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On the Map of King Oscar Fjord and Kaiser Franz Josef Fjord in North-Eastern Greenland

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natives drew our attention to a crocodile sleeping on the surface. This was very curious, in view of there being no river within 8 miles. This place was also visited by Mr. Kennelly, who explored it thoroughly. He describes it as the crater of an extinct volcano, lying at a slight elevation between two "dambos" or "vleys." The upper rim is almost a perfect circle, with a slight lip-like break on the eastern side. The diameter is just 300 yards, a conclusion which Mr. Kennelly arrived at by finding the range of a mark on the opposite side with his rifle. A pool of water of a dark greenish colour lies about 150 feet below the rim, oval in shape, and some 250 by 180 yards. The depth must be very great. Mr. Kennelly exploded four charges of dynamite in the pool, well away from the sides, but nothing came to the surface, and he is of the opinion there are no fish in it. The water is fair, but slightly brackish. There was nothing to indicate that the water altered its level at all during the seasons, except a very faint line 2 inches above the present level. The native name for the crater is Chilengwe. They have a superstitious horror of the place, and did all they could to dissuade Mr. Kennelly from going down to the water, assuring him that there was a large snake there. The only possible way down was by means of the lip-like break in the rim, and it was certainly a rather dangerous descent.

On our return journey to Serenje we followed our previous route, and arrived there on the 2nd inst. without any incident worthy of record. One noticeable fact was, the natives at the several villages along the road did not appear so timid: on our return journey we did not find any villages deserted.

ON THE MAP OF KING OSCAR FJORD AND KAISER FRANZ JOSEF FJORD IN NORTH-EASTERN GREENLAND.*

By Dr. A. G. NATHORST.

As I have already stated in my preliminary note on the Swedish expedition to North-East Greenland, 1899,† published in this *Journal*, the chief geographical result was the discovery of King Oscar fjord and the mapping of the extensive fjord-system connected with it, together with that of Kaiser Franz Josef fjord, which was then visited for the first time since its discovery in 1870, the whole being thoroughly mapped on the scale of 1 : 200,000. While referring the reader to the above-mentioned note, as also to the detailed account in *Ymer*,‡ let me

* Maps, p. 104.

† A. G. Nathorst, "The Swedish East Greenland Expedition," *Geographical Journal*, November, 1899, p. 534.

‡ A. G. Nathorst, "Den Svenska Expeditionen till nordöstra Grönland, 1899," *Ymer*, 1900, p. 115, with map on the scale of 1 : 500,000.

now, with reference to the accompanying map showing the course of the Antarctic, and to the map of King Oscar fjord and Kaiser Franz Josef fjord, give an account of our previous knowledge of these regions.

Kaiser Franz Josef fjord was, as is well known, discovered by the second German Polar Expedition, with Koldewey in command, in 1870. The official report of this expedition* was accompanied by a "Carton über den Kaiser-Franz-Josefs fjord," of which we here give a reduced copy (Fig. 1).

This sketch represents the inner part of the fjord—inside Payer

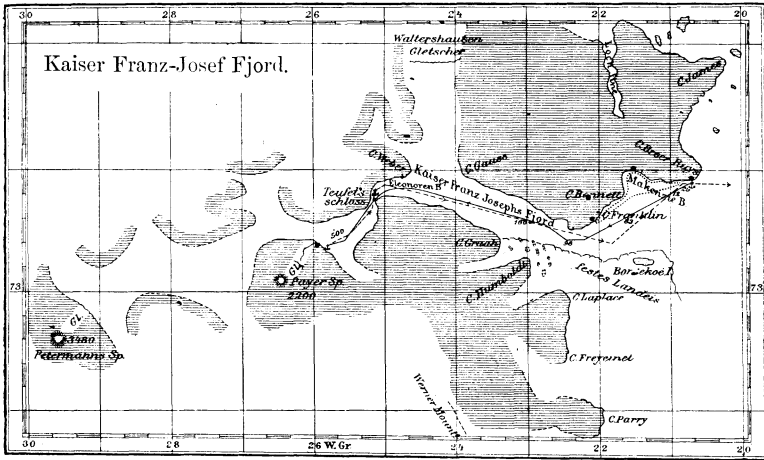


FIG. 1.—SKETCH-MAP OF FRANZ JOSEF FJORD (FROM 'ZWEITE DEUTSCHE NORDPOLARFAHRT').

Spitze—as broader and larger than the outer one, in contradiction to the general rule that the fjords grow narrower towards the interior. On the two maps of the east coast of Greenland which accompany this same work, the inner part of the fjord is entirely omitted, and consequently the fjord comes to a termination, though not fully defined, immediately above Payer Spitze (Fig. 2). There is, moreover, a further discrepancy, in that Petermann Spitze is placed on the first-mentioned map in 72° 48' N. lat. and 29° 32' W. long., while on the second it is placed somewhat north of 73° N. lat., and almost a degree of longitude farther east. In this, as in other respects, the two maps last-mentioned come nearer the true state of things than the first. Payer †

* "Die zweite deutsche Nordpolarfahrt in den Jahren 1869 und 1870 unter Führung des Kapitän Karl Koldewey." Herausgegeben von dem Verein für die deutsche Nordpolarfahrt in Bremen. Leipzig: F. A. Brockhaus. 1873.

† J. Payer, 'Die österreichisch-ungarische Nordpol-Expedition in den Jahren 1872-1874 nebst einer Skizze der zweiten deutschen Nordpol-Expedition 1869-1870, etc.' Wien, 1876.

gives a third map (Fig. 3) which differs in many respects from those already mentioned. The title of this map is "Uebersichtskarte der Nordostküste von Grönland nach der Aufnahme von Julius Payer."

As will be seen from Fig. 3, Payer divides into two the large assumed island—Ymer island on the Swedish map—east of the innermost German anchorage, calling the northern part "Petersen Insel," the southern "Mohn Insel." The strait which he places between these two does not in reality exist, and it is curious that he should have assumed its existence when we remember how near the *Germania* passed to the west side of the island. While the two maps first mentioned leave the continuation of the bay east of Payer Spitze—Antarctic sound in the

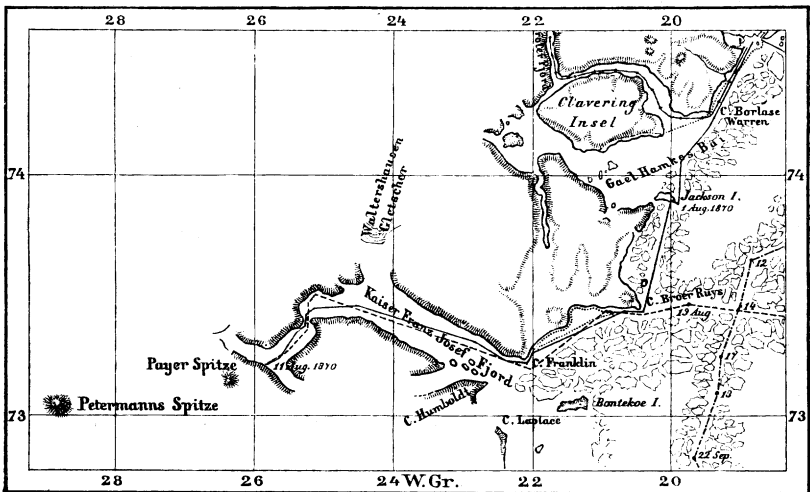


FIG. 2.—PART OF THE EAST COAST OF GREENLAND, WITH KAISER FRANZ JOSEF FJORD (FROM 'ZWEITE DEUTSCHE NORDPOLARFAHRT').

Swedish map—an open question, Payer in his map gives it an outlet at Broch islands. In this he has come somewhat near the truth, but as, at the same time, he supposes the bay to be closed on the south, the whole system of the Franz Josef fjord is here, in his view, terminated, whereas the other maps leave the question of its communication with Davy sound an open one. In this respect Payer's map is no improvement.

On comparing the three outline maps previously mentioned with our map of Kaiser Franz Josef fjord, the following principal divergences will be noticed. Dusén fjord is not marked on the German map, nor is there any sign of the Musk-ox fjord on the east side of the North fjord. On the north side of Franz Josef fjord, opposite Payer Spitze, the official German map indicates the existence of a broad branched

fjord, which sends two arms towards the west, and also one towards the north-east. This is the Ice fjord of the Swedish map, but there is no bay to the north-east. The fact that on the inner side of Payer Spitze Franz Josef fjord does not widen, but is really narrower, is seen on simply glancing at our map. On the southern side there is only one fjord arm, not two, and the two indicated on the north side in the German official map do not exist. Nor does the inner part of the fjord make a bend to the north-west, but it runs due west. The south arm of the fjord has been called by me Kjerulf fjord in the place of that called by the same name by Payer, but which, as a matter of fact, does not exist. As Petersen island and Mohn island are non-existent as

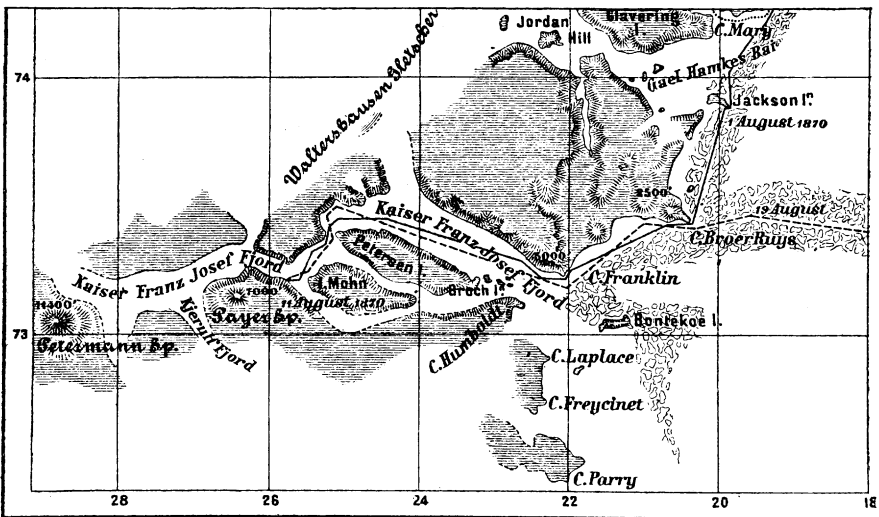


FIG. 3.—MAP OF FRANZ JOSEF FJORD AND ITS SURROUNDINGS (FACSIMILE OF PAYER'S MAP).

such, I have instead used the names for the western promontories of the supposed islands—Cape Petersen and Cape Mohn. As also, in consequence of the rounding of the coast, no Cape Gauss can be definitely distinguished, I have called the entire peninsula by that name. Otherwise the German names are retained—Teufelsschloss, Cape Weber, Waltershausen Gletscher, Eleonoren Bai—though the last mentioned has probably been employed for a bay lying somewhat more east than the one the Germans designated by that name. Kaiser Franz Josef fjord had, so far as we know, been visited by no one since 1870 until our arrival.

I will now proceed to summarize our previous knowledge of the tracts round the south and east outlets of King Oscar fjord. Our chief source of information was the celebrated voyage of discovery undertaken

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by Scoresby, Junior, in 1822, when, for the first time, we obtained a fairly correct idea of the nature and outlines of the north-eastern coast of Greenland between 69° and 75° N. lat.* Fig. 4 is a facsimile of the portion of Scoresby's map showing the neighbourhood of Davy sound.

On August 10, 1822, the previous rainy and foggy weather showed

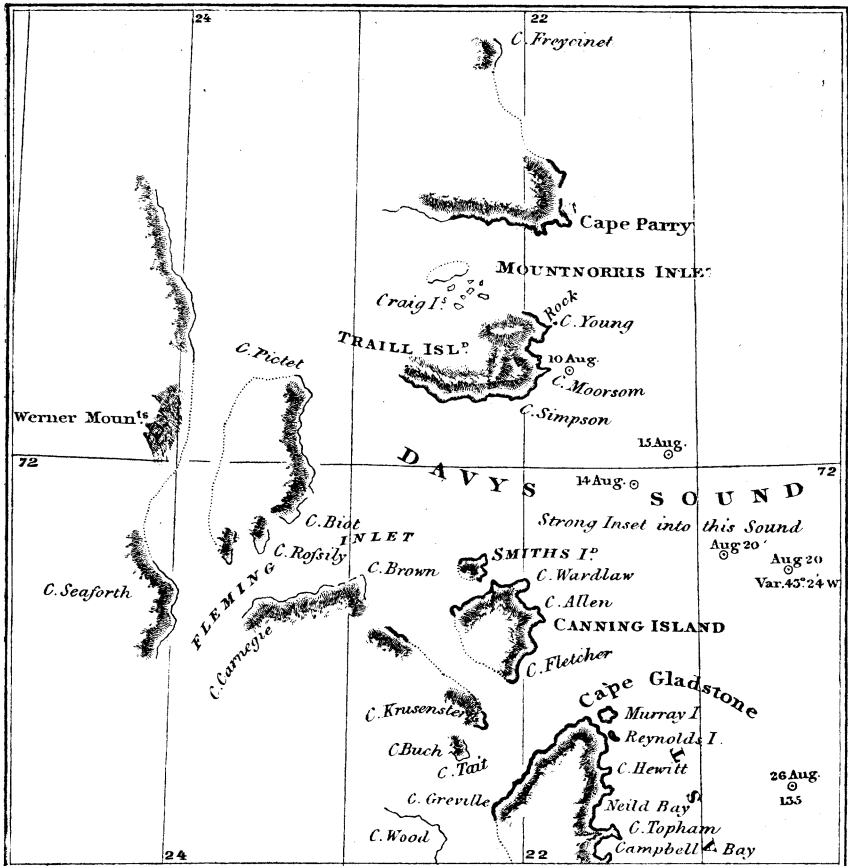


FIG. 4.—FACSIMILE OF PART OF SCORESBY'S MAP OF EAST GREENLAND, 1822. THE CIRCLES WITH DATES GIVE THE POSITIONS OF SCORESBY'S VESSEL, THE *BAFFIN*, WHENCE BEARINGS AND MEASUREMENTS WERE TAKEN.

some improvement in the afternoon, so that the coast could be approached, and the vessel made fast to a large sheet of land-ice $2\frac{1}{2}$ miles from the

* W. Scoresby, Junior, 'Journal of a voyage to the northern whale-fishery, including researches and discoveries on the eastern coast of West Greenland, made in the summer of 1822 in the ship *Baffin*, of Liverpool.' Edinburgh: 1823.

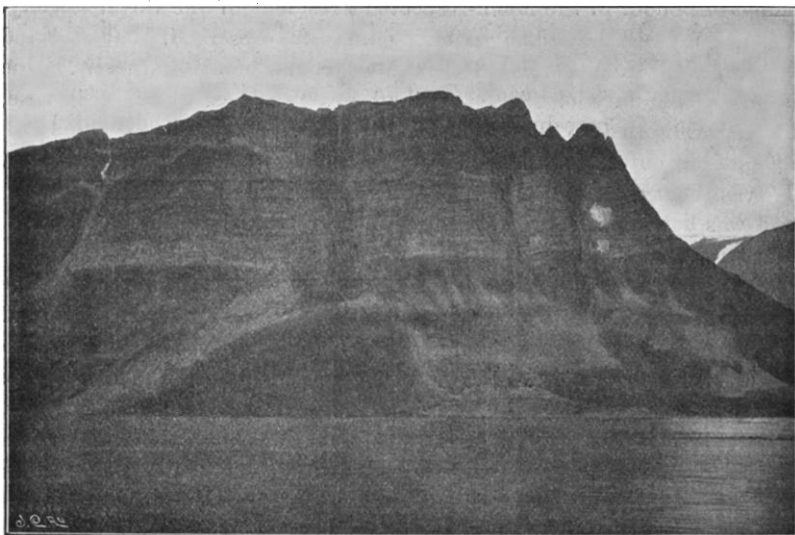


FIG. 5.—“DAS TEUFELSSCHLOSS,” HORIZONTAL SILURIAN STRATA, KAISER FRANZ JOSEF FJORD.

(From a photograph by P. Dusén.)

land, which was afterwards visited by Scoresby. We now cite his own words in so far as they touch on the geographical conditions.

“The land abreast of the ship (bearing N.W. by W., true) had every appearance of an island. It was named Traill island, in compliment to a highly esteemed friend, Dr. Thomas Stewart Traill, of Liverpool. The latitude of the middle of it is about $72^{\circ} 12'$. The south-eastern part of it is a stupendous cliff rising from the very sea, without a yard of beach, at an angle of 50° or upwards, to the height of about 1300 feet. This cliff is of singular beauty. The prevailing colour, which is slate-blue, or bluish-grey, is intersected and variegated by zigzag strata of bright yellow and red. From the peculiar structure and distribution of the strata of this part of the coast, it received the name of Vandyke cliffs. The northern termination of these cliffs consists of an acute ridge, jutting into a short promontory, which was named Cape Moorsom, out of respect to Mr. Richard Moorsom, Junior, of Whitby; and another headland, a little farther north, was called Cape Mewburn, after an old school companion and fellow-collegian. . . . The most remote headland of Traill island that was seen, lies about 5 miles to the northward of Cape Moorsom; this was named, after a reverend friend in Whitby, Cape Young.

“Traill island lies rather within, or to the westward of, the general line of the coast. Its extent in latitude is about 10 miles. To southward of it a very large inlet was discovered, which I named Davy’s

sound, in honour of the much-respected President of the Royal Society. And, to the northward, another opening was observed, that received the name of Mountnorris inlet, in honour of Lord Mountnorris. The northern boundary of the latter inlet lies nearly east and west true, and is terminated to the eastward by a bold headland, to which the name of our enterprising and highly respected north-western navigator, Captain Parry, was applied. To the southward of Traill island, the land was but imperfectly seen, on account of a constant haziness in that quarter, which did not wholly disperse for some days."

Scoresby then describes his ascent of a mountain ridge at Cape Moorsom, and relates that in the vicinity of Cape Mewburn he found the ground-plans of two summer huts used by the Eskimo, with manufactured bones, etc. His father, who had crossed the country to Cape Simpson, had there found at least fifty similar summer residences, round which a vast quantity of bones of various animals were strewn on the ground. The following day, the king's birthday, bad weather prevented their getting on shore, and, as no further opportunity for landing offered, Scoresby's determination to take possession of the coast on behalf of Great Britain was never carried into effect.

A boating-party, under most unfavourable conditions, had penetrated to Cape Young, and stated that from this spot, looking into Mountnorris inlet, they had seen a number of islands which Scoresby called Craig islands, though he could not state their position more closely. Another

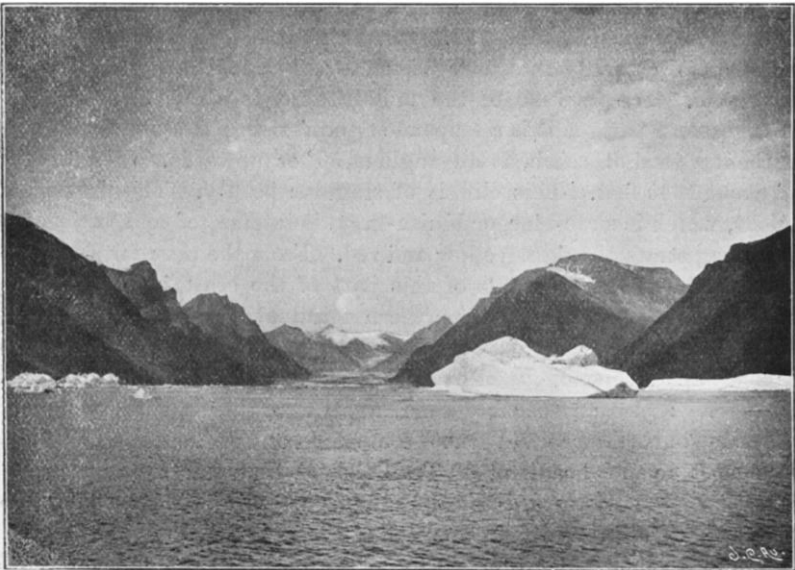


FIG. 6.—THE INNERMOST PARTS OF KAISER FRANZ JOSEF FJORD, WITH PETERMANN SPIZ.

(From a photograph by P. Dusen.)

party, penetrating to the ice-free southern side of Traill island, somewhat west of Cape Simpson, found several dozens of old huts and the ground-plans of summer tents, as also a vast quantity of the bones of various kinds of game, made into sleigh runners, etc. This spot would certainly be well worth a thorough investigation from an ethnographical point of view.

On August 14 Scoresby continued his examination of the coast. "Our position at this time was nearly in the middle of the opening of Davy's sound, of which the two islands last mentioned [Canning island and Smith island], and other land to the westward of them,

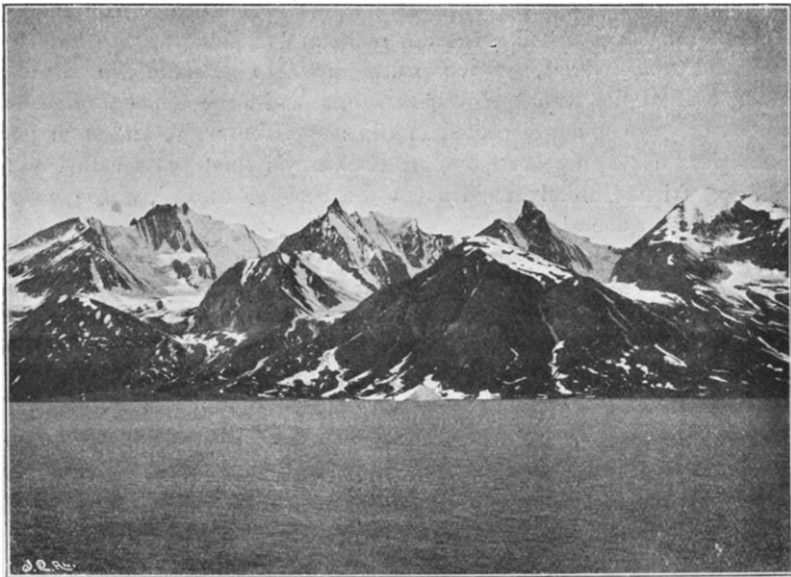


FIG. 7.—"SYLTOPPARNE" (NEEDLE POINTS) (1360-1570 METRES), ALMOST VERTICAL SILURIAN STRATA, KING OSCAR FJORD.

(From a photograph by P. Dusén.)

constitute the southern boundary, and Traill island the northern boundary; the width of the sound betwixt them being about 16 miles. A distant tract of a mountainous country was seen to run across the interior of Davy's sound. But it appears to be insular, and does not close up the sound. Three capes that were distinctly defined on the southern part of this island received the names of Cape Biot, Cape Rossily, and Cape Buache, in compliment to three French philosophers, members of the institute; and the north-eastern cape of the same island was called after Prof. Pictet, of Geneva. To the westward of this island there is a small chain of the most elevated mountains hitherto met with upon this coast. This chain, named Werner mountains, in

respect to the memory of the celebrated geologist, is distinctly seen at the distance of between 30 and 40 leagues, in the ordinary state of the atmosphere, and is so bold that it gives to the mountainous coast before it the appearance of low hummocky land. To the southward of Cape Biot is a ramification of the main sound, which was named Fleming inlet, after the esteemed author of the 'Philosophy of Zoology,' penetrating to the westward and southward; and between Cape Pictet and Traill island, Davy's sound runs towards the north-west, to an extent that, being beyond the reach of vision, could not be determined. As we had no opportunity of getting intersecting bearings of the land in the interior of Davy's sound, an accurate survey could not be obtained; but all that could be expected from a careful and repeated examination of the coast for estimating the distances and discovering the indentations and promontories, was accomplished. Two headlands, in Fleming inlet, received the names of Cape Seaforth and Cape Carnegie in compliment to two much-respected families of Edinburgh; and some promontories in the northern branch of Hurry's inlet were called after different friends, chiefly resident in the Scottish capital, whose names appear in the general chart."

Considering that, according to his own map, the distance from Scoresby's vessel to the supposed Fleming inlet would be about 32 miles, to Cape Seaforth more than 60 miles, and to Cape Krusenstern close upon 31 miles, it is evident that no great importance can be attached to the supposed existence of Fleming inlet, or that deep bay which, between Cape Krusenstern and Cape Gladstone, was supposed to stretch down to Hurry inlet. Lieut. Ryder long ago proved that, somewhat north of the Fame islands, Hurry inlet is closed, and Mr. Dusén, on his part, ascertained that the said bay does not run so far down from north to south as Ryder conjectures. The map of the northernmost part of Hurry inlet and surroundings made by Mr. Dusén having not hitherto been published, I take the opportunity of communicating it here (Fig. 8).

Returning to Scoresby's map, there is in it, besides, some uncertainty as to whether Canning island really is an island. The sound, which, according to Scoresby, should lie between Werner mountains and the supposed island on which Cape Pictet was placed, has been proved by our observations to be non-existent. The so-called island is in reality a part of the mainland, and the coast-line takes a very different course. As no Cape Pictet exists, I have transferred the name to a mountain.

Scoresby did so much at one stroke to increase our knowledge of the north-eastern coast of Greenland, that we can never feel sufficiently grateful to him. It must, therefore, not be taken as censure if I say that, like most other navigators, he was guilty of the fault of wishing to map far too much at too great a distance. It must not be forgotten

that low ground cannot be visible at a distance of 30 to 60 miles, for which reason the high mountains appear as islands and capes, the lower ground and valleys as sounds and fjords. Later on, when a complete survey is undertaken, it is often difficult to determine what the discoverer really meant when giving the names.

Concerning the question as to where Davy sound ends and King Oscar fjord begins, I have deemed it best to place the boundary between the two at an imaginary line drawn between Master's bay and Dréam bay, *i.e.* at about $72^{\circ} 10'$, corresponding to the position of Cape Pictet and the western end of the south outline of Traill island in Scoresby's map. In this way Davy sound has been given exactly the same limits as in his. Future investigations will prove whether it really sends any ramification to the south-west or not.*

When Clavering turned homewards in 1823, on the conclusion of Sabine's pendulum observations at Sabine island, he followed the coast towards the south, and after passing Cape Broer Ruys on September 7, as also the bay between Bontekoe island and the mainland, which he called Foster bay (at the head of which "several inlets and fjords were observed"), he continued his course south along the coast at the edge of the land-ice, which still lay unbroken 5 or 6 miles outside

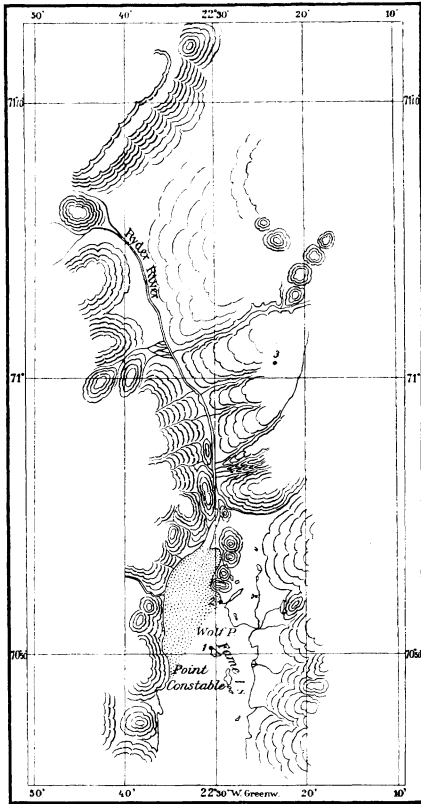


FIG. 8.—MAP OF THE NORTHERNMOST PART OF HURRY INLET AND THE SURROUNDINGS OF RYDER RIVER VALLEY, ACCORDING TO THE SURVEY MADE BY P. DUSÉN, 1899.† SCALE 1 : 500,000.

* The Danish expedition on board the *Antarctic*, 1900, has shown that I was wrong in supposing that Fleming inlet did not exist; but it is not so large as Scoresby supposed. Canning island was found to be a peninsula.

† The astronomical positions are from observations by F. Åkerblom :—

1. Lat. $70^{\circ} 50' 2''$ N., long. $22^{\circ} 30' 5''$ W.
2. „ $70^{\circ} 51' 9''$ N., „ $22^{\circ} 29' 5''$ W.
3. „ $71^{\circ} 0' 6''$ N., „ $22^{\circ} 23' 2''$ W.

the shore. On the evening of the 8th the vessel was far beyond Cape Parry, and till September 13 they were busied in warping and hauling the vessel through the ice, which was very compact. A strong N.N.E. storm occurred on the 13th, during which their position was at times very critical, until at last it was found possible to force a passage clear of the ice. Clavering's most important discoveries were made farther north, outside the limits here mentioned, but in his map there appear for the first time the two islands afterwards called Mackenzie island and Franklin island. According to the course shown on the map, he steered between the former island and the mainland, but outside the island last mentioned. His diary (with map) was not published till many years after his death.*

Sabine has also given a brief description † of the geographical observations on the coast in question, made during the same voyage. His map differs from Clavering's in one respect, viz. he represents the *Griper's* course to have been east of or outside Mackenzie island, while Clavering, as previously stated, makes the course run west, or inside of it.

Seventy years now passed before any new contributions were made towards our knowledge of this stretch of coast, when, in 1891, a Danish expedition was undertaken under command of Lieut. C. Ryder. ‡ The interesting discoveries made by this expedition in Scoresby sound and the mapping of the same cannot now be dwelt on. What is of interest for our purpose is the stretch of coast between Cape Broer Ruys and the Liverpool coast. Ryder in his map has marked with a special colour those tracts which were "mapped" by him, but it is patent that there can be no question of any real mapping, as the distance from the coast, as Ryder himself declares, was on an average 30 to 40 miles, while he adds, "This mapping may therefore be considered as a correction of the earlier maps as regards position, without laying claim to being satisfactory."

In our map we have followed Ryder's as regards the islands named after Bontekoe, Mackenzie, and Franklin; but it must be remembered that the position of these islands, more especially as regards the two last mentioned, is still only to be deemed approximate. The peninsula of Cape Parry has been incorrectly drawn by Ryder as an island, which is supposed to be separated from the land at Cape Freycinet by a broad arm of the sea. Traill island on Scoresby's map, *i.e.* that part south

* D. C. Clavering, "Journal of a Voyage to Spitzbergen and the East Coast of Greenland in His Majesty's Ship *Griper*," the *Edinburgh New Philosophical Journal*, vol. ix. Edinburgh: 1830.

† E. Sabine, 'An Account of Experiments to determine the Figure of the Earth,' etc. London, 1825. 4to, pp. 416-426.

‡ C. Ryder, 'Den östgrönlandske Expedition, utfört i Aarene 1891-92.' Förste Del, pp. 149-152. Meddelelser om Grönland, Heft 17. 1895.

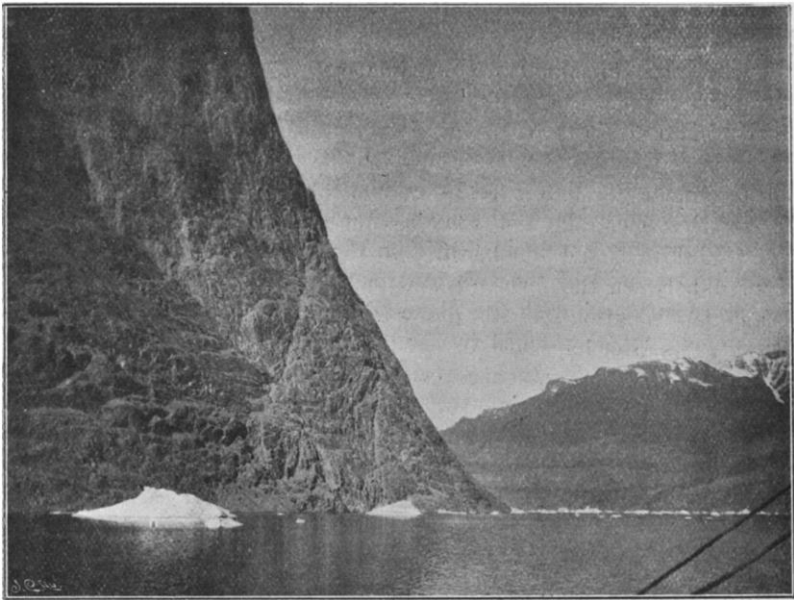


FIG. 9.—“ALTESTUPAN,” AN ALMOST PERPENDICULAR CLIFF (1500-1800 METRES PROBABLY) AT THE NORTH SIDE OF KAISER FRANZ JOSEF FJORD. AZOIC.

(From a photograph by P. Åkerblom.)

of Mountnorris inlet, has been made a separate island by Ryder, whereas Scoresby, as also in the case of Cape Parry, left it an open question. In this respect, therefore, Ryder's map is no improvement; moreover, he has moved not only Cape Parry, but also Traill island about 5 miles to the west. In accordance with our observations from Davy sound, which coincide with Scoresby's to a remarkable degree, the position of Scoresby's coast outline for Traill island may be quite correct; but as Ryder probably had some reason for the change made, this outline in the Swedish map has been placed somewhat more to the west than in Scoresby's, though I dare not aver that this is correct. In consequence of this, Cape Parry has again been moved somewhat to the east. Franklin island, which has not been moved, may possibly for this reason be placed too near the coast. It will be left to future expeditions to ascertain the exact facts.

The English Admiralty chart* had, curiously enough, as late as 1899, taken no notice whatever of Ryder's map of Scoresby sound, or the Danish charts published in accordance with it, but represents the coast in complete agreement with Scoresby's map. The name Davy sound has, for some reason or other—possibly from considerations of

* Admiralty Chart No. 2282, Arctic ocean and Greenland sea.

space—been placed in this chart just where King Oscar fjord really is, instead of between Traill island and Smith island. I cannot avoid calling attention to this, in order that undue weight may not be attached to the alteration introduced by the draughtsman.

With respect to the manner in which our map was executed, I entrusted the survey and mapping to Mr. P. Dusén, C.E., who, in a special paper in *Ymer*,* has given an account of the methods used. They may be briefly described as follows: After the measurement of a base-line about 2 miles in length on the eastern side of Kjerulf fjord, the neighbourhood of the two innermost ramifications of Franz Josef fjord were surveyed with the plane-table, a part only of Kjerulf fjord, which could not be reached by land, being filled in from a sketch by Dr. J. Hammar made during a canoe voyage. Taking the results so obtained as a starting-point, the rest of the mapping was carried out, by means of the plane-table, from the ship, for, owing to the calm weather which prevailed and the absence of currents, it was found possible to maintain a constant rate of 6 knots. At each change of direction, the time of which was accurately noted, the orientation of the plane-table was of course altered. The coast outlines in the narrower waters were sketched in by eye, but where well-defined points occurred on the shore, these were fixed by intersections. The

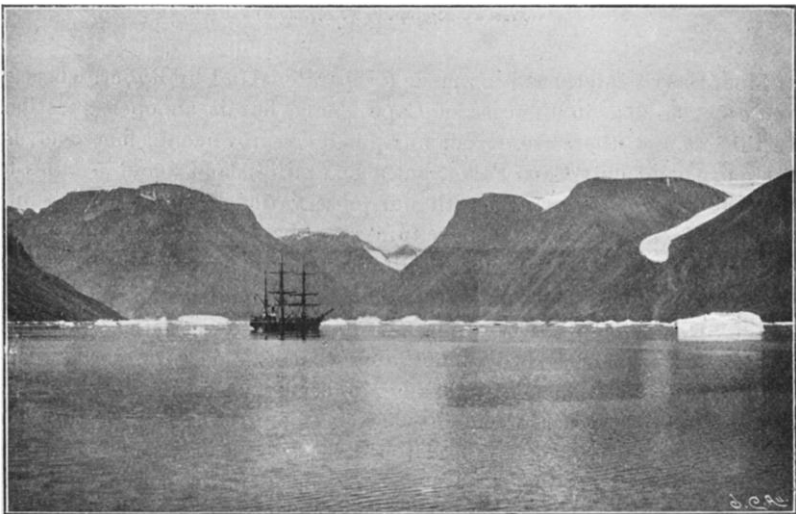


FIG. 10.—THE ANTARCTIC IN THE INTERIOR OF KAISER FRANZ JOSEF FJORD, NORTH OF KJERULF FJORD.

(From a photograph by P. Dusén.)

* P. Dusén, "Om kartläggningen af Kejsar Frans Josefs fjord och Konung Oscars fjord," *Ymer*, 1900, p. 229.

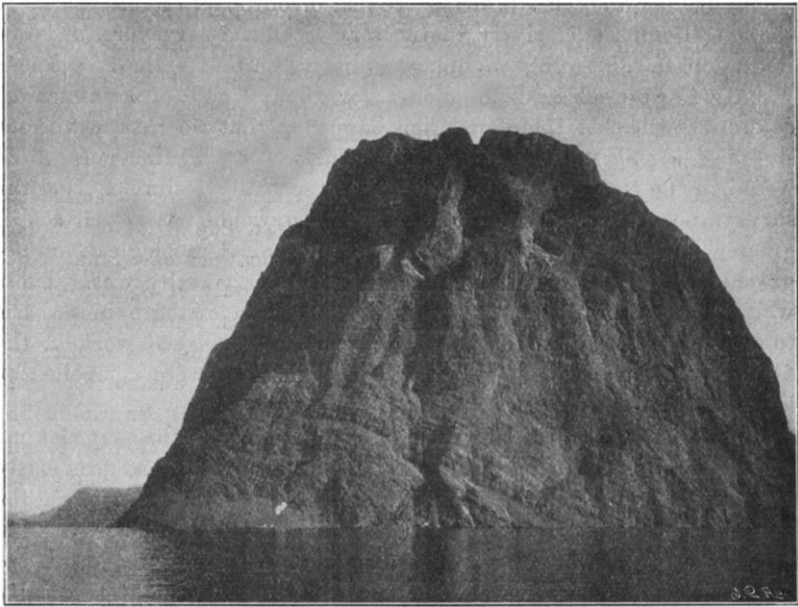


FIG. 11.—ELLA ISLAND (1210 METRES), SILURIAN STRATA, KING OSCAR FJORD.
(From a photograph by P. Dusén.)

work was controlled by a series of astronomical observations for latitude and longitude by Dr. F. Åkerblom,* while those made by the second German Polar expedition in the neighbourhood of Payer Spitze were also utilized, the correctness of the astronomical determination of position by the same expedition at Cape Franklin having been verified. Altitudes were either estimated or determined from the ship by the photographic method, the position at the time being known. For the topographic surveys the photographic method, which it had been proposed to adopt, proved impracticable owing to the nature of the country. The original map was constructed on the scale of 1 : 200,000.

When I saw how very extensive King Oscar's fjord was, with its many ramifications, I found myself in a somewhat difficult position. From the very first I found that I must choose between the mapping of the two fjords and their scientific investigation, as the time at our disposal could not possibly be sufficient for both. As a matter of course, under such circumstances I regarded the mapping as the most important, as it was very uncertain whether so favourable an opportunity

* F. Åkerblom, "Positions géographiques déterminées par des observations astronomiques faites pendant l'expédition suédois, au Grænland en 1899." *Översigt af Kgl. Vetenskaps Akademiens Förhandlingar*, 1900, p. 763.

would ever again occur. During the rest of our stay, therefore, I made the vessel work exclusively in the service of the surveyors, and our investigations on shore were almost entirely limited to those occasions when we were obliged to anchor for the purpose of astronomical determinations. It therefore often happened that we passed without stopping a good many places the scientific investigation of which would, in one respect or another, have been specially desirable. Had the surveys not been undertaken, the expedition would have been a still greater success as regards geological, botanical, zoological, ethnographical, as also hydrographical results than it really was. Those who follow in our footsteps have now, however, a cartographical basis to work from, and should therefore be able to do good work in the directions mentioned. The researches which we were compelled to leave are still to be made.

In addition to what has already been said about the map, let me make a few remarks concerning two mountains which had previously been named. The one is Petermann Spitze in Franz Josef fjord, the height of which is given in the German map as 3480 metres (11,420 feet), and even, in *Petermanns Mitteilungen*, 1871 (title-page and table of contents), as 4267 metres (14,000 feet). That this height is greatly over-estimated was evident, but as we could obtain no intersections, but only photographs and bearings from one and the same direction, no accurate determination has been possible. Probably it is not very far from the truth to consider the altitude as between 2500 and 2800 metres (8000 to 9000 feet).

The second mountain, or rather chain of mountains, is that described by Scoresby as Werner mountains. On our way north from Scoresby sound to Franz Josef fjord, these high summits, as described by Scoresby and Ryder, were seen from afar rising considerably above their surroundings. But on our proceeding along the south-western side of King Oscar fjord, the mountains in question, or at least the greater part of them, were probably hidden by the high side of the fjord, for we could not recognize them with any certainty. The name has, however, been entered in the map at the same spot as in Scoresby's and Ryder's, but the figures of altitude cannot relate to the highest summits.

As I propose to give an account of the geology of the region in another publication, I will here but mention briefly its chief characteristics. Quite in the west there occur crystalline rocks—gneiss, mica-schist, and quartzite. Farther east—roughly east of an imaginary line from the west mouth of Antarctic sound to Polhem valley, and north and south in the same direction—the place of these is taken by formations of red, grey, and green schist, yellow sandstone, grey and black limestone, etc., belonging to the Silurian system. Whether Cambrian rocks are to be found in this series, I cannot say. East of the Silurian formation, *i.e.* approximately east of an imaginary line running from

Cape Weber to a little east of Ruth island, and still further, there is a vast series of Devonian sandstone (old red), the lowest chiefly greyish green, the uppermost red, in which I subsequently found *Holoptychius nobilissimus* and a new *Asterolepis*, determined by Mr. A. Smith Woodward, of the British Museum. East of this spot we find on the coast volcanic post-Devonian rocks, diabase or basalt, as also granite and syenite (probably also post-Devonian), the latter not unlike those of the Christiania fjord.

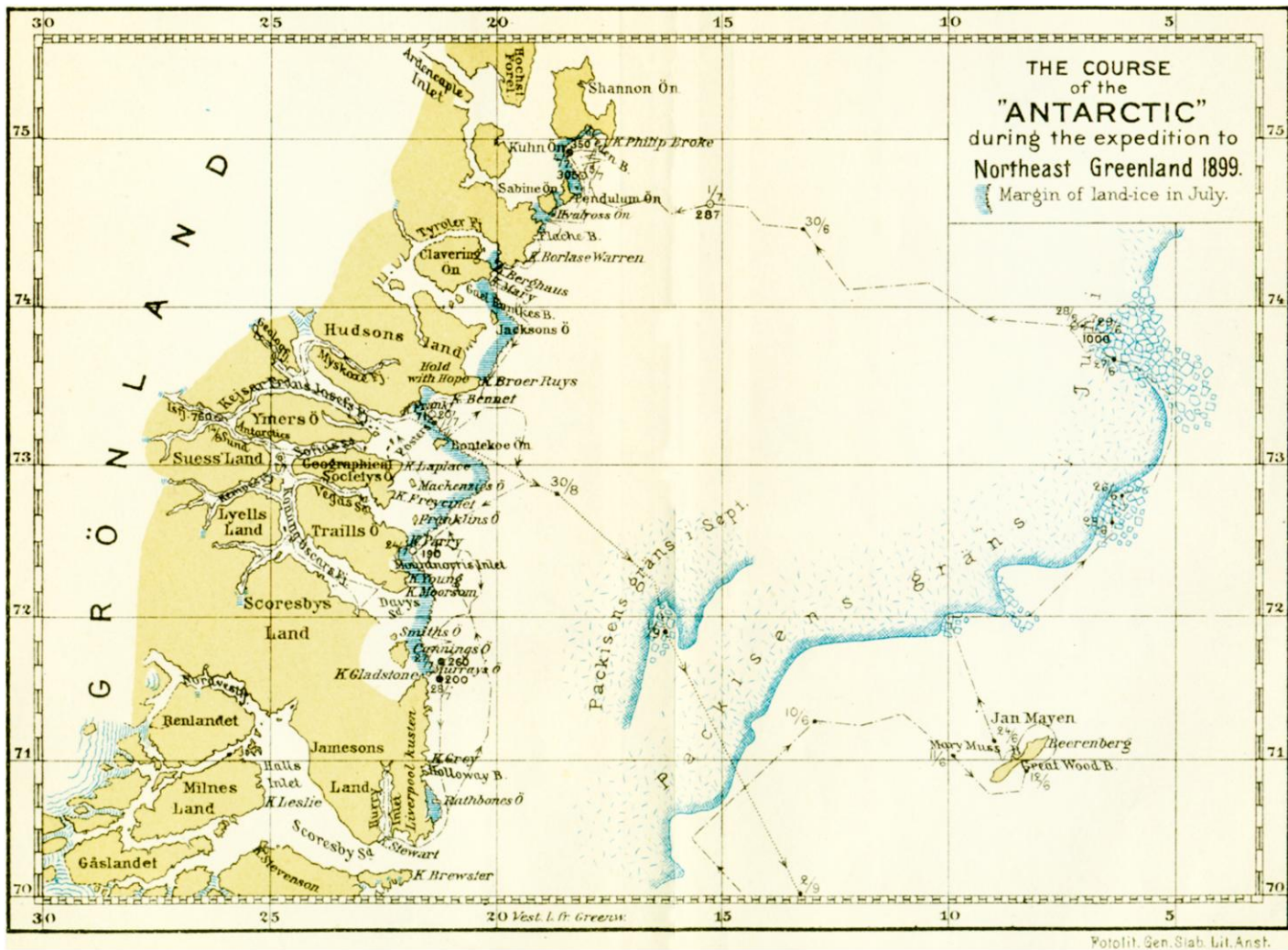
Although at various points, more especially in Antarctic sound, the Silurian rocks exhibit a folded structure, and may even be tilted up almost vertically, as, *e.g.*, in Syltopparne, there is some reason for uncertainty as to whether a real folded mountain chain occurs. In Mount Berzelius, the Teufelsschloss, at the Geologists fjord, and many other places, the strata are horizontal. In any case the folding, if such there be, must have taken place before the deposit of the Devonian strata, for they show merely local disturbances, or but slight dips. Whether the Devonian sandstone in the south part of King Oscar fjord has a superstratum of other kinds of sandstone, belonging to a somewhat more recent system, I will not discuss here.

Nor will I dwell on the very interesting dislocations (faults) that are found in several places, but only mention that *Mytilus edulis* and *Cardium groenlandicum* occur in a fossil state, together with *Astarte*, *Saxicava*, etc., in shell-banks and raised beaches, formed when the sea was higher than at present. Of these the first-mentioned species is of the greatest interest, as hitherto it has not been found either living or as a fossil north of Angmagsalik, $7\frac{1}{2}^{\circ}$ farther south.

THE ORIGIN OF MOELS, AND THEIR SUBSEQUENT DISSECTION.

By J. E. MARR, M.A., F.R.S.

1. ORIGIN OF MOELS.—It is well known that, when bare rock is exposed at the surface of the ground in upland regions, the ultimate outlines of mountains which have been shaped by denudation depend upon the climatic conditions. In arid regions, whether of frost or desert, the mountains possess what is known as house-roof structure, and exhibit straight sides; whereas when running water in the form of streams exerts a dominant influence on the sculpture of mountains, the mountain eventually shows a cross-section consisting of two logarithmic curves, of ever-increasing steepness as they rise from the base of the mountain; these curves meet at the mountain's summit. In regions where running water exercises a marked influence upon the character of the surface contours, the existence of a covering of vegetation produces considerable modifications in the superficial features. Vegetation, as is well known, tends to check transportation by running water, for the water sinks into the vegetable matter, and is discharged slowly, and accordingly a tract of land occupied by vegetation will, under similar conditions, possess fewer streams than a tract in which the surface is occupied by solid rock. At the same time, the existence of the vegetable matter assists weathering of the underlying rock, owing to the solvent organic acids supplied by the vegetation, and to the



KING OSCAR FJORD AND KAISER FRANZ JOSEF FJORD

From a survey by
P. DUSEN

of the
SWEDISH EAST GREENLAND EXPEDITION 1899.

Scale of Miles
0 10 20 30
Nat. scale 1:1,000,000 or 15.78 miles-in.
Astronomical Positions by FAKERBLOM.

30
73
30
72



Explanation

- ⊕ Observation of Latitude and Longitude.
- ⊖ Obsⁿ of Latitude only.
- ⊙ " " Longitude
- ⚓ Anchorages.
- △ Ruins of winter huts of the Esquimaux.
- △ Ground of summer tents of the Esquimaux.
- Heights in feet.
- Depths in fathoms.
- The dotted coast lines are copied from the maps of Scoresby of the Second German Polar expedition and of Lieut. Ryder



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Scale of Miles
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Astronomical Positions by FAKERBLOM.

30
73
30
72
27 26 25 24



Explanation

- ⊕ Observation of Latitude and Longitude.
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