WILEY

Review

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Source: *The Geographical Journal*, Vol. 58, No. 3 (Sep., 1921), pp. 237-238

Published by: geographicalj

Stable URL: <http://www.jstor.org/stable/1780502>

Accessed: 27-06-2016 03:32 UTC

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Zealand, but since then the decline has been more or less steady. The fall in prices, the production in Canada, the Argentine, and Australia, and the growth of pastoral pursuits, with the development of the trade in frozen mutton and dairy produce, were all contributory factors in the decline. Mr. Copland goes at length into the geography and economics of wheat cultivation, and shows how production in New Zealand might be increased. In Canterbury and Otago alone, the two most suitable areas, he believes that 750,000 acres could be devoted to wheat. This would bring the annual production of New Zealand to over 18,000,000 bushels. The most serious obstacle Mr. Copland foresees is the lack of labour arising chiefly from the greater attractiveness of urban than rural life. The volume is a valuable piece of work, and it is worth noting that it is the outcome of investigations by students in Canterbury University College.

R. B.

POLAR REGIONS

Grønland langs Polhavet. Udforskningen af Grønland fra Melvillebugten til Kap Morris Jesup. Skildring af den II Thule-Ekspedition, 1916-18. Knud Rasmussen. Gyldendalske Boghandel, København og Kristiania, 1919. 4to. *Maps and Illustrations.*

It is well known that on the first Thule expedition in 1912 Rasmussen crossed the inland ice to Independence Bay and, independently of Mylius Erichsen, discovered that Peary Land is not an island. On the expedition of 1917, here described, he skirted the whole coast of northern Greenland from Thule on Wolstenholme sound to De Long fiord. The chief results of this expedition have already been reported in vol. 53, p. 59. It may be added that Sherard Osborn fiord is only a third as long as hitherto supposed, and that Victoria Inlet is hardly more than 50 miles deep. It contains no island other than Stephenson island at the mouth. The long fiord running eastwards from near the mouth of Nordenskiöld fiord was named after J. P. Koch, and the western and eastern inlets of De Long fiord after Th. Thomsen and Prof. Böggild respectively.

From St. George's fiord the return journey was made overland, and the great scarcity of animal life, and therefore of food, threatened death to everyone, and Dr. Thorild Wulff, who had been ailing for some time, was unable to bear up against the difficulties of the route and starvation.

Reports are added on the botany and fauna of the country traversed and on the geology. The former is drawn up by C. H. Ostenfeld from Dr. Wulff's notes, and the chief features have been mentioned in the note referred to above. The poverty of the vegetation naturally entails a corresponding scarcity of animal life, and hence the party endured great hardships from want of food. Few musk oxen were seen, the first beyond Cape May, and ptarmigan were often hard to obtain, though this bird is generally distributed along the whole coast. L. Koch considers the folded range along the north coast of Greenland, the remains of which he discovered, to be a continuation of the Caledonian fold which runs from Scotland through Norway and Spitzbergen and is connected by a submarine ridge with north Greenland. Farther west it penetrates through Grinnell Land into Ellesmere Land.

The volume is well provided with sketch-maps and numerous photographs and coloured illustrations. The addition of rather long accounts of the travels of other Arctic explorers, and of Eskimo tales and other matter not strictly connected with the expedition, together with thick paper, has expanded it to an unwieldy size.

W. A. T.

Ergebnisse der Schweizerischen Grönlandexpedition, 1912-1913. Bearbeitet und redigiert von Prof. Dr. Alfred de Quervain, Leiter der Expedition, und

von **Prof. Dr. P. L. Mercanton**, Leiter der Westgruppe, und mit Beiträgen der Mitglieder: Dr. med. H. Hoessly, Dr. W. Jost, Dr. A. Stolberg, Ing. K. Gaule, Arch. R. Fick. Band 53, Denkschriften der Schweizerischen Naturforschenden Gesellschaft. Kommissionsverlag von Georg & Co. in Basel, etc. 1920. 4to. *Maps and Illustrations*.

Dr. de Quervain's expedition was noticed at the time in the pages of the *Journal*, and his narrative 'Quer durchs Grönlandeis' was reviewed in vol. 43, p. 689. In this volume are given in detail the scientific records of the expedition. The observations were very varied and numerous, as taken both before and during the crossing of the inland ice by the main expedition, and by a party left behind on the west coast, particular attention being given to glacial conditions and to meteorological elements by which they are affected. A few short notes on Dr. de Quervain's résumé of the topography of the inland ice may be interesting.

The first important geographical fact ascertained was that, as on Nansen's route, central nunataks do not occur, but that the surface of the ice in both cases assumes the same regular geometrical form almost independent of the underlying foundation, rising at first steeply from the edge and then more gently. About 60 miles north of the route followed and about the same from the western coast nunataks of considerable height do occur—the mountains of Schweizerland. While the highest point of the route, 2510 metres, is about 200 metres less than Nansen recorded, and Peary's maximum was 2400 metres, it was proved that the inland ice rises to the north-east, so that there is no continuous fall northwards. It has been shown by Dr. de Quervain's observations that there are two centres of glaciation, one between his crossing and Nansen's, and another to the north-east of his route, and probably there is a third north of Koch and Wegener's route. In the latitude of the Swiss expedition the dip of the ice is at right angles to the continental axis, that is, this axis coincides with the ice-parting. The foregoing statements need some modification from the fact that the lofty summits near the east coast seem to cause a marked displacement of the ice-parting eastwards, and form the backbone of glaciation in this latitude. Rising beyond the snow limit, they belong to the accumulation region of the inland ice and hinder the free flow of the ice eastwards. That the greatest elevation of the ice is west of these mountains and overtops most of them does not necessarily indicate a corresponding rise in the rocky substratum, for the centre of the Finno-Scandinavian glaciation, when at its maximum, lay not over the mountains, but over the Gulf of Bothnia. Other effects of the substratum are the terraced form of the inland ice, the crevasses noticed for a considerable distance inland from the west coast, and the influence of the great fiord system extending for at least 60 miles inland.

The inland ice is now a stationary glacier in which accumulation and ablation nearly balance each other, a relic of the diluvial ice wave which swept over America from west to east. It cannot rise to a greater elevation without causing atmospheric circulation of a more anticyclonal character, which would check its growth by reducing the precipitation.

W. A. T.

MATHEMATICAL AND PHYSICAL GEOGRAPHY

Dictionary of British Scientific Instruments, issued by the British Optical Instrument Manufacturers' Association. London. 1921. 8vo. Pp. xii. + 334. Price 21s.

This work has the multiple object of providing a concise definition of each instrument, with illustrations of important types; of indicating the firms