

'Continent—Continent Collision' includes papers on the Himalayas by: Tapponier *et al.*; Le Fort; Colchen *et al.*; Searle and Fryer; Coward *et al.*; papers on the Alps by: Hunziker; Ricou and Siddans; Butler *et al.*; Channell; contributions on older collision belts by: Hossack and Cooper (Scandinavian Caledonides); Hawkesworth *et al.* (Precambrian Namibian Damara Belt); Daly (Proterozoic Irumide Belt of Zambia); and Shackleton (Precambrian African collision tectonics).

'Continent—Arc Collision' comprises only one paper by Milsom and Audley-Charles on the Southern Banda Arc. A lamentably short section in a book on collision tectonics!

'Cordilleran Collision' only has two chapters, one on Alaskan examples (Jones *et al.*), and the other on the Andes (Dalziel). Once again, a rather short section giving the book an obvious imbalance towards continent—continent collision.

In summary, this volume dedicated to the work of Robert Shackleton should be available on all 'self-respecting' Earth Science Library shelves. For research workers involved in aspects of collision tectonics, it is a book worth purchasing to join the mushrooming publications on related topics.

K. T. PICKERING, *Leicester University*

The Nordic Seas

Burton G. Hurdle (ed.), *Springer-Verlag, Berlin, 1986*

777 pp., DM198

There is a singular lack of books concerned with modern polar science. The publication of *The Nordic Seas* by Springer-Verlag is thus most timely, since it offers a collection of review papers whose aim is to describe major features and phenomena in the Norwegian, Barents and Greenland Seas, and also, where relevant, in the North Atlantic and Arctic Oceans. The book is divided into eleven informative chapters spanning past and current research interests. An addendum concerned with preliminary results from a recent series of marginal ice-zone experiments in the area (MIZEX) is included in an attempt to make the book as up-to-date as practicable.

The main chapters, all compiled by eminent scientists in the field, are: Climatology (by Stuart G. Gathman); The Ice Cover (Peter Wadhams); The Physical Properties of the Sea Ice Cover (W. F. Weeks); Brief Overview of the Physical Oceanography (Ola M. Johannessen); The Arctic Waters (James H. Swift); The Sound-Speed Structure (Burton G. Hurdle); Features of Fjord and Ocean Interaction (Herman G. Gade); Tides (Ernst W. Schwiderski); Bathymetry (R. K. Perry); Seafloor Topography, Sediments, and Palaeoenvironments (P. R. Vogt); Geophysical and Geochemical Signatures and Plate Tectonics (P. R. Vogt). It is difficult to conceive of additional chapter titles which ought to have been included. Each chapter is self-contained, although some cross-reference to other chapters is evident, indicating that the editor was careful to ensure continuity and lack of repetition by distributing manuscripts amongst the contributors.

By far the largest contribution to *The Nordic Seas* are the two geophysical chapters by Peter Vogt. The former article begins on page 237 and the latter ends on page 662; together they occupy over 60 per cent of the book. Here I have to admit to browsing, for I could not

face all those 425 pages without cause or reason, especially since the Scott Polar Research Institute Christmas party was only a day away by the time I reached them. Vogt's account appears to be very thorough. It presents data closer to the limit of our knowledge than many of the chapters because the main thrust in MIZEX was towards oceanography, sea ice and acoustics, and not seafloor geophysics. Thus I suspect that there are less very recent data available in this field to alter our views. In his footnote Vogt says that 'an earlier, less complete version . . . was published during preparation of this book'. I find this unfortunate, as it suggests that the time to bring the book to press was too long.

Chapters 1 and 9 take the reader through the climatic, oceanographic and hydrographic, acoustic, and bathymetric aspects of the Nordic Seas. Sea ice characteristics are also covered in as much detail as possible. Due to MIZEX, however, vastly more sea ice data are now available, especially measurements relating to the physical properties of sea ice. This was appreciated by Weeks who states 'Since observations that did not exist could not be discussed, the two possible options were to terminate writing (an equivalent choice for the reader being to terminate reading) or to construct a house of cards based on speculations concerning the presumed internal structure and composition of the ice in the Nordic Seas. The latter option was chosen . . .'. Weeks does discuss some recent results towards the end of his chapter, but mostly he emphasises how little we know. An earlier draft of the other chapter on sea ice was also published elsewhere, reinforcing suspicions of tardiness in the book's production. This chapter, by Wadhams, deals with the various ice types of the East Greenland Current, the Barents Sea and coastal Greenland, with wave-ice interaction and breakup, with ice thickness, roughness and deformation, with polynyas and leads, and with pack ice limits, kinematics and decay. Remote sensing and modelling are also discussed briefly.

Chapter 1 discusses the climate of the Nordic Seas. Pressure, temperature, precipitation, winds, etc. are considered, but mainly in the open water since this is where most of the data have been collected. Some discussion on Arctic aerosols is also included. The author is careful to avoid any details about ice-related phenomena, and, like many of the contributors, promises that MIZEX will provide the data. If the chapter were written now I suspect that it would be many times longer, and would draw from a host of new data. This statement is equally true of Ola Johannessen's article on physical oceanography. MIZEX was mainly concerned with oceanography, and Ola as chief scientist and leader of a strong group from the Geophysical Institute, University of Bergen, obtained vast quantities of oceanographic data of excellent quality. It is sad that his chapter, only now released, and containing accounts of the circulation, hydrography, and frontal structure, could not include more of the processed MIZEX data. In view of Jim Swift's statement in chapter 5 that Helland-Handsen and Nansen's 1909 study of the hydrography of the Nordic Seas was essentially correct, one must presume that this chapter would not change significantly due to MIZEX and that it represents a detailed account of the extent of our knowledge on the water masses in the various domains of the Nordic Seas. It is certainly a very useful review to have available on the bookshelf. I found chapter 6 on the sound-speed structure by Burton Hurdle (also editor of the book) most interesting, especially since my knowledge of ocean acoustics is minimal. However, I would have liked the author to have spent more time discussing modern techniques in the field of cold-water ocean acoustics, and again, to have given examples of recent Greenland Sea datasets. The two following chapters, dealing with fjord oceanography and tides respectively, would not be markedly different if written today. I found both informative and useful. One comment: I know Galileo Galilei (1564–1642) did not get it all correct but shouldn't we acknowledge his final work as being the first real effort to model tides? Perry's chapter on bathymetry is again a most useful chapter to have

for reference. It presents a view of Nordic Sea bathymetry which is based on all available unclassified data at the time of preparation.

The addendum goes some way to negate my major criticism, namely that several chapters need MIZEX data to bring them up-to-date. It is clear that the editor was aware of this short-coming and has attempted to overcome it with the addition of this extra chapter. To some extent he has succeeded. However, I would have preferred to see the data included in the relevant chapters. That way each would be a totally self-contained account of the subject, written to the limit of Man's knowledge of the area.

It is definitely too strong a criticism to say that *The Nordic Seas* is outdated, especially since the editor allowed authors to alter and expand their contributions before the book finally went to press. Also as a reference text, particularly for chapters which would not be substantially affected by MIZEX data, the book is well worth owning as the basic oceanography and geophysics is all there. However, MIZEX has altered and greatly enhanced our views about this region, and it is probably time for *Son of the Nordic Seas* or *Return of the Nordic Seas* to be produced. Willy Weeks, in his chapter on the physical properties of sea ice, warns the reader with the dictum *caveat emptor*. I shall do the same in reviewing *The Nordic Seas* for the prospective purchaser. But note. I shall also add *sutor ne supra crepidam judicaret* as a warning to all reviewers.

VERNON A. SQUIRE, SPRI

Recent Earth movements: an introduction to Neotectonics

C. Vita-Finzi, *Academic Press, 1986.*

226 pp., ISBN 0-12-722370-3/1.

The first dictum that any aspiring Earth Scientist learns is that 'the present is the key to the past'. Sedimentologists, for example, have long been accustomed to searching for modern analogues of ancient sedimentary deposits to assist them in understanding and interpreting the geological record. Those who study structural geology and tectonics have not been so fortunate. By their very nature, tectonic events tend to be episodic and abrupt. Even on major active faults the period between successive movements is typically of the same order as a man's life-span; and many tectonic processes operate on a much longer time-scale, perhaps as long as or longer than that of entire civilisations. So it is not easy to study present day earth movements by direct observation.

Claudio Vita-Finzi's book is a fascinating perambulation of how to go about tying in geological observations with presently or recently active processes. It is essentially a personal account of his own endeavours in a new and exciting field. Those who know Claudio will recognize in the examples he discusses his own long-standing and wide-ranging interests and research activities.

I read this book while working in the north Indian Ocean not far from the region illustrated on the cover boards. No geophysicist who works at sea can fail to be impressed by the effects and scale of recent earth movements. As I write this, we have just profiled across a sub-surface volcanic ridge which is taller than Everest. Adjacent to it is a 2000 ft-deep gash caused by recent fault movement in the otherwise completely flat seafloor. On land it is a great deal more difficult to discern the details of recent earth movements than it