CARBON DIOXIDE: FRIEND OR FOE? By SHERWOOD B. IDSO. Tempe, Arizona: IBR Press (a division of the Institute for Biospheric Research, Inc.), 1983. xiv + 96 p. + 3 tables, 12 figs. Softbound. US $9.95.

This controversial monograph addresses two topics of vital interest to society at large: the climatic and agricultural consequences of rising carbon dioxide content in the earth's atmosphere, and the conduct, or misconduct, of science.

Atmospheric CO_2 has recently become the center of an increasingly acrimonious climatological debate. Since CO_2 is transparent to visible-spectrum solar radiation but absorbs the longer wavelengths re-emitted from the earth's surface, increased atmospheric CO_2 should cause elevated global surface temperatures. However, it is not clear how marked this effect should be because a number of imperfectly understood climatological interactions may be involved. State-of-the-art climate models predict a response which Idso claims is an order of magnitude too large. He further alleges that the U.S. National Research Council, the U.S. National Academy of Sciences, and certain climate-modellers have conspired to suppress any challenge to this prediction.

Idso's case for a much smaller temperature response to increased CO_2 rests partly on the results of personally conducted meteorological studies, but since he provides no data it is impossible to judge whether his conclusions are justified. More convincing is his demonstration of a recent cooling trend in northern latitudes, where most industrial CO_2 output has been concentrated, in contrast to relatively constant temperatures in southern latitudes. Idso claims that this empirical evidence is in direct contradiction to the climate-modellers' predictions. On the other hand, he fails to mention some important evidence which supports the model predictions, such as increased Antarctic iceberg calving and measurable rises in sea-level, which may herald the break-up of the western Antarctic ice-sheet. Thus his analysis can hardly be regarded as impartial.

Throughout the book Idso champions the empirical, 'real-world' approach as an alternative to computer-based climate-models. The trouble is that whatever uncertainties are associated with the model predictions, at least as great an uncertainty is entailed in predicting the continuation of an empirically observed correlation unless this can be convincingly related to theory. In this volume at least, Idso does not present a convincing theoretical argument to explain why the northern latitude cooling trend should be related to increased atmospheric CO_2. Moreover, since computer-models are nothing more than sophisticated hypotheses which must eventually be tested by empirical data, it is surely preferable that the two approaches should be regarded as complementary rather than as alternatives.

Another problem with the part of the book discussing climatology is the general lack of theoretical explanation. Thus the non-specialist reader may well be left in a confused state concerning such issues as the precise nature of the all-important CO_2-humidity interaction. This is a pity, since the subject matter of the book is of general interest. Moreover, the book's semi-popular format suggests that the author is trying to reach a general audience.

In Chapter VI Idso addresses the implications of rising CO_2 levels for agriculture, a topic which has been understandably glossed over by the climate-modellers. Idso provides extensive experimental documentation for his argument that elevated atmospheric CO_2 should substantially improve crop-yields, and in many respects this is the strongest part of the book. However, the effect that changes in world agricultural and vegetation patterns must in turn have on climate is not discussed, and this is a serious omission. Silviculture, for instance, is not mentioned at all, although the clearing of forests is thought to have had a major influence on atmospheric CO_2 concentration. In view of the vast complexity of and uncertainties associated with the whole CO_2 problem, Idso's call on the last page of the text for augmented CO_2 emissions in order to boost agriculture seems to verge on the irresponsible.

Finally, it is impossible to review this book without commenting on Idso's allegations of scientific malpractice. On the one hand there are grounds for regarding Idso's complaints as more substantially based than an advanced case of sour-grapes. It is becoming increasingly clear that the present system regulating the funding and publication of scientific studies is frequently unfair and counterproductive, and it is right that the general public, as well as the scientific community, should be made aware of this. On the other hand Idso does not present a completely undistorted case. For instance, he objects to his protagonists' "dismay" at a challenge to their work, while actually the cited "dismay" was over the publication of research with a simplistic theoretical basis, whose conclusions hinged on unpublished empirical results, in a highly regarded scientific journal. Was not this dismay justified? Nevertheless, for all the book's shortcomings, the author has packed an astonishing amount of provocative and readable material into his 92 pages. The book was worth writing, and is worth reading, but should be approached with clear awareness that this will not be the final word in the CO_2 debate.

T.R. Carlisle
The Arctic Institute of North America
The University of Calgary
2500 University Drive N.W.
Calgary, Alberta, Canada
T2N 1N4

DIE SEEADLER. By WOLFGANG FISCHER. Die Neue Brehm-Buecherei, A-Ziemsen Verlag, Wittenberg Lutherstadt, GDR. 1982. 3rd edition, 192 p. + 17 tables, 37 illus., 58 photographs. Softbound. M14.20.

In the updated third edition of this book, the late Wolfgang Fischer presents information on breeding biology, population dynamics, protection and conservation of eight species of sea eagles of the genus *Haliaeetus*. This genus has a worldwide distribution except for South America where an ecologically similar group of eagles is represented. The Steller's sea eagle (*H. pelagicus*) of eastern Asia is the largest member of the genus. The wings of the larger females span up to 2.8 m and their bodies weigh 7-9 kg.

Although collectively called sea eagles these species vary considerably in the degree to which they are associated with aquatic habitat. The whitebellied sea eagle (*H. leucogaster*) is found only near the coast, from India to Australia. The Steller's sea eagle inhabits the seacoast and the lower reaches of large rivers in northeast Asia. The whitetailed sea eagle (*H. albicilla*) of Europe and Asia, and the bald eagle of North America (*H. leucocephalus*) primarily frequent the coasts but also occupy large rivers and lakes. The bald eagle builds ground or cliff nests less commonly than does the whitetailed sea eagle. The rarity of ground- or cliff-nesting by bald eagles, according to the author, may relate to their absence from the Canadian Arctic north of the treeline; the whitetailed sea eagle nests on the ground on treeless islands in northern Europe and Asia. The African fish eagle (*H. vocifer*) and the Madagascar fish eagle (*H. vociferoides*) commonly inhabit rivers, lakes and inland swamps in addition to the coasts. The Pallas' sea eagle (*H. leucoryphus*) occupies inland waters and also arid regions of central Asia, and is rarely found near the coast. The Sanford's sea eagle (*H. sanfordi*) inhabits inland and coastal forests. Its long tail, and dependence on pigeons and phalangers rather than fish and carrion as prey, set this species apart from the rest of the group. The author refers to this species as a "sea eagle of the forest".

The author adopts a species approach in his book, treating the whitetailed sea eagle in detail (67 of 151 pages of text), and points out ways in which the other seven species differ. The whitetailed sea eagle is similar to the North American bald eagle except that is is larger and does not develop a white head. Adult plumage is reached at 5-6 years of age. The breeding biology and behaviour of whitetailed sea eagles is described in detail, including a discussion of reproductive maturity, pair formation and courtship, nest site characteristics, laying, incubation and the rearing of young. Fischer describes vocalizations during courtship which are synchronized between male and female, akin to the "unison call" of cranes. Breeding activity occupies the major portion of the year, from nest building as early as November in central Europe to the gaining of independence by the young in August. The male is the primary provider for the one, two or sometimes three young.

As is typical of sea eagles in general, the whitetailed sea eagle prefers to eat carrion. It also robs other predatory birds of their food to obtain its daily food requirement of 500-700 g of meat. When a shortage of carrion demands it, live fish, birds and mammals are taken. This eagle may become entirely submerged in water when catching a live fish, may attempt to tire a diving duck by swooping repeatedly for as long as 45 minutes, or may opportunistically prey on the young of large mammals including fox, seal, and caribou.

In the section on persecution and protection the author reports that in recent years, after a dramatic decline and extermination of sea eagles in some areas, populations appear to be recovering in parts of North America and Europe. Historically, persecution was the major factor in causing population declines; later, bioaccumulation of toxic chemicals in the environment, the loss of habitat, and a reduction in food availability were added. Of all species in this genus the Madagascar fish eagle (*H. vociferoides*) is most in danger of extinction.

The author achieved his objective, summarizing new and old information about the eight species. Valuable personal observations gathered as director of animal care in the Tierpark Berlin and on a number of expeditions in Europe and Asia are presented in addition to observations of others. Thus, considerable previously unpublished or obscure information is provided, which is the major strength of this book. The literature is widely reviewed but not exhaustively so. The sources of observations are not always adequately described to allow the reader to judge the reliability of the data. Fischer makes relatively few general interpretations; some of his interpretations are simplistic. This third edition has 46 more pages than the second edition and features more excellent photographs. The book reads easily and, as do other books in this series, represents a valuable reference source for biologists and naturalists interested in sea eagles and particularly the whitetailed sea eagle.

Josef K. Schmutz
The Arctic Institute of North America
The University of Calgary
Calgary, Alberta, Canada
T2N 1N4
PRESENT ADDRESS: *Department of Biology*
University of Saskatchewan
Saskatoon, Saskatchewan, Canada
S7N 0W0

THE ROGER J.E. BROWN MEMORIAL VOLUME. Edited by H.M. FRENCH. Proceedings, Fourth Canadian Permafrost Conference. Ottawa: National Research Council of Canada, 1982. 594 p.

The profound influence of Roger J.E. Brown on the development of permafrost studies in Canada is unquestioned. The quality of his research is manifested in the Proceedings of the Fourth Canadian Permafrost Conference, where Roger's work is quoted in all but two papers dealing with climate and permafrost, his special interest. It is appropriate that the Proceedings volume be dedicated to him, and that an extensive obituary, bibliography and photos from Roger's career be included.

The first thing that struck me about this volume is the diversity of the 65 papers and the large number of people now involved in permafrost research. Although the conference was Canadian and by far the greatest number of papers are authored by Canadians, many international workers participated, indicating the Conference's importance. Papers are categorized into seven sections. The first two sections, dealing with Climate and Permafrost and Soils and Permafrost, centre on a variety of themes including processes, distribution, thermal regimes, influence of terrain factors on distribution and microclimate, and relict permafrost. Most papers in the section on Hydrology in Permafrost Regions are on various aspects of icings, although surface water movement and isotope variations are treated. Stimulated by oil and gas exploration, the Geophysics and Subsea Permafrost section contains papers mostly on physical characteristics, distribution, and thickness of permafrost below the Beaufort Sea, determined by geophysical methods. In addition, papers on acoustic testing of frozen soils and electro-magnetic methods for mapping permafrost along pipeline corridors are presented. In a departure from previous permafrost conferences, a section on Gas Hydrates and Permafrost is included. The interest in this timely subject is indicated by the inclusion of nine papers on a variety of subjects including the development and production of gas hydrate deposits. The next section is on Laboratory Testing of Frozen Soils. Papers deal with strain, compression, deformation, creep and relaxation tests on various frozen materials. The last section on Engineering Applications in Permafrost Areas is the largest, containing 16 papers. Aspects of frost heave, thaw, heat flow, and electrical freezing potentials are treated, as are methods and techniques utilized in various engineering activities in permafrost regions.

The volume will appeal to professionals and students who want to keep abreast of the latest results in all areas of permafrost research. As with many conference proceedings volumes dealing with a general subject, specialists with narrow interests or persons with a cursory interest in permafrost may not find it necessary to own.

Generally, the papers are well written and illustrated. The editor has done a good job. The papers are arranged in a logical sequence and the illustrations are well presented and easy to read. All in all, the production of the book is first rate.

N.W. Rutter
Department of Geology
The University of Alberta
Edmonton, Alberta
T6G 2E3