A THREAT TO THE POLAR ICE SHEETS?

[Review by G. de Q. Robin* of Sherwood B. Idso's *Carbon dioxide: friend or foe?*, Tempe, Arizona, IBR Press, 1982, 92 p, illus. Soft cover $9.95.]

This is a forceful small book that needs publicity. It reviews the climatic and agricultural consequences of the rapidly rising CO_2 content of the atmosphere. Idso's conclusions differ from those of the Carbon Dioxide Assessment Committee of the U.S. National Academy of Sciences and most atmospheric modellers. He predicts a worldwide temperature change of less than +0.3°K from a doubling of atmospheric CO_2 as opposed to the much greater figure of +2.0 to +4.0°K obtained by most modellers. He considers that increased agricultural productivity arising from increased CO_2 levels in the atmosphere is well established, and that the resultant benefit to man deserves more than the passing mention it is given in most official surveys.

Idso is not the only person whose funds for research on CO_2 climatic effects have been cut after reaching similar conclusions. Those responsible for the cuts clearly believe that such conclusions result from inadequate treatment of the problem. However Idso effectively levels the same charge at climatic modellers by quoting extracts from committee reports and scientific papers. Although his views appear biased against the establishment, this is no more than a natural reaction against the criticism he has received.

Modelling deficiencies appear more likely in tropical regions where negative feedback effects due to latent heat redistribution may be dominant. How then does the problem relate to polar regions where some influence of positive feedback due to early seasonal disappearance of snow and sea ice cover appears likely? Such effects make polar regions more promising for detection of global effects. However combined records from the Arctic and Antarctic do not provide clear evidence of CO_2 induced warming to date.

In my experience the publicity given to the postulated rapid collapse of the West Antarctic ice sheet due to CO_2 induced global warming fits many of Idso's criticisms. Careful consideration by the glaciological community shows that we do not have sufficient knowledge of all processes involved to give a reliable answer. Furthermore, the response could be a gradual increase in size rather than a collapse. Nevertheless, the collapse hypothesis continues to receive unwarranted emphasis from senior establishment scientists.

Idso and I, and most scientists at all levels, agree on one point. The effects of increasing CO_2 in the atmosphere are important and we need to know what they will be. The complications in reaching an answer seem more akin to the problems of economics than of the basic sciences, which nevertheless must provide the answer.

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PERMAFROST

[Review by P. J. Williams* of the *Roger J. E. Brown Memorial Volume: Proceedings of the Fourth Canadian Permafrost Conference*, edited by H. M. French, Ottawa, National Research Council of Canada, 1982, 594 p, illus.]

Canada has more permafrost than all the other English speaking countries together. Before the War the output of scientific literature on this topic from Canada was nevertheless quite insignificant. Wartime activities stimulated research; especially since about 1960, when the First Canadian Conference gave rise to a slim volume of largely tentative papers, an ever expanding and more comprehensive science has developed which is well represented by the diversity of papers in this volume. Roger Brown's career coincided with this period. He was widely known for the extensive fieldwork he carried out on the distribution of permafrost and for the stimulation he gave to others in that fundamental topic, which was his foremost research interest.

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The first section of the volume 'Climate and permafrost' describes ground temperature studies in relation to micro-climate and permafrost, and one notes that this is still an aspect surrounded by uncertainty. Knowledge is gradually being built up from field observations—by experimentation, for example, on the formation of patterned ground, and through other studies—but measuring micro-climate near and below the surface, and predicting thermal conditions, are both difficult and costly. Typically, Roger Brown was co-author of several of the papers in this section.

The section on 'Permafrost and soil' deals with the effects of fire on active layer thickness, with soil forming processes and the structures and micro-structures found in frozen soil, and with the engineering geology of northern soils. The third section, on hydrology, is also diverse, including items on river icings, isotope variations in permafrost waters, and run-off on small plots.

Papers on 'Geophysics and subsea permafrost' illustrate well the detailed measurements that are now being made on the sea bed, covering marine seismic refraction studies (to locate permafrost), temperature and electrical conductivity tests, and other geophysical measurements in field and laboratory. The section on 'Gas hydrates and permafrost' illustrates an extension of permafrost research: the hydrates are a combination of natural gas with water to give an ice-like solid. Pressures and temperatures in near-surface permafrost are such that the hydrates may change into gas and water or gas and ice, and thus they may be a source of danger in oil and gas extraction in the permafrost regions. At the same time they may be of major significance as gas resources.

Papers on creep and strength in the section 'Laboratory testing of frozen soils' add to the growing literature on mechanical properties, covering both field and laboratory studies. The final and largest section is entitled 'Engineering applications in permafrost areas'. Interesting though the papers are, engineers may feel many to be scientific rather than practical—those, for example, on heat flow measurements made in a laboratory, electrical freezing potentials, and numerical modelling of frost heave. The scientist, however, can certainly point to the need for the more basic understanding of frozen ground. Often such topics become of crucial importance to major engineering applications when time is already too short for their study. Engineering is represented in this section by discussion of the Trans-Alaska Pipeline workpad, and by articles on, for example, preserving permafrost below tanks and use of foam insulation in roads.

In many respects this volume symbolises the man it commemorates. Roger Brown trained as a geographer and studied, after graduation, at the Scott Polar Research Institute, Cambridge. He then spent some 20 years with the Division of Building Research at the Canadian National Research Council. The studies in the volume start with the essentially geographical and proceed to practical engineering. He was well known for bringing together Russian, Chinese and North American permafrost scientists; here Finnish, Russian, French, Polish, Swedish, Japanese, Turkish, US and Canadian authors combine to produce an internationally oriented volume. Demonstrating maturity and scholarship, this volume suggests that Canada may finally be mobilising scientific forces to cope with its unique problems and opportunities for the development of its permafrost regions. Roger Brown was research adviser to the Fourth Canadian Conference on Permafrost. It is fitting that he should be commemorated by a volume in the first rank of its genre.

RECENTLY RECEIVED BOOKS AND REPORTS

Arctica 1978 . . . 7th Northern Libraries Colloquy 19–23 septembre 1978 publié sous la direction de Jean Malaurie . . . DEVERS, S. *ed.* Paris, Centre National de la Recherche Scientifique, 1982. 580 p.

Despite its long delayed publication which robs some of the contributions of their immediate interest this volume of papers, presented to the seventh Northern Libraries Colloquy in Paris, contains much material of value not only to polar librarians and archivists but to the general scientific community, covering as it does the bibliography of the social sciences, the life and earth sciences as well as reports on various aspects of documentation, archives and museums. There are valuable appendixes listing details of Arctic libraries and museums and a catalogue of Arctic films.