

Apart from the usual problem of interpretation associated with all types of geophysical surveying, the method presents one inherent practical difficulty. The electrodes need to traverse the crevasse in advance of the bodies they are intended to safeguard and it is difficult to push a train of electrodes from behind without elaborate guides. The latest development shows that this is practicable with a large vehicle, otherwise one has to risk sending a skier or a dog team with electrodes.

The method may be capable of measuring the width of a crevasse and the thickness of its snow bridge, which might give a clue to the carrying capacity. This is asking a lot, but it is unfortunate if a crevasse is detected which is amply bridged. There is then the embarrassing problem of deciding whether to delay by bridging it artificially, whether to use explosives to see how big a hole needs to be filled, or whether to chance a crossing.

Further developments and more systematic tests of the method with moving heavy vehicles across glaciers will be followed with much interest by all concerned.

W. H. WARD

THE WHITE DESERT. JOHN GIAEVER. Translated from the Norwegian by E. M. Huggard. London, Chatto & Windus, 1954. 304 pages, maps, text-figures, 31 plates. 24 cm. Price £1 5s. *od.*

THIS book contains the official account, by its leader, of the Norwegian-British-Swedish Antarctic Expedition to Queen Maud Land. The success of the expedition depended to a large extent on the way its members, drawn from three nations, got on with one another. Captain Giaever writes with enthusiasm of the ease with which this international co-operation was attained, and attributes it to the efforts of each and every member. The reader is left to guess the immense part that Giaever himself must have played in cementing the expedition together. His understanding and tolerance are soon apparent, and his modesty is well illustrated by his qualms as to his ability as a "non-scientist" to lead a mixed bunch of scientists in a two years' exile.

The object of the expedition was to carry out research on the coastline and inland ice of Queen Maud Land with particular reference to a mountain range some 200 miles from the ice front.

In February 1950 the expedition ship *Norsel* deposited the party on the ice shelf at Maudheim where the main base was established. Meteorological and glaciological observations were started immediately and, in addition, the first winter was spent in planning and preparing for the spring and summer sledging trips. When daylight returned Giaever saw the various parties off and the reader soon feels the loneliness and wanderlust experienced by those left at Maudheim. This was intensified in 1951 by the tragic drowning of three of the party. The second winter was spent in much the same way as the first with the added drama of a brilliant eye operation performed by the expedition doctor. The weasels and sledges were again prepared and the second summer saw the continuation of the field work. In December 1951 the *Norsel* returned and brought the expedition home.

Appendices deal with the air operations and the journeys of the glaciological, survey, geological and seismic parties, each written by the respective specialists. In the main they are descriptive accounts of the journeys and the work done, and they do not profess to give much in the way of scientific results. The glaciological party made measurements of snow accumulation and ice movement, determined the limits of the local ice shelf, and searched the nunataks for evidence of glacial advance or recession. They found evidence of considerably greater ice masses in earlier times but no evidence of recent recession comparable with that in the Northern Hemisphere. The geologists, by visiting the countless nunataks, performed their usual trick of returning with heavier loads than they set out with. The seismic party penetrated 375 miles inland from Maudheim, passing beyond the mountain range onto the inland ice; the book contains a profile based on their soundings which indicates a fjord-indented coastline beneath the ice.



Captain Giaever brings out well the difficulties of working under exacting conditions of blizzard, extreme cold and isolation. His book cannot be too highly recommended as an account of all the facets of a successful and well-organized expedition. D. S. BROCK

#### SNOW HYDROLOGY: SUMMARY REPORT OF THE SNOW INVESTIGATIONS.

Published by the North Pacific Division, Corps of Engineers, U.S. Army, Portland, Oregon, 1956. 437 pages, 70 pages of plates, maps and figs., 27 cm.\*

THIS publication is a summary report of some snow investigations conducted in the western half of the United States of America by the federal Weather Bureau and the Corps of Engineers, the military body concerned with river floods in the Mississippi Basin. Its 437 pages of photolithographed typescript are accompanied by 70 plates, many containing several figures each, although these, like the typescript, are admirably legible.

The growing use of surface water resources in most countries has led to proposals for numerous engineering works, for whose proper design and operation hydrological information and theory have become increasingly necessary. Such theory has however, even in snow-provided countries, hitherto tended to be concerned with rainfall only and not snow, whose melt and run-off have been assessed by empirical methods.

The investigations now reported began with research in the physics of snow in three upland areas. From the data thus obtained basic relationships of phenomena were determined and methods were devised for applying these to the solution of snow hydrology problems. The results could then be used in such matters as the estimation of maximum probable and "standard" floods, the forecasting of seasonal run-off and the methods of predicting hydrographs of river discharge, such as are required for the operation of reservoirs and the fighting of floods.

The equipment used included a radio-isotope-radio-telemetering snow gauge and an electronic storage routing analogue. The former transmitted daily readings of snowpack water equivalent by high frequency radio from a remote site to a base station.

The editors of the report took the view that the basic relationships revealed by the investigations were probably applicable wherever snowfall was of appreciable hydrological concern. They therefore presented their information in considerable detail and even with some duplication, so that the reader could see for himself how conclusions were attained or methods could be applied, and could find individual subjects discussed completely without reference to other parts of the report. It is intended to be not a handbook or manual of procedure but a store of data, theories and methods to which hydrologists can turn time and again for material, when tackling their own problems. The two-word title of the report is conveniently brief but perhaps incorrectly comprehensive. Each chapter includes a brief bibliography; an index is lacking, but there is a generous table of contents.

It may not be irrelevant to mention that at the present time the irrigation engineers of Iraq are busy with hydrometric work for the assessment of the water resources of the Tigris and Euphrates basins and have already decided that they must bring into account the snows of the Iranian and Turkish mountains within the basins. In so doing they will surely be indebted for much valuable guidance to the publication now being reviewed; to their gratitude will be added that of the hydrologists and river control engineers of numerous other countries. W. ALLARD

ÉTUDES DE GLACIOLOGIE EN TERRE ADÉLIE, 1951-52. FRITZ LOEWE. *Expéditions Polaires Françaises*, No. 9. Paris, Hermann et Cie., 1956. (Actualités Scientifiques et Industrielles, 1247.) 159 pages, 10 text-figures, 8 plates.

THE book covers description of apparatus and observations of radiation balance at Port Martin on the coast of Adélie Land (lat. 67° S., long. 141° E.) and 1,800 m. up on the inland ice at lat. 80° S.,

\* These reports may be ordered from the District Engineer, San Francisco District Corps of Engineers, San Francisco, California. Charges, including mailing, are as follows: "Snow Hydrology" \$4.65 per copy; "Development of Radioisotope-Radiotelemetering Snow Gauge Equipment," \$1.10 per copy. Drafts should be made payable to the Treasurer of the United States. Ed.