the connection between the Antarctic Treaty areas and the Convention on the Law of the Sea (1982).

Jurisdiction, enforcement, and liability remain the Achilles' heels of the Antarctic Treaty System. Each part of the Treaty System other than CRAMRA requires its parties to take appropriate measures within their competence, including the adoption of laws, regulations, and administrative actions to ensure its implementation. This formula, dictated by the sovereignty issue, allows states to take measures on either a territorial or a nationality basis. The provisions on liability are weak: except the detailed and technical provisions contained in CRAMRA, no satisfactory solution has been found on this topic. The Protocol on Environmental Protection (1991) only contains a commitment for the Parties to elaborate a liability regime.

Chapter 8 reminds the reader of the importance of one of the Antarctic Treaty's main achievements: the provisions on non-militarisation and non-nuclearisation. They have ensured the use of Antarctica for exclusively peaceful purposes. The management of Antarctic natural resources and the protection of the continent's environment form the bases of chapters 9 and 10. The author describes the different regulations adopted on these matters, since the Antarctic Treaty does not directly address these issues.

At the end of this invaluable review, the author concludes that the various legal instruments adopted to regulate human activities in the Antarctic have given rise to a single coherent system. The main consequence of this

unity is that each part of the system has to be interpreted and applied by reference to the other parts. However, the question of the effects that this regime might have for states that have not become parties to any of the treaties of the Antarctic Treaty System remains problematic. Without excluding the possibility that some parts of the regime have acquired an 'objective' quality and therefore create rights and confer obligations upon third states, the author logically concludes that 'To acknowledge a right for third States to be active in the area in disregard of the rules prescribed by the Antarctic Treaty system would be enormously detrimental to the community's interest in the well-being of that area' (page 296).

This book will be very useful for any person who has an interest in the legal regime established for Antarctica. The many problems are clearly explained by a lawyer who has considerable experience in public international law. The author, the former Legal Advisor to the Foreign and Commonwealth Office, has succeeded in providing in eloquent language an up-to-date survey of the Antarctic Treaty regime. Appendices presenting the full text of the main treaties comprising the Antarctic Treaty System complement the author's contribution. Although the form of the work — a written version of a series of lectures — does not lend itself to the extensive use of references, the author has included a useful bibliography divided according to the different issues covered. (Serge Pannatier, University of Neuchâtel, Avenue du Premier – Mars 26, 2000 Neuchâtel, Switzerland.)

THE CRYSTAL DESERT: SUMMERS IN ANTARCTICA. David G. Campbell. 1992. Boston, New York, London: Houghton Mifflin Company. 308 p, maps inside covers, hard cover. ISBN 0-395-58969-X. £17.99; US\$21.95.

This book is a personal account of three summers spent in Antarctica by an American who is Professor of Nations and the Global Environment at Grinnell College, Iowa. He is a marine biologist who was studying the pathology of amphipods while based at the Brazilian station Commandante Ferraz on Keller Peninsula, King George Island in the South Shetland Islands. It is not an expedition account, nor is it a scientific treatise; it is a remarkable description of a small part of Antarctica and some of the scientific work undertaken there.

The book is arranged in 12 chapters with a prologue and followed by a Linnean appendix, extensive notes to supplement the text, references, and a comprehensive index. The prologue forms a good introduction to the South Shetland Islands, King George Island in general, and Admiralty Bay in particular, where Keller Peninsula projects southward into the head of the bay. The author's three visits are put in context, and the station, its environs, and its members are described. Some of the earlier history of the South Shetland Islands, including the other bases that clutter Fildes Peninsula and make it 'the urban slum of Antarctica' (page 9), is also sketched for the reader.

The chapters of the book have rather fanciful titles at

first glance, but they are apposite for their content. The first, 'Seabirds and wind,' records the voyage from South America to the Antarctic, as seen through the eyes of a keen observer, describing the ship, the sea, the birds, the seals and whales, and the ever-present wind. In the second chapter, 'Memories of Gondwana,' the reader is given a glimpse of the geological evolution of Antarctica, revealing the oft-surprising fact that it was once a verdant land, very different from its frigid nature of today. 'Life in a footprint' opens with an account of an elderly tourist trampling a moss bed, which, through her footprints, will bear testimony of her passing for decades to come. An earlier such comment is probably the source of the generalization that the Antarctic ecosystem is fragile, a point strongly disputed by some biologists who point to the extreme robustness of other parts of the ecosystem. The chapter continues with a description of the Antarctic flora, illustrated with extracts from historical accounts. 'Penguins and hormones' may sound a little obscure, but the author points out that it is the secretion of a few molecules of sex hormone from the hypothalamuses of 35 million chinstrap penguins during the dark of winter that ensures the continuation of the species. Here the professional biologist is gently teaching the layman some science while writing a readable account of these unique birds. He continues to educate in chapter five, 'The galaxies and the plankton,' drawing a numerical parallel of astonishing proportions between the stars and the myriad planktonic creatures of the sea, further emphasizing the numbers with the diet of a blue whale. Here, too, is an excellent account of Antarctic krill, from its biochemistry to its swarming behaviour. In chapter six, 'The bottom of the bottom of the world,' the author goes underwater to see the wealth of marine life inhabiting the sea bottom in Admiralty Bay. In doing so he also describes the experience of scuba diving in Antarctic waters. Next is a fishing trip and the subsequent laboratory work to examine the parasites, followed by collection of seal excrement to look for further parasites in 'The worm, the fish and the seal.' Once again, this is not dull science but the work of a literate enthusiast who can breathe life into his passion.

Chapter eight, 'Visions of ice and sky,' introduces a change in direction with a brief history of Antarctic exploration. The author begins with the tales from Polynesian folklore and the Indian arrowheads dredged from Escurra Inlet, mentioning the scepticism that greeted this find, suggesting that it might be a subtle political ploy to support the Chilean territorial claim to the Antarctic Peninsula. He continues with the voyages of the eighteenth and early nineteenth centuries, quoting extensively from contemporary journals and other sources to provide an insight to the conditions of the seafarers who sailed south and the expectations of those who sent them. The history continues with the bloody slaughter by the sealers under 'The indifferent eye of God,' when the 'southern summer of 1820–21 was a dark one for the fur-seals' (page 168) of the South Shetland Islands. Following the virtual extinction of the fur seal by 1825, commercial attention in the Southern