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**LIEUTENANT RYDER'S EAST GREENLAND EXPEDITION,
1891-92.***

THE last number of the *Geografisk Tidsskrift* of the Danish Geographical Society contains a full account of the East Greenland Expedition of 1891-92 (see *Proceedings*, p. 711), in the form of letters from Lieutenant Ryder. The first of these was written on board the *Hekla*, in the ice in lat. $72^{\circ} 26' N.$, long. $9^{\circ} 56' W.$, and the others, written in February and June, 1892, are dated from the winter quarters of the expedition in $70^{\circ} 27' N.$, and $26^{\circ} 11' W.$

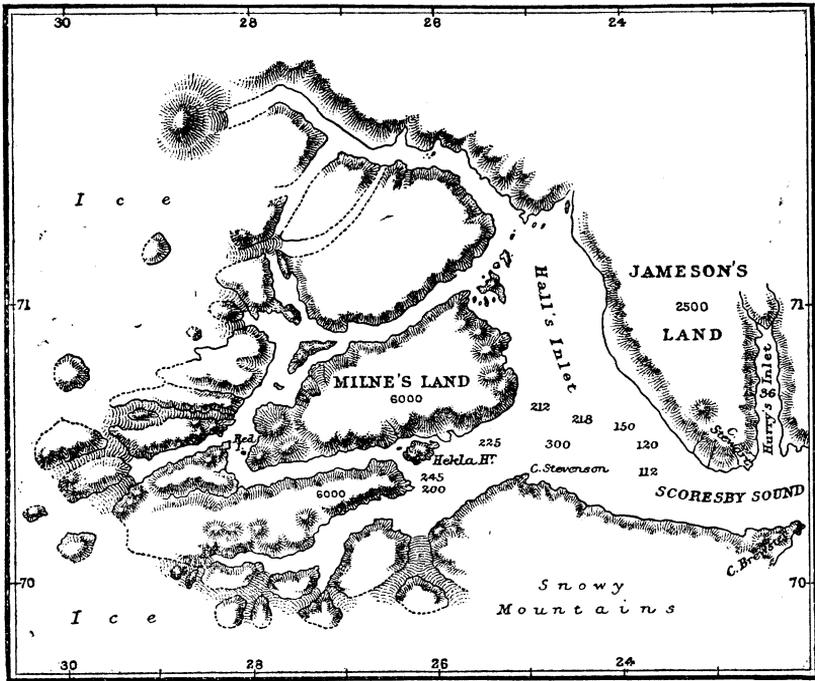
The *Hekla* had great difficulty in effecting a landing on the Greenland coast. Leaving Copenhagen on June 7th, 1891, she met the outer edge of the ice thirteen days later in lat. $68^{\circ} 12' N.$ and long. $13^{\circ} 5' W.$, 220 miles east-south-east of Cape Brewster. But there was no possibility of making way through the ice, and the expedition steamed northwards as far as $76^{\circ} 13' N.$ There the somewhat more open character of the floes raised the hopes of the commander, and he entered the ice. But it was 33 days before the *Hekla* overcame the difficulties offered by pack-ice and fog, and entered Scoresby Sound. Only one landing could be made during this month; this was off Cape Broer Ruys, on the south of the little Holland Island, a fringe of solid ice 5 miles wide having been crossed on sledges. Altogether the year was very unfavourable, and even Jan Mayen, which is usually ice free, was surrounded for about 60 miles by the ice-pack. The width of the floating ice-fields in the east of Greenland attained 300 miles at $68^{\circ} N.$, 380 miles at $72^{\circ} N.$, 360 miles at $74^{\circ} N.$, and 300 miles at $76^{\circ} N.$ Under such unfavourable circumstances the members of the expedition considered themselves fortunate in reaching the entrance of Scoresby Sound on August 2nd.

When the *Hekla* steamed westwards in Scoresby Sound it soon became apparent that the great fjord divided into several branches which stretched far inland. The *Hekla* entered the south-western branch of the fjord, in the hope that it might be an inlet leading to Scoresby's Knighton Bay. Near the entrance of this branch an excellent spot for a winter station was found on the coast of an island named Denmark Island, and situated to the south of Milne's Land; and when a renewed attempt at erecting the winter station at Cape Stewart proved unsuccessful—the whole coast being thickly wrapped in ice—it was decided to stay there for winter quarters. On August 23rd the *Hekla* was brought to her winter station.

Various boat expeditions, partly in the steam launch and partly in rowing boats, were made until September 25th, the result being that 3060 square miles were laid down, and the great interior ramifications

* Revised with additions for *The Geographical Journal* by Lieutenant Ryder.

of Scoresby Sound were explored and mapped. It appeared from these explorations that the Hurry's Inlet, between Jameson's Land and Liverpool Coast, is not an inlet connecting Scoresby Sound with Davy Sound—as supposed by Scoresby—but only a fjord 28 miles long. It has in the east the steep crags of Liverpool Coast, rising to a height of 3000 feet, and seemingly composed of gneiss. Towards the west rise the 2500-foot-high crags of Jameson's Land, which are considered by the explorers as an immense moraine of the glacial age. Many fossils, both animals and plants, belonging to the Jurassic and to Tertiary periods, were collected there.



SKETCH OF THE INNER BRANCHES OF SCORESBY SOUND, BY LIEUT. C. RYDER,
ROYAL DANISH MARINE, 1892.

(Scale 50 miles = 1 inch. Soundings in fathoms. Heights in feet.)

At Cape Brewster, where fossils from a period older than the Jurassic have been found, the crags are but from 300 to 500 feet high, and the coast is covered with moraines. It has a relatively rich vegetation, and on standing here one almost forgets that he is in a polar region. On the contrary, the southern shore of Scoresby Sound is a high unindented basalt wall, 60 miles long, covered with small secondary glaciers, which are reconstructed on the slopes out of *débris* of the ice, which falls in cascades from the upper plateau. The interior ice attains a height of about 6000 feet.

The ramifications of the tributary fjords appear in Lieutenant Ryder's map, which we reproduce.

The edge of the inland ice, which is 176 miles distant from the sea at Liverpool Coast, is seen at the heads of the smaller bays of the fjords.

It appears certain that all the fjords reach the inland ice. The heights of the icebergs from the northern glaciers in Hall's Inlet have been measured up to 300 feet above the water surface. Two of the largest icebergs which have been measured have been found to have lengths of respectively 6000 and 3000 feet, and widths attaining 2000 and 3000 feet. The gneiss, which is covered by basalt in the western sounds attains a thickness of 500 feet in the south-west, 3000 feet in Milne's Land, and 6000 feet in the northern part of the explored region. Moraines, glacial striæ, and *roches moutonnées*, testifying to a previously much greater extension of ice, are met with everywhere, even on the tops of the plateaus at a height of 4330 feet.

Animal life is rich, especially in Jameson's Land, where reindeer are seen in wonderful numbers. They also are numerous on the coasts of the interior fjords. Many musk-oxen were seen around Hurry's Inlet, and traces of foxes, hares, bears, ermines, and lemmings were observed in Jameson's Land. The richness of vegetation (150 flowering plants were gathered in Scoresby Sound), and the size attained by it, especially around the western basin, is most astonishing, especially in comparison with what it is on the western coast, or a little further north, where the snowfall is smaller.

No human beings were seen, but numerous winter houses, graves, &c., now abandoned, testify that the fjords were recently inhabited by a relatively numerous Eskimo population. The average temperatures observed were, in Fahrenheit degrees:—October, 19°; November, -4·4°; December, -4·5°; January, -1·5°; February, -11·6°; March, -14°; April, 1·1°; May, 22·8°; the lowest observed minimum being -52°·2. Severe föhn storms, one of which suddenly raised the temperature to 52° Fahr., were experienced in May and the first days of June.

As soon as spring came, sledge journeys were begun, and the exploration of the fjords was continued. No sickness occurred amongst the members of the expedition during the entire time.

In 1891 the winter-ice in the interior of Scoresby Sound had broken up so early that only very little was to be seen when the *Hekla* in August first entered the fjord; in 1892 quite the contrary took place. It was impossible for the ship to get out of the harbour before August 8th; and even at this late date it was with much difficulty that the passage out of the fjord was made, the winter-ice lying in large unbroken masses in the whole of the inner part of the fjord west of Cape Hooker. After a short visit to Cape Stewart, the expedition left Scoresby Sound on August 13th, and proceeded southward along the coast. From Cape Brewster to 69° N. the ice offered no difficulty, but

at the latter point firm unbroken land-ice was met with, which could not be passed either by the ship or with boats. The *Hekla* therefore returned northwards, and got out of the ice on August 18th in $68^{\circ} 25' N.$, $19^{\circ} 25' W.$ A short visit was made to Iceland for the purpose of coaling and taking in provisions; and on August 29th the *Hekla* again left for Greenland, the intention being to try to reach the coast at Cape Grinel and follow it southward to Angmagsalik, but constant easterly storms and packed ice made this impossible. On September 10th the coast was reached at Angmagsalik ($65^{\circ} 40' N.$), the wintering place of Captain Holm. While the ship was anchored in a bay here the expedition made boat excursions northward to $66^{\circ} N.$ The ice, here lying packed close to the land, prevented further progress, and it was too late in the season to await a spreading of the ice. All the inhabited places in the district were visited. During the eight years that had elapsed since the visit of Captain Holm the population had decreased from 400 to 300 souls. A very large collection of dresses, weapons, and utensils was purchased from the Eskimo.

On the 26th of September the *Hekla* left the harbour, and after a fine voyage arrived at Copenhagen on October 12th.

PHYSIOLOGICAL EFFECTS OF HIGH ALTITUDES.

By CLINTON DENT, F.R.C.S.

MR. CLINTON DENT, F.R.C.S., sends the following communication, which is a summary of an article published in the *Nineteenth Century* for September last, with additions suggested by Mr. W. M. Conway's recent experiences in the Karakoram:—
 "Mountaineering as a special branch of travel has developed so much within the last thirty years, that the oft-discussed question as to the possibility of ascending the highest points of the Earth on foot has assumed a new phase. Probably, as far as practical skill is concerned, mountaineers of the present day are fully qualified to make the experiment. The question is whether the feat is a physiological possibility. The intrinsic 'mountaineering' difficulties are not likely to be insuperable. Assuming that Gaurisankar is really the highest point, it is probable that on the north side the snow slopes will be tolerably gentle. Days must occur, though they might be exceptional, when the snow would be in good order, and not powdery or granular. At the same time, the extremes of heat and cold experienced render it likely that extensive ice-slopes will be met with. Time would prevent any great length of ascent by step-cutting, and success would only be possible when snow overlying the ice was yet