

rup Glacier, to determine the glacial effects on oceanography.

The field parties were taken off Devon Island on September 30 and to Resolute, N.W.T., by CCGS *Labrador*, and by a Helio-Courier aircraft piloted by R. Ragle and P. Upton, Arctic Institute of North America. The program will resume in April 1963.

Dr. Fritz Müller, leader of the Jacobson-McGill Arctic Research Expedition to Axel Heiberg Island, visited Devon Island in June for over a week. The expedition members are particularly indebted to him for discussions on the ice cap concerning glaciological and geophysical problems, for the loan of instruments, and for the use of the Super Cub aircraft chartered by his

expedition. The entire scientific program benefited from his visit.

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SPENCER APOLLONIO

Reviews

THE WORLD OF ICE.

By JAMES L. DYSON. *New York: Alfred A. Knopf. 1962. 9½ x 6½ inches, xvii + 292 + xiii pages, 62 plates. \$6.95.*

The lands covered with perennial snow and ice are the only uninhabited regions of the world. Except for a few scientific and military installations, not a single permanent settlement occurs in this vast area, which embraces about ten per cent of the land surface of the earth. Scientific and popular interest in glaciers and ice caps has, however, been long maintained at a high level. This is due to a number of different factors, such as the romance of exploration in difficult and uninhabited areas, the large geographic extent of ice, and the interesting and unique phenomena connect-

ed with moving ice. With the great exploration, logistic, and scientific excitement of the International Geophysical Year came increased public interest in the lands of perennial ice and snow. Several popular writings about the field of glaciology have appeared in response to this heightened interest. The most complete so far is by James L. Dyson, head of the Department of Geology and Geography at Lafayette College, Easton, Pennsylvania.

Professor Dyson has produced a rather rambling but highly readable survey of glaciers, ice sheets, sea-ice, and permafrost, emphasizing the influence of ice on human activity. Discussion of snow, snowlines, and the development and classification of glaciers leads into a brief description

and explanation of glacier movement. Mountain and continental glacial erosion is treated with abundant reference to interesting areas, such as the deep valley of the Yosemite, the fiords of Scandinavia and Alaska, and the buried trench of the Hudson River. An interesting chapter is devoted to the effects of glaciers on mountaineering, but a reciprocal relation might also have been mentioned — much of our present understanding of glaciers and glaciology comes from the work of scientists who were attracted to the field and the problems through prior mountaineering experience. A brief chapter treats in a rather superficial and incomplete way the important field of glacier-hydrology. The Greenland and antarctic ice sheets are described in two interesting chapters, which can give the reader a "feel" for the environment and the natural processes that work there. Professor Dyson points out that we must soon consider the tourist potential of Antarctica! Sea-ice and ice islands are briefly treated, as is ground ice. The advance and recession of glaciers in response to a changing climate is beautifully portrayed. Although much emphasis is given to the relation between ice and our changing climate, Dyson reminds us that evidence of recent climatic amelioration comes from many sources. Very little mention is made, however, of a very recent climatic change in the other direction, which occurred in many areas of the northern hemisphere in the 1940 to 50 decade. This climatic deterioration has caused marked glacier advances in the Pacific Coast Range from Oregon to Alaska, and changes in the prevailing pattern of temperature, precipitation, and glacier recession over a much larger area. The various ways in which climatic information can be preserved by glacial action are discussed in an excellent chapter, which is followed by an equally good description of the geomorphic features left by the Pleistocene glaciation of eastern North America. The book closes with some interesting statements about the possible behaviour of the world of ice in the near and

distant future. A fairly good bibliography, glossary, and index complete the volume.

Professor Dyson describes all this in simple, easily understood prose, punctuated frequently with interesting experiences or anecdotes. For instance, we learn about the perils of boating over a forested spit (in a discussion of the over-deepened trough of Lituya Bay), the ice worm and the abominable snow man (in a chapter about life on ice), recent changes in the range of the tufted titmouse (evidence of climatic amelioration), and the elimination of snakes in Ireland (a consequence of the waxing and waning of the Würm ice sheet). However, a rambling organization and a lack of diagrams make some of the more important concepts a little difficult to visualize and assimilate. The photographs are excellent, but they are grouped by themselves so that their relation to the trend of thought in the text is not readily apparent. Although a large amount of material is covered, technical errors are almost non-existent, and controversial theories are handled with caution and restraint.

This volume is especially good for the layman because it introduces him to a fascinating subject in a most painless and enjoyable way. It is not, however, a textbook, nor is it entirely successful as an introduction to the science of glaciology. Some readers will want to know *why* certain processes occur; Dyson provides only cursory or superficial explanations. For instance, the fact that glaciers advance and retreat in response to subtle changes in climate is stated repeatedly, but no mention is made of the unstable nature of glacier tongues that causes this great sensitivity. Readers who wish deeper insight into the many interesting problems of glaciology must turn to the short but excellent little book by Robert P. Sharp ("Glaciers", University of Oregon Press) or to the technical literature. It is surprising that there does not exist, in English at least, a single modern text on the science of glaciology.

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