Whales, while the fourth is of the Antarctic Peninsula, which is useful for following the discoveries of de Gerlache, but otherwise of limited value. One double-page map with an inset of Cape Adare would have been much more valuable for the reader.

There are two photographs. The first is of Borchgrevink, suitably square-jawed, and the second is of Markham, who looks every inch the committee man. However, the most interesting picture is that on the dust jacket. This is a modern photograph of Borchgrevink's huts at Cape Adare surrounded by penguins.

To sum up: a most useful contribution, well and clearly written, and a pleasure to read. (Ian R. Stone, The Registry, University of Kent at Canterbury, Canterbury, Kent CT2 7NZ.)

A MAN FOR ANTARCTICA: THE EARLY LIFE OF PHILLIP LAW. Kathleen Ralston. 1993. South Melbourne: Hyland House Publishing. x + 236 p, illustrated, hard cover. ISBN 1-875657-13-4. £16.99.

This book gives an admirable account of Phillip Law's early life and of his Antarctic activities from 1947 to 1954. The author does not cover his further 12 years as director of the Australian National Antarctic Research Expeditions (ANARE) or his activities and views on Antarctic developments since 1966.

Although not stated, the book follows the author's 1992 PhD thesis 'Antarctic leader and administrator — the early life of P.G. Law.' The author, a senior lecturer in the Department of Management at Monash University, related Law's upbringing, character, and development to his leadership and management of Antarctic operations. Bibliographic lists in the book show an intensive search for material on Law, but less appreciation of wider aspects of Antarctic exploration and research.

The first four chapters cover Law's life before the start of his Antarctic career. With schoolteacher parents — a martinet father and an understanding and loving mother — his elder brother was rebellious and enterprising. Phil, however, followed the rules and worked hard to achieve excellence at school until held back to work with his own age group. He then aimed at excellence in several sports, and at the age of 24 he was open lightweight boxing champion of Melbourne University. As young men, he and his brother also showed great enterprise in bush walking and skiing.

During the depression, Law started his career as a country schoolteacher. Through hard work and ability he progressed rapidly to become senior mathematics and physics teacher in a leading high school in Melbourne by the time he was 26. He soon moved on to university teaching and research. After obtaining his MSc in 1941 he enlisted as a pilot/navigator in the RAAF, but was quickly recalled by the Manpower Commission to help with optical munitions projects in his physics department. His administrative talents led rapidly to his becoming assistant secretary, and for six months acting secretary, of the government's Scientific Instruments and Optical Panel. After World War II, this experience with the Civil Service and business led him to seek a career in administration instead of spending his life in teaching and research. Through his professor he heard that a government committee was looking for a senior scientist to guide research on an Antarctic expedition. He jumped at the chance and rapidly changed career.

The next four chapters of the book deal with Law's first seven years with ANARE, initially as chief scientist, then in directing its activities from early 1949. His first Antarctic voyage was made on an old Antarctic ship, *Wyatt Earp*, formerly used by Lincoln Ellsworth. This was a frustrating experience, as the ship was inadequate for the task of finding a site on the Antarctic continent for a base, and as limited support was given to Law's cosmic-ray studies. It was not until 1954 that an adequate ship for dealing with the coastal ice became available on charter from Denmark.

In the meantime, two sub-Antarctic bases were established on Heard and Macquarie islands. These were supplied annually by naval 'landing ship tanks' from World War II, but, although large, they were barely strong enough to withstand gales in the Southern Ocean. Law organised and took part in the operations here, and he established a reputation as an enterprising leader who would tackle any task, as he had the hazardous landing operations. As Law did not winter in an Antarctic base, life there receives only a brief mention and the scientific achievements of the parties are not discussed.

These four chapters differ from most Antarctic books in that nearly as much space is given to headquarters planning and operation as to the fieldwork. In dealing with government ministers, with the Civil Service, and business, Law was outstanding. If he and his staff considered something really important, he would persevere until the decision came his way. Procedural short cuts in obtaining supplies were essential, and Law, with his wartime experience, saw that these took place. Through this work, he clearly justified his Australian reputation as 'Mr Antarctica.'

In December 1949 Law sailed from Cape Town as observer with the Norwegian–British–Swedish Antarctic Expedition (1949–1952) to gain experience in establishing a base on the Antarctic continent. As a member of that expedition, the reviewer was particularly interested in this section. The author appears to have specifically selected and quoted extracts from diaries or comments that were critical of the organisation, food, and leadership of the expedition, as well as of the formal relationship between the ship's captain and the expedition leader. However, Law undoubtedly learned much from our mistakes, not all of which were mentioned. Our successes, which also influenced him greatly, receive no mention at all. In addition to our scientific programme, these included selection of a suitable ship, huts, aircraft, and vehicles. Many of these lessons were later used in establishing Mawson Station, but are attributed in this book to Law's creativity.

As an analysis of Law before his Antarctic days, the book is first class. However, the volume considers only the expeditions in the pre-International Geophysical Year (IGY) period. This fails either to give a full picture of Law or to do justice to his achievements in laying firm foundations for Australia's contributions to Antarctic science in the years of international cooperation that followed the IGY and the Antarctic Treaty. (Gordon Robin, Scott Polar Research Institute, University of Cambridge, Lensfield Road, Cambridge CB2 1ER.)

SOUTHERN OCEAN ECOLOGY: A BIOMASS PERSPECTIVE. Sayed Z. El-Sayed (Editor). 1994. Cambridge: Cambridge University Press. xxi + 399 p, illustrated, hard cover. ISBN 0-521-44332-6. £45.00; US$59.95.

This book is the culmination of an interdisciplinary, large-scale, long-term international research program that began in the early 1970s. The program, called BIOMASS (Biological Investigations of Marine Antarctic Systems and Stocks), was finalized by a colloquium held in Bremerhaven, Germany, in September 1991. The book consists of 22 chapters, which are organized into six sections encompassing physical oceanography, phytoplankton and zooplankton, Antarctic krill, fish and birds, Antarctic marine systems, with a final section considering future developments, including relations and contributions of the BIOMASS to ongoing and future studies.

The book begins with a history of the organization and accomplishments of BIOMASS by the editor, who served as Convenor of the SCAR Group of Specialists on Southern Ocean Ecosystems and Their Living Resources. El-Sayed and the Group of Specialists provided the leadership for this program and mobilized many scientists into an organizational structure that involved technical groups, working parties, and *ad hoc* working groups. As the program developed there was coordination of research efforts by the Group of Specialists, and the organization of a BIOMASS Data Center. The BIOMASS program organized two large international, multi-disciplinary experiments labeled with the acronyms FIBEX (First International Biological Experiment) and SIBEX (Second International Biological Experiment). Data from these experiments, which reside in the BIOMASS Data Center (now at the British Antarctic Survey, Cambridge), will be invaluable as baseline information for future studies of the Southern Ocean.

This book is focused on the final analysis and summary of the BIOMASS data (mostly data derived from the FIBEX and SIBEX seasons). Many of the contributed papers also include an update of data that have been obtained since the BIOMASS field programs were completed. For example, the chapter on krill energetics by Quinton, Ross, and Clark is a fairly complete summary, bringing together BIOMASS data as well as recent advances. Thus, the book not only includes analyses and summaries of studies under the BIOMASS program, it includes an updating for the work done subsequently in most of the six discipline areas.

As I read through the book, I could not help but be struck by the diversity that is contained therein. This is a reflection of the BIOMASS program, where interdisciplinary work was a primary objective. The structure of the book, where each of the main sections is summarized by a discussant, gives insightful views into the BIOMASS program. These are views held by individuals, both at the end of the program and during its implementation.

In general, the book reflects the specific focus of the BIOMASS program. That is, it was intent upon assessing and studying Antarctic krill (*Euphausia superba*). Oceanographic and other measurements were taken in concert with cruises with the objective that physical and biological data would be necessary for understanding krill distribution and abundance patterns. A major effort was made to quantify abundance of krill, both through electronic sensing and net sampling. Oceanographic stations and measures in primary production were then taken during all the cruises. Counts of seabirds were also carried out. Noticeably lacking from BIOMASS was work in pack ice. The reason, of course, was that many of the oceanographic ships involved did not have ice-breaking capabilities. Thus the scope of the studies and the general dimension of the data with respect to Southern Ocean ecosystems was in the region north of floating ice during the austral summer. As a result, the seals and some of the penguins were not well represented in BIOMASS and are, hence, not well represented within this symposium.

In addition to the papers presenting syntheses of discipline areas, the latter sections include discussions of the development and operation of the database, and the role that BIOMASS has played in ongoing and proposed programs. I feel that the chapter on the development of the database is particularly useful for those planning future international, multi-disciplinary programs. Mistakes were made as the BIOMASS program developed, but they were generally overcome. Thus, the BIOMASS data stand as a great resource for future scientific endeavors, as many of the discussants and contributors to this volume attest in their writings. The discussants' report by R.M. Laws on Antarctic marine systems again echoes the need for integrated studies across trophic levels and the need to focus on higher trophic level predators. This is being met to some extent by the Ecosystem Monitoring Program within the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR) and is discussed in the paper by John Croxall on the relation of BIOMASS to CCAMLR. I found Croxall's perspective on the contribution of BIOMASS to the overall CCAMLR program particularly insightful. He gives brief summaries of fisheries information on krill, observations about declines in fish stocks, and his perspectives about interactions between fisheries and various Antarctic species.

The article by Gerd Hubold, looking at the relationship of BIOMASS to the sea-ice zone, again points out the emphasis of the program to ice-free areas during the summer. He continues by discussing the need to develop