

from southern Alaska. Dumond constructs a circumstantial case for the use of lagoons along the Alaska Peninsula as whale traps that seems worth testing archaeologically. Yarborough provides a systematic overview of ethnographic and zooarchaeological data on Alutiiq whaling. She concludes that whaling likely arose during the past five millennia, as a result of environmental change and population growth causing subsistence stress, but, given the close historic connections between Eskimo and Indian in this area, it may be worthwhile to consider the much earlier evidence for delphinid use from the northern Northwest Coast of North America. Small whales are present in some of the oldest faunal assemblages there, dating to 6000–7000 BP (calibrated) at Namu and Coho Creek, when population pressure is unlikely to have been a factor.

The archaeological discrimination of scavenging from varieties of whale hunting is a critical interpretive problem, as Mason and Gerlach illustrate. A successful approach to resolving this issue has been developed elsewhere by McCartney and Savelle for the excellent Eastern Thule record, through the comparison of archaeological and natural mortality profiles. McCartney here extends this long-term research project to the Alaskan coast, reviewing the ethnographic and zooarchaeological evidence that bears on preferential harvesting of juvenile animals. As expected, this type of size selection was generally practised, but, because such direct evidence of whale hunting has been neglected by earlier Alaskan archaeologists, the database is frustratingly thin. Friesen and Arnold demonstrate a further application of mortality profiles, in building a convincing case for the practice of beluga drives, as opposed to other hunting methods, at a late prehistoric site in the Mackenzie Delta. Perhaps not surprisingly, given McCartney's grumblings, this is the only contribution in which the researchers work directly with a fully adequate zooarchaeological database, with correspondingly fruitful results. Savelle presents the results of ethnoarchaeological research on modern beluga and narwhal hunting in the central Canadian Arctic, with an eye to constructing an analytical framework for whaling-based settlement systems, and identifying key taphonomic processes affecting the distribution and survival of whale bone. Since the hunting of marine mammals everywhere operates under a distinctive set of logistical constraints, these results are useful for modelling site formation in the prehistoric Alaskan context. Additional research of this sort is called for, to specify the range of variability (technological, seasonal, topographic, etc) in whaling logistics. Yesner considers whaling from the furthest remove, as simply an instance of humans electing to exploit megafauna in one way or another. The discussion of conditions under which different modes of hunting and scavenging might arise is interesting, but the point of comparing utilization of whales and elephants is at times hard to discern.

Larson usefully summarizes archival and recent oral historical data on the function of the *qargi*, or ceremonial

house, in north Alaska. As a widely distributed feature type with potentially high archaeological visibility, *qariyit* would seem to represent a privileged avenue for investigating the social dimension of whaling, Larson's cautions notwithstanding, and another topic woefully neglected by past archaeologists. Jolles highlights the profound assistance rendered to a generation of early twentieth-century ethnographers and archaeologists by a single Yupik informant, really an anthropologist in his own right, named Paul Silook. Silook warned that the knowledge he contributed did not capture the full range of whaling practices, but his singular perspective remains the largely unexamined, and unacknowledged, germ of the current understanding of traditional Yupik whaling. Braund and Moorehead provide an overview of modern bowhead whaling in the settlements that have been designated as whaling villages since the harvest became subject to direct International Whaling Commission intervention in 1977, and Braham presents a painstaking analysis of the sex and size composition of twentieth-century bowhead catches.

The volume concludes with the voices of the whalers themselves, in the form of a transcript of the presentations by Yupik and Inupiat representatives of the Alaska Eskimo Whaling Commission, and the personal reflections of Anungazuk, an Inupiat whaler. It was an unusually thoughtful move on the organizers' part to invite native participants to the session, given the often strained relationship between anthropologists and indigenous communities. Although the lived experience of whaling is clearly distinct from the representations that anthropologists make of it, the concerns of both groups converge on such issues as the everyday mechanics of making a living by hunting such impressive creatures, the centrality of whaling to Yupik and Inupiat lifeways, and the long-term survival of a rich cultural heritage. This volume exposes how much remains to be learned about such essential aspects of the Eskimo whaling tradition. The diverse papers collected here illustrate the fragmented state, but also the promise, of whaling research, and will hopefully move the field toward the theoretical and methodological accord that will be necessary to advance these researches seriously. It is fortunate that McCartney (and the other symposium organizers, Harritt and Jolles) have created this opportunity. (Peter Whitridge, Anthropology Program, University of Northern British Columbia, 3333 University Way, Prince George, BC V2N 4Z9, Canada.)

**CHEMICAL EXCHANGE BETWEEN THE ATMOSPHERE AND POLAR SNOW.** Eric W. Wolff and Roger C. Bales (Editors). 1996. Berlin, Heidelberg, New York: Springer Verlag (NATO ASI Series I, Volume 43). xi + 675 p, illustrated, hard cover. ISBN 3-540-61280-7. DM398.

Recently completed deep ice-core drilling projects in central Greenland have highlighted their unique capacity to detail the complex history of the climate and atmospheric environment on our planet. This evidence is recorded in the changing chemical composition of the ice

and trapped gases and particles within the ice layers, which together serve as a proxy for the chemical composition of the overlying atmosphere. The relationships between the composition of the atmosphere and of the snowfall and ice-cover are, however, not well understood even for the present time. In order to interpret fully the records in the ice, we must not only be able to understand how the processes acting at present control this relationship, but also predict how they may have evolved under different climatic regimes in the past.

A NATO Advanced Research Workshop was held at Il Ciocco, Tuscany, during 1995 to focus on these issues at a time when important new data had recently become available from both Greenland and Antarctica, and new generations of deeper drilling programmes were either being completed or were in firm planning stages. This book is a compilation of invited peer-reviewed papers and discussion documents that formed the basis for the workshop, and generally follows the organisation of the meeting. Like the meeting, the book has clear goals to assess the present state of knowledge on the factors that control chemical exchanges between atmosphere and snow and ultimately lead to the record preserved in ice cores; to identify and examine the individual processes involved, especially in the light of new measurements; and finally, in a series of brief discussion papers, to look forward and consider priorities for future work.

The first part of the book contains a series of useful, well-referenced, introductory chapters that review current knowledge of polar ice and atmosphere chemistry, and aspects of the atmospheric transport processes that carry chemical constituents of interest from the source regions to the polar ice sheets. The first three chapters review the chemical record in ice cores as reflected in three of the principal groups of constituents trapped in the ice, namely, aerosol species, acidic gases and greenhouse gases, and reactive species that can exchange reversibly between the snow and the atmosphere. They succeed in giving a good taste of the range of data available and introduce the reader to some of the processes that complicate the extraction of atmospheric records from ice-core records. Tropospheric circulation is distinctly different around Greenland and Antarctica, and separate chapters are devoted to short reviews of the tropospheric transport pathways to these regions, including a brief summary introducing modelling estimates of global circulation during the last glacial maximum. The Arctic atmosphere is already significantly polluted by a range of acidic aerosols, nitrogen oxides, and persistent organic pollutants, and one chapter is devoted to observations mainly from the Canadian Arctic, which have been carried out since the early 1970s. Only with the recent deep drilling activity in central Greenland has it been possible to undertake year-round aerosol sampling in the central parts of the ice sheet, and these data show that the seasonal pattern of the anthropogenic components is markedly different from that found at lower elevations in the Arctic. Similarly in Antarctica, there are strong contrasts between the interior and coastal areas, which are

dominated by the influence of moist maritime air masses. Continuous atmospheric chemistry measurements were initiated at the South Pole in 1972. A useful history of the observations at the South Pole complements discussion of recently launched observational programmes at several coastal sites in Antarctica. The introductory half of the book is rounded off with two more theoretically based papers that examine the dominant chemical reactions that characterise the polar atmosphere and how such processes can be set into a modelling framework that will allow interpretation of some key ice-core data in a global context.

After this extensive overview, the reader is well prepared to move into the body of the book, which presents recently acquired field data, mainly from the ATM experiments at the Summit site in central Greenland. These experiments involved detailed study of the year-round air-snow exchange processes for a wide range of both 'irreversible' (non-volatile) and 'reversible' ( $\text{H}_2\text{O}_2$  and  $\text{NO}_3$ ) constituents. These chapters introduce in some depth the various individual processes that control the chemical record ultimately preserved in the ice. A series of chapters examine the processes occurring above the snow surface, such as dry and wet deposition of the atmospheric aerosol; processes of adsorption and vapour exchange at the snow surface, and post-depositional processes that may affect certain constituents on time-scales of days to weeks (photochemistry, turbulence, snow drifting), weeks to years (ventilation of the snowpack, metamorphism of firn, and gas diffusion in firn), and years to millennia (chemical/cosmic ray-induced reactions and movement of species within the ice).

Finally, three brief working-group reports based on discussions held during the meeting provide a valuable summary of the main processes considered to influence the records of three primary components in ice: aerosol species, acidic gases, and oxidants. These discussions culminated in a series of recommendations for priorities in future work to allow quantification of the relationship between air and snow concentrations based on a firm knowledge of the processes controlling the transfer and stability of the deposited species. Only when the transfer functions are known will it be possible to embark on the more difficult inverse problem — to infer the concentrations in the palaeo-atmosphere from the concentrations in ice cores. Nevertheless, one chapter in the book does touch on how this problem may be approached conceptually and may help to guide priorities in planning air-transfer function research.

This timely book marks a growing maturity in the ice-core research community, and a growing preparedness to examine the fundamental basis for interpreting ice-core data in terms of palaeo-environment conditions. This is the first serious effort to take a comprehensive look at the wide range of processes that must be considered if the technique is to provide robust, quantitative palaeo-reconstructions — and the reader is left in no doubt about the complexity of the task involved. But the book does give

sharp focus on the main issues that must be tackled and provides a useful conceptual frame within which to move research forward. It will be of immense value to those planning future work, especially deep ice-core drilling programmes that will need to be complemented by appropriate studies of the atmosphere–snow transfer functions, to ensure that the maximum returns are achieved from these large investments. All scientists concerned with the reconstruction of the atmospheric environment in the past will find much of value and interest in the book, which hopefully may provoke parallel critical reviews of the fundamentals of other proxy environmental indicators. (David Peel, British Antarctic Survey, High Cross, Madingley Road, Cambridge, CB3 0ET.)

**CONSTITUTIONAL AND ECONOMIC SPACE OF THE SMALL NORDIC JURISDICTIONS.** Lise Lyck (Editor). 1997. Stockholm: Nordiska Institutet för Regionalpolitisk Forskning. 215 p, soft cover. ISBN 91-88808-18-1. SEK350.

This book is the latest in a series of volumes edited by Lise Lyck of Copenhagen Business School. Her attention focuses this time not on the thorny issue of political integration in Europe or management and human resources policy in the Arctic, but instead on the political and economic development of small island jurisdictions in the northern hemisphere, notably the Faeroes, Greenland, Iceland, and Aaland. The Channel Islands and the Isle of Man are also considered, albeit in less detail. The book presents the findings of the first of three phases of research aimed at providing answers to two main questions — what does autonomy mean and how have the constitutional arrangements pertaining to each island affected its political and economic development? As the editor rightly notes, such questions have assumed greater significance as campaigns for autonomy proliferate.

After the usual introductions (and a curious chapter presenting basic statistical information that would, perhaps, have been better placed in a well-presented and referenced appendix), a series of chapters takes a different perspective on the main issues being raised. Some are better than others. Adolphsen's philosophical discourse, for instance, is excellent and reminds the reader that instead of focusing on the formal separation of the legislative, executive, and judiciary, one must look at the interplay between competing economic interests if a correct understanding of history and current affairs is to be formed. Mørkøre's chapter is similarly well written and provides valuable insights into the economic and political crisis that has engulfed the Faeroes, together with timely warnings about the dire consequences it may have for the unity of the Danish realm. Fagerlund, in contrast, performs an enjoyable and intricate dance around the subject of relations between the island jurisdictions and the European Union. It is a joy to see that someone has finally grasped what is meant by a 'special' relationship. The final two chapters are fascinating. Two politicians previously at the heart of different campaigns for autonomy — the colourful Jonathan

Motzfeld from Greenland and the doyen of Faeroese politics, Atle Dam — provide intriguing commentaries. It is interesting to see that old habits die hard. Even politicians who have passed their former glories could not resist the temptation to evade the questions posed by Lise Lyck. She deserves congratulating for at least trying.

Disappointingly, however, not all authors could compete. Too often, key issues are considered only superficially, with description taking the place of analysis. Indeed, the reader could sometimes be forgiven for asking whether the authors had not forgotten the aim of the book. Could not more have been written about the shortcomings of the Icelandic constitution (page 63), the economic significance of the ferry industry to Aaland (page 84), or the crash in Greenland in the 1950s of a US plane carrying nuclear weapons (page 155)? Without such detail, the price seems a little high, not least when the formatting and grammar sometimes become too messy for easy reading. Winston Churchill might also have had a choice comment or two to make about what are described on pages 130–131 as the British invasions of the Faeroes and Iceland during World War II. Such faults are, of course, minor. Coupled with too many instances where references are lacking and claims not fully substantiated, however, the reader is left wondering about attention to detail. For example, has being outside the EU really allowed the authorities of the Isle of Man, Jersey, and Guernsey to create flexible and responsive regulatory regimes in finance and banking (page 104)? Is it not too simplistic to refer to the 'Inuit' population of Greenland when as far back as 1901, the last year when a census was carried out on the basis of race, almost 50% of the population was already of mixed descent? Is 'Inuit' not already plural (page 126)?

Faults notwithstanding, the book has much to recommend it. It provides valuable information for interested readers and scholars alike. It is also one of the few books published in the area in English. Like Oliver, however, one hopes for more — more analysis, more rigour, and more detail. It is hoped phases two and three of the project satisfy. (Graham Poole, Micronomics, 400 South Hope Street, Suite 2500, Los Angeles, CA 90071, USA.)

**THE CHARTING OF THE OCEANS: TEN CENTURIES OF MARITIME MAPS.** Peter Whitfield. 1996. London: British Library. 144 p, illustrated, hard cover. ISBN 0-7123-0493-2. £20.00.

Historical maps of the world, particularly those relating to voyages, have long attracted readers and collectors, and for this reason this beautiful book will appeal to many. Peter Whitfield, former director of Stanford's International Map Centre in London, now runs his own company publishing facsimiles of historical maps. The author of two other books on maps of the world and of the heavens, he brings to his task a great understanding of how to perceive maps as changing fragments of knowledge — over five centuries and more.

Happily unwilling to overload the reader with information, and scupulous in his choice of maps (and other