GEOLOGICAL SURVEY OF CANADA

G. M. DAWSON, C.M.G., LL.D., F.R.S., DIRECTOR

REPORT

OF AN EXPLORATION ON

THE NORTHERN SIDE OF HUDSON STRAIT

BY

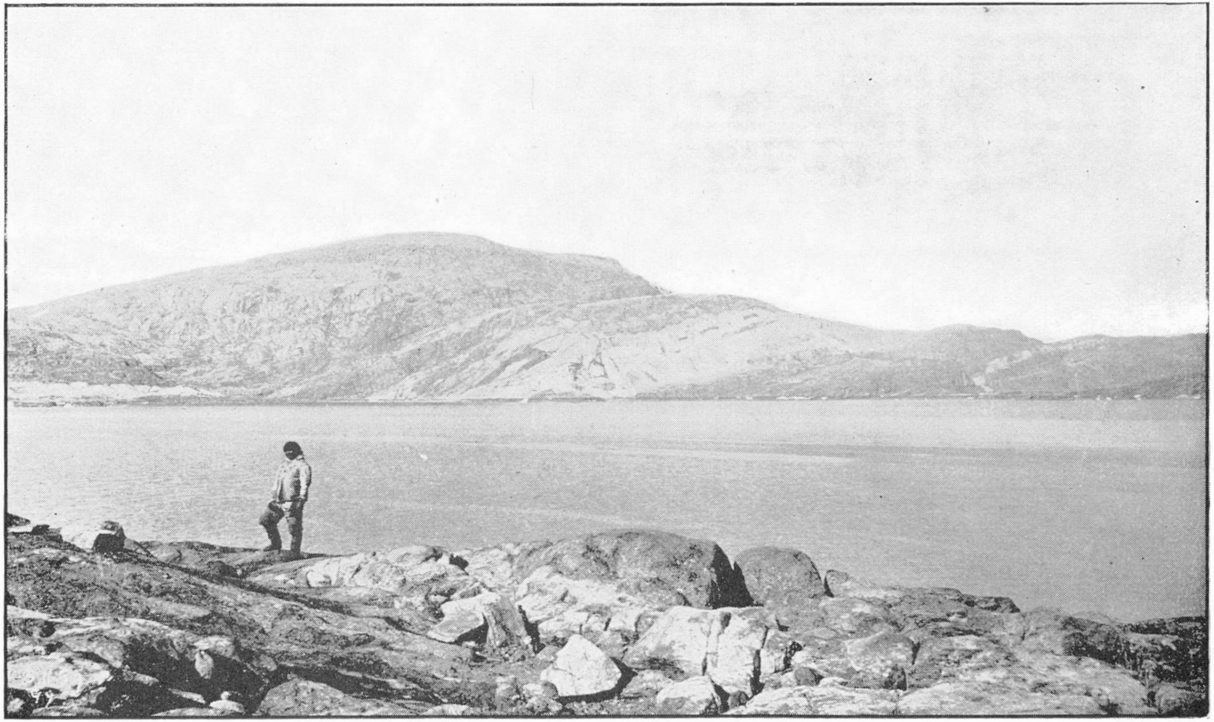
ROBERT BELL, M.D., LL.D., F.R.S.

OTTAWA

PRINTED BY S. E. DAWSON, PRINTER TO THE QUEEN'S MOST EXCELLENT MAJESTY

1901

713



R. Bell, Photo., 1897.

NEAR BRUCE HARBOUR, LOOKING NORTH.
Showing band of white crystalline limestone.

To G. M. Dawson, C.M.G., LL.D., F.R.S., &c.,

Director Geological Survey of Canada.

Sir,—The accompanying report on my field-work of 1897, on the northern side of Hudson Strait, contains fuller descriptions than the summary report, already published, as to the topography of the region surveyed or explored, together with all the details in regard to its geology, which are considered worth mentioning. Some general information on Baffin Land is also given. The appendix contains lists of the plants and insects obtained during the season. These will serve to supplement the published lists of similar collections which I made in Hudson Strait in 1884 and 1885, when many specimens were also secured in other departments of zoology and lists of the species published in my reports for those years. The illustrations are selected from my photographs as characteristic examples of the scenery of the coast. The topography and geology of the north side of the strait are reduced from my track-surveys, originally plotted on a scale of 4 miles to 1 inch, and which required only slight adjustment to bring them into correspondence with the numerous observed latitudes and longitudes.

I have the honour to be, Sir,

Your obedient servant,

ROBERT BELL.

Ottawa, December, 1900.

NOTE.—*The bearings throughout this report are given with reference to the true meridian.*

REPORT

OF AN EXPLORATION ON

THE NORTHERN SIDE OF HUDSON STRAIT

BY

ROBERT BELL, M.D., LL.D., F.R.S.

My summary report for 1897 contains a general account of my exploration of that year on the northern side of Hudson Strait, or in the southern part of Baffin Land, including a sketch of the geographical and geological results. The present report is intended to give a fuller description of the topography and geology of this comparatively new region, together with many facts which were observed in reference to its physical features, natural history, botany, climate and other matters which may be of interest or value. As stated in the above mentioned report, the opportunity for making this exploration was afforded by the sending out of the sealing steamer *Diana* by the Department of Marine and Fisheries to make investigations in the strait for other purposes.

Objects of this report.

Diana expedition.

I was provided with a small yacht at Halifax, which was carried on the deck of the steamer, and a crew of four sailors was engaged to accompany me to the field of operations, but I had no assistant. The *Diana* left the above port on the 3rd of June, and our course lay through the Strait of Belleisle, which was clear at that season, but owing to ice encountered off Hamilton Inlet, it was the 22nd of June before we entered Hudson Strait, which was found perfectly free of ice. Owing to the ship keeping too near the north shore in going through the strait, we became jammed in ice off Big Island, which stands out prominently like a great pier projected from that side and intercepts the drifting shore-ice. This contretemps delayed us considerably, and it was therefore not till the 12th of July that the *Diana* had completed her first voyage into Hudson Bay.

Enter Hudson Strait.

Enter Hudson Bay.

It was originally intended that I should be landed at a point in the vicinity of Kings Cape, or as near as possible to the junction of the north-east side of Hudson Strait with the east shore of Fox Basin, but this was found to be impracticable at the time we happened to arrive near that point on account of a rapidly moving ice-floe. Eventually I commenced work at Ashe Inlet in Big Island. Before leaving the *Diana* the plan agreed upon was that I should proceed north-westward up the coast as far as possible, consistent with a tolerable certainty of being able to return to Ashe Inlet in order to meet the ship there on the 10th of September, so as to be taken to St. John's, Newfoundland, as arranged by the Minister of Marine and Fisheries. Had the captain of the *Diana* succeeded in landing me at Kings Cape, I could probably have explored about double the length of coast that was possible under the new arrangement. Owing to the very imperfect knowledge of the coast in the neighbourhood of Kings Cape and beyond it, and the absence of any chart showing the coast even approximately, it was impossible to appoint a place to meet the ship in that vicinity, otherwise I might have kept on till I fell in with her. Being therefore obliged to go twice over the same ground, to say nothing of the delay in getting to Ashe Inlet, I was able to accomplish little more than half of what could otherwise have been done. Still, I managed to complete a good track-survey as far as Chorkbak Inlet, over a length of 250 miles of coast, checked by many observations for latitude and longitude, in addition to a traverse all around Big Island, 30 miles in length and 16 in breadth, surveys of numerous inlets and of a route for 50 miles into the interior, to the shores of Lake Mingo, lying close alongside Lake Amadjuak, which was also seen and bearings taken to various points on its shores. Having completed the above, I returned to Ashe Inlet, which was reached ten days before the date appointed. The interval was filled up by an exploration around North Bay nearly to Icy Cape, which lies east of Big Island. On the return voyage the *Diana* passed close to the north end of Akpatok Island, which had heretofore been supposed to be a separate island to which the name of Green Island had been given. Having rounded the north-east point of this island, we coasted southward along part of its eastern side, stopping for a day at anchor midway down. This afforded me an opportunity of landing to examine the rocks, which were described in my summary report. It is unnecessary to repeat the notice of the remainder of my return journey to St. John's and Ottawa, which is given in the Summary Report for 1897.

Plan of operations.

Length of journey doubled.

Work accomplished.

Akpatok Island.

Dimensions and Area.

Baffin Land one island.

The territory, now known as Baffin Land was, until about 1875, supposed to consist of different islands known as Cockburn Island, Cumberland Island, Baffin's Land, Sussex Island, Fox Land, &c. It seems to be now established that these are all connected and that there is but one great island, comprising them all, to which the name Baffin Land has been given. It forms the northern side of Hudson Strait, its southern extremity being in latitude 61° 42′, opposite Cape Chidley, and it extends in a north-westerly direction to latitude 74° 00′. It has a length of about 1,005 English statute miles with an average breadth of 305 miles, its greatest width being 500 and its least 150 miles. Its area approximates 300,000 square miles, and it therefore comprises about one tenth of the whole Dominion. It is the third largest island in the world, being exceeded only by Australia and Greenland.

Dimensions.

Area.

Discoverers.

The land around Frobisher Bay was discovered by Sir Martin Frobisher in 1576. Captain John Davis discovered Cumberland "Island," now known to form the eastern part of Baffin Land, in 1585. The northern part of the great island was discovered by Captain William Baffin, in 1616. It was, until recently, called Cockburn Island, although it had been named Baffin's Island or Baffin's Land by Lieutenant (afterwards Admiral) E. W. Parry, in 1821, 'out of respect to the memory of that able and enterprising navigator.' These lands therefore formed part of the British possessions in North America, by right of discovery, dating from periods of 143 to 183 years before the acquisition of Canada. They were formally transferred to the Dominion by Order-in-Council of the Imperial Government on the 1st September, 1880, together with all the islands of the Arctic archipelago lying to the northward of the mainland of the continent.

Discovery.

Transferred to Canada.

Narrative and General Description.

For a short narrative of my season's operations and a brief general description of the portions of the coast and interior examined, I cannot do better than quote the following from my summary report, written very soon after my return:

Narrative of operations.

The *Diana* brought me to Ashe Inlet on the 19th July, and my yacht was launched there on the 20th. The following day the wind blew too strongly for us to get out of the inlet and the time was spent in fixing its position relatively to other geographical features of Big Island, as a commencement of a track-survey of the coast. On the 22nd we made a start to windward, intending to pass up on the outside of Big Island. Before leaving the inlet, early in the morning, we

Land at Ashe Inlet.

Eskimo guide

fortunately found an Eskimo who had some knowledge of the English language and was acquainted with the south coast and the southern interior of Baffin Land, and I engaged him to go with us as guide and interpreter for the whole of our journey. He had slept near our anchorage and had nothing with him but a gun.

Take inside passage.

The hull of our yacht was made of one inch white-pine boards. She was, therefore incapable of contending with the ice, and our safety lay in avoiding it altogether. We had not gone many miles up the outer coast of Big Island, when we met an ice-pack lying in our course as far ahead as the eye could reach. Our Eskimo guide now advised us to try the passage between the island and the mainland, and accordingly we turned back and attempted to get round the south-eastern extremity, but on account of the wind failing us altogether we were able to make only about six miles to the south-eastward of Ashe Inlet. Here we discovered a much better harbour than Ashe Inlet, and I named it after Reeves, our sailing master. It is about a quarter of a mile in diameter, has two deep narrow entrances, a good bottom for holding and a depth of from five to fourteen fathoms at low water. The next day we rounded the south-eastern extremity of Big Island, which is about thirty miles long, but owing to a strong north-west wind we were obliged to anchor for the night among some small islands lying north-east of this point. It was fortunate that we took this route, as we found the family and relatives of our guide camped on the lower end of the island, and he was now able to make arrangements with them for his absence till September. He had not previously told us anything about his people.

Reeves Harbour.

Four harbours discovered.

At this season of the year there was continuous daylight in Hudson Strait during the whole twenty-four hours, and we sailed at two o'clock the following morning (24th) and made a track-survey of the inner side of Big Island as well as of a part of the main shore opposite. Two good harbours were discovered on this side of the island towards the northern end, and two more on the coast of the mainland in this vicinity.

Archipelago 25 miles wide.

In proceeding north-westward up the coast from Big Island the shore began to be fringed with innumerable rocky islands thickly clustered together. The breadth of the belt or archipelago increased as we advanced, until we approached the long inlet or fiord called Chorkbak, where our exploration ended. Here the islands became less numerous. The maximum breadth of the archipelago is about midway between Big Island and this inlet, and is about twenty-five miles. The islands vary in size from ten miles in length down to mere rocks. The spaces between the large ones are filled up with smaller islands having a great variety of dimensions and form. As a rule, the largest and highest islands lie towards the mainland, while the outermost ones are smaller and lower. In sailing among these islands it was only when near the outer edge that we could see a clear horizon to the southward.

The whole coast is rugged and for the most part mountainous. The innermost islands interlock with the bays and points of the mainland in such a manner that it is impossible to know without the aid of a guide whether one has reached the main shore or not. On ascending the higher hills or mountains of the outer ranges on the mainland, long channels of the sea can be seen running inland in different directions among the hills, which so closely resemble those among the adjacent large mountainous islands that only a person already acquainted with the geography could trace the coast-line of the mainland. The larger islands are equally hilly and rugged and the channels between them are usually not wide. Viewed from the top of a distant hill, so that the intervening channels cannot be seen, the eye fails to detect any difference between the general appearance of the islands and the mainland. The conditions may be best described if we imagine a rough mountainous country, rising as a whole gradually to the northward, to have been half submerged. The outer islands, which are also the smallest and most scattered, represent the more completely sunken hills, while as we proceed inward the progressingly larger and larger ones represent the less and less submerged areas and ranges, until, at last, we find only narrow channels of the sea running into the solid land. Besides these narrow and sometimes tortuous channels, numerous wide and tolerably straight fiords run inland. These generally have high hills on either side of them.

Mountainous coast.

Many channels.

The islands.

On leaving Big Island, it soon became evident that it would be impossible to make an instrumental survey of any considerable part of such a coast as this in the limited time that would be at my disposal, and that this time would be most advantageously spent in making the best track-survey possible under the circumstances, especially as it was necessary to devote a portion of the time to geological observation. I therefore determined to keep an accurate record of all the courses we followed among the islands or up the fiords, under the guidance of our Eskimo pilot, and also as good an estimate as possible of the length of each course, plotting them on diagrams as we went along. On these diagrams the relative positions of all the surrounding points, bays, islands, hills, &c., were also marked by the aid of many cross-bearings

Character of survey.

Astronomical observations.

and estimated distances. Observations for the latitude and the variation of the compass were taken every day, and I also obtained numerous sights for longitude.

Good harbours.

The coast abounded in good harbours, and careful sketch-plans with soundings were made of all those that we visited. The heights of numerous hills, which I climbed, were ascertained by barometer. A sufficient number of photographs for illustration were obtained; notes were recorded on all subjects that might be of interest in regard to this little-known region, whether from personal observations or from information supplied by the natives.

Observations and collections.

Weather.

From the time of our leaving Ashe Inlet, on the 21st of July, until we returned to it again on the 1st of September, the weather was mostly fine and bright, although cold upon the water, but we suffered much delay from calms. The main obstacle to our progress, however, was the field-ice, which appeared to have come into the strait from the eastward during the winter or early spring, and to have insinuated itself into every channel and fiord. When not tightly packed, it was constantly moving hither and thither under the influence of the rapid and changeful currents generated by the high tides of the strait.

Calms

Field-ice.

Tides of Hudson Strait.

The height of the mean tide at Big Island was ascertained by Mr. Ashe to be 30 feet, and the time of high-water at full and new moon to be 9h. 32m. Farther west we could not determine the time of high or low water, which was irregular, on account, apparently, of the effect of the reflux from Hudson Bay upon the in-coming or out-going tide of the strait; while the local conditions, such as the directions, divisions, depths and widths of the channels still further complicated the problem. In trying to navigate our frail yacht in the open spaces, the heavy ice would set down upon us or run together and threaten to crush our little vessel in the most unexpected manner. Our undertaking was, therefore, constantly accompanied by great danger and anxiety, and it was only by constant vigilance night and day that we were fortunate enough to escape any harm during the entire trip.

Amadjuak Bay.

When we had reached a point a little beyond the entrance of Amadjuak Bay, we found the ice closely packed among the islands all around us. But the next morning the wind or tide had opened a lane up the fiord itself and I explored it to its extremity. The ice outside still remained packed, and in order to utilize the time most profitably, I determined to make an exploration into the interior of the country. Two seamen were left in charge of the yacht with instructions to make lines of soundings in the fiord, and with the other two and the Eskimo

Journey inland.

guide, I started on a journey northward towards Amadjuak Lake, one of the bays of which was supposed to be at no great distance from this part of the coast. It proved, however, to be upwards of fifty miles inland. This journey occupied seven days, and the results will be described further on. When we returned to the head of the fiord, the sea was found to be open and we immediately set sail to continue the westward exploration of the coast.

On the 22nd of August we had reached Chorkbak Inlet, and in case of being detained by calms or head winds on our return journey, I judged it prudent to turn back from this place in order to be sure of being able to keep our appointment to meet the *Diana* at Ashe Inlet on the 10th of September. In returning I followed a course which lay outside of that of the westward journey, so as to make a second line of track-survey among the island belt and of the outside of Big Island. We had fairly good weather and anchored again in Ashe Inlet on the 1st of September. In order to fill up the time with advantage till the 10th, I ran across to the main north shore opposite the island and explored it topographically and geologically nearly to Icy Cape. I then returned to Asle Inlet before the 10th, but owing to stormy weather, the *Diana* was not able to enter until the 12th. It only required two or three hours to transfer our outfit and surplus stores to the steamer and to dismantle the yacht and make her ready to tow across the strait to Fort Chimo, where I proposed to leave her, as it was not considered advisable to risk taking her to St. John's. Newfoundland, on the deck of the *Diana*. On the following morning we reached the northern extremity of Akpatok Island in Ungava Bay, and after coasting along the eastern side of the island we anchored close to the shore about half-way to the southern extremity. This afforded me an opportunity of landing in order to take photographs, examine the rocks, collect fossils and ascertain the heights of some of the cliffs and hills by the barometer. This was so far as I am aware, the first landing of a white man upon this island. Its position and general form and direction are erroneously represented upon the latest charts. The hypothetical "Green Island" of the charts corresponds with the northern part of Akpatok Island as determined by the observations of Captain Whiteley, and it is probable that this, seen from the northward, was mistaken for a different island.

Turn back from Chorkbak Inlet.

Rejoin the Diana.

Land on Akpatok Island.

General Aspect.

Baffin Land has the usual sub-arctic climate and is destitute of trees. The rocks are principally Laurentian, not only in the portion which

General nature of the rocks.

I explored, but also all along the north-eastern coast, judging from the accounts of Dr. Franz Boas, who has travelled over the greater length of this side of the island, as well as from other evidence. The island has a generally mountainous, or hilly and barren aspect, but from the western shore bordering on Fox Basin a considerable area of flat Silurian limestone extends inland to Lake Nettilling and there are also areas of similar rocks in the northern parts of the island. In some districts comparatively level Laurentian areas occur. These level portions are the favourite haunts of the reindeer in summer. At this season the rocky Laurentian hills have generally a dark or nearly black appearance, owing to a growth of lichens upon them, but this sombre character is often relieved in valleys and on hill-sides by strips and patches of green, due to grasses and sedges in the lower parts and to a variety of flowering plants on sheltered slopes exposed to the sun. The landscape is further relieved by long banks and smaller patches of white where the last of the snows of perhaps several winters remain in shaded places.

Aspect.

Flat Silurian limestone.

Green portions.

Ice in valleys.

In two valleys of the interior I found accumulations of ice resembling small glaciers, but which had evidently been formed mainly by the constantly overflowing and simultaneous freezing in the winter of streams that in the summer run under the ice or in canyons they have cut through it.

Mountains and Glaciers.

Direction of ranges.

The mountains of Baffin Land may be grouped as three principal ranges, all running north-north-westerly nearly parallel to the eastern side of the island and the western coast of Greenland, the north-eastern or outmost range being the highest and the south-western the lowest.

Elevations of the high lands.

According to Dr. Franz Boas, the high interior of Baffin Land, lying just north of Cumberland Sound, is apparently all covered with ice like the interior of Greenland. Around the margins of this ice-cap the general elevation above the sea is about 5,000 feet, and it rises to about 8,000 feet in the central parts. Another area of smaller extent, but apparently equally high, lies a short distance to the north-west of the one just described. The high land, mostly ice-covered, lying north-east of Cumberland Sound and stretching over to Exeter Sound, is probably at least 5,000 feet high. Large portions of the northern interior are over 1,000 feet above the sea, often nearer 2,000 feet while the higher parts of these areas may be 3,000 feet or more. The mountainous region between Frobisher Bay and Cumberland Sound appears to have an elevation of between 2,000 and 3,000 feet. The southern extremity of the island, between Hudson Strait and Frobisher Bay, is covered by the Grinnell glacier, between 70 and 100 miles in length from south-east to north-west, between latitude 62° and 63°, with a breadth of about 20 miles. The smooth summit of the glacier is distinctly visible from vessels in Hudson Strait in certain conditions of the weather. I have been told that one narrow stream of ice from its southern side reaches the water of the strait, but I was unable to verify this. The rough existing charts represent the northern side of the glacier as sending ice down at two or three places into the heads of inlets of Frobisher Bay. The Eskimos call the Grinnell glacier Ow-u-i-to, and my guide, Twimi, knew of only one point at which it discharged into the sea. This place is called Pak-a-lui-a, and is not far to the north-west of Resolution Island. This man stated that all the icebergs which enter and pass up the strait, and which are well known to be of small size, come from Pak-a-lui-a. He also informed me that in the same neighbourhood, or at the second principal point north-west of Gabriel Strait, codfish are very abundant and many of them of large size. During my visit to these regions in 1884 and 1885 vague reports reached me of the existence of glaciers on some parts of the shores of Fox Basin, but as no icebergs have been seen in the basin nor any known to come out of it, should there be any land ice in that direction it does not appear to reach the sea. No glaciers, even of small size, are known to occur in Labrador, and there are probably none in southern Baffin Land or elsewhere to the west of the Grinnell glacier.

Grinnell glacier.

Codfish abundant.

In the southern part of the great island, or along the north-east side of Hudson Strait, the land is high all the way from Resolution Island to Fair Ness, the mountains near the coast rising from one to two thousand feet above the sea, but some of those which I saw in the interior at a distance of about one hundred miles north-eastward of Fair Ness, appeared to be much higher and were capped with snow. The prominent point just named marks the termination of the outer high range on the north side of the strait and behind it is Markham Bay, with a breadth of fifteen miles. On the north side of this bay the land becomes much lower and, except in a few places, it continues so to beyond Chorkbak Inlet, but as we approach the vicinity of Kings Cape, or Sik-o-su-liat, the height again becomes a thousand feet or more. The Eskimos informed me that the high and rugged land, (Laurentian) of this promontory, continued northward up the east side of Fox Basin to the Koukdjuax River, which flows out of Lake Nettilling. Beyond this the shore of Fox Basin becomes low and flat for a considerable distance. This condition, as elsewhere explained, is

Character of coast.

believed to be due to the presence of beds of Silurian limestones lying almost horizontally.

Lakes.

Judging from what I saw of the interior of Baffin Land on my journey to Lake Amadjuak and on my return by a somewhat different route, the mountains are everywhere interspersed with lakes. Two of them are known to be of great size. Lake Nettilling is propably about 140 English statute miles in length, by 60 in breadth. Lake Amadjuak may exceed 120 miles in length by 40 in breadth in its central part, so that their united area must be very considerable. The greater diameter of each of these lakes lies north-west and south-east, or parallel to the mountain ranges. Lake Mingo, whose outlines and dimensions were sketched by the aid of numerous bearings and estimated distances, has a somewhat rounded or compact form and is at least 15 miles in diameter. It lies close to the south-western side of Lake Amadjuak and discharges into it by a very short river, which the Eskimos informed me has only a moderate current, adding that they paddle through it either up or down stream in their kyaks. I would therefore assume that the difference of level between these lakes does not exceed ten feet. Lake Mingo was found by barometer to be just 300 feet above the level of the sea, so that the elevation of Lake Amadjuak will be about 290 feet. The natives, including my guide, who have seen the Koukdjuax River, which discharges this lake into Fox Basin, with a course of some fifty or sixty miles from its western bay, describe it as a very large stream with numerous rapids. This is only what might be expected, since the rate of descent is probably five or six feet per mile. Various reports reached me of a large lake lying not far from the head of Frobisher Bay, but these may refer to Lake Amadjuak, which extends in that direction. The lakes, of which sketches were made on my journey from Amadjuak Bay to Lake Mingo, are shown on the accompanying map, and they will be referred to further on in describing the geology of the routes followed in going and returning.

Two great lakes.

Lake Mingo.

Koukdjuax River.

Origin of Hudson Strait.

Fox Channel or the southern part of Fox Basin is a continuation of Hudson Strait, and the deep submerged valley in which they lie has a straight north-westerly course of 700 miles. Hudson Bay is comparatively shallow. The bottom is very even and from 70 to 100 fathoms in depth over great areas. Its outlet falls, at right angles,

Soundings.

into the channel of Hudson Strait, in which the soundings range from 200 to upwards of 300 fathoms. The origin of the straight and deep depression in which Hudson Strait and Fox Channel lie, is probably of very ancient geological date. In the great Archæan regions of northern Canada, I have elsewhere shown that the long straight channels of numerous narrow lakes and direct river courses are due to erosion commenced along decomposing dykes of igneous rocks, and that the depressions so formed have, in some cases, been subsequently enlarged from time to time by denudation. Sometimes a group of dykes or fissures produces the same effect as a single dyke. The depression of Hudson Strait and Fox Channel may have originated in this way. My first published suggestion of this is contained in a paper on Glacial Phenomena in Canada, printed in vol. I. of the Bulletin of the Geological Society of America, 1880, p. 300.

Ancient origin.

Erosion along dykes.

In preglacial times, when the northern portion of the continent was elevated considerably above its present level, this valley was situated on the dry land probably as far down as the existing general line of the Atlantic coast, as its depth increases from north-west to south-east or from the interior towards the ocean, and the ice-sheets of the glacial period moved from the high land on both sides directly towards and into it and then down the valley itself, as shown by the striation and the materials of the drift. The few soundings which have been taken eastward of the mouth of the strait would seem to show that its channel continues outward in the same direction, in the bottom of the sea, with comparatively shallow water immediately south of it. This latter section is overlooked by the mountains running in that direction from Cape Chidley. A preglacial river, exceeding in size any of those at present existing in North America and whose branches traversed the dry bed of Hudson Bay, coming together in its north-eastern part, probably flowed down this valley into the Atlantic.*

Direction of movement of ancient glaciers.

Geology of Baffin Land.

In the course of the voyage of the Canadian Government expedition steamer *Neptune* in 1884, and of the *Alert*, sent out on similar service in 1885, I made some notes on the geology of the northern side of Hudson Strait, principally in reference to Big Island and its vicinity.† The results of the work of 1897, embodied in the present report, and which are supplemented by the notes just mentioned, constitute the

Sources of geological information.

* On a Great Preglacial River in Northern Canada. Scottish Geographical Magazine. Volume XI., 1895, p. 368.

† Report of Progress, Geol. Surv. Can., 1882-84, pp. 1-62 DD, and Annual Report Geol. Surv. Can., vol. I. (N.S.) 1885, pp. 1-25 DD.

principal knowledge of the geology of Baffin Land available up to the present time. In Dr. Franz Boas's general description of this great island,* based on his own observations after a residence there of two years, a few notes are given in regard to the geology of some of its northern parts and of the region of its great lakes, which I shall quote, together with a few observations made by others, before proceeding to give the results of my own investigations in the southern part of the island in 1897.

Silliman's Fossil Mount.

A very small outlier of nearly horizontal beds of fossiliferous limestone, shale and marl occurs at the head of Frobisher Bay, in the form of a crumbling hill, resting on the northern flank of the Laurentian range on its south-western side. It was discovered by Captain C. F. Hall and named by him Silliman's Fossil Mount.† Collections of fossils from this hill have been made by different persons. These have all been examined by Mr. Charles Schuchert and reported on by him in a paper on The Lower Silurian (Trenton) Fauna of Baffin Land, in which he gives lists of all the species.‡ They correspond with those which I obtained on Akpatok Island, determined by Dr. Whiteaves § and Mr. Schuchert considers the rocks of both localities to belong to the Galena division of the Trenton group which also occurs on the lower part of the Nelson River, as well as at Stony Mountain and on the west side of Lake Winnipeg in Manitoba. Silliman's Fossil Mount is described as being in latitude 63° 44′, longitude 68° 56′ W., or three miles south of the (mouth of) Jordan River and one mile from tide water. It has a length of 1,000 yards from north-west to south-east, and was ascertained by Mr. R. W. Porter to be 340 feet in height.

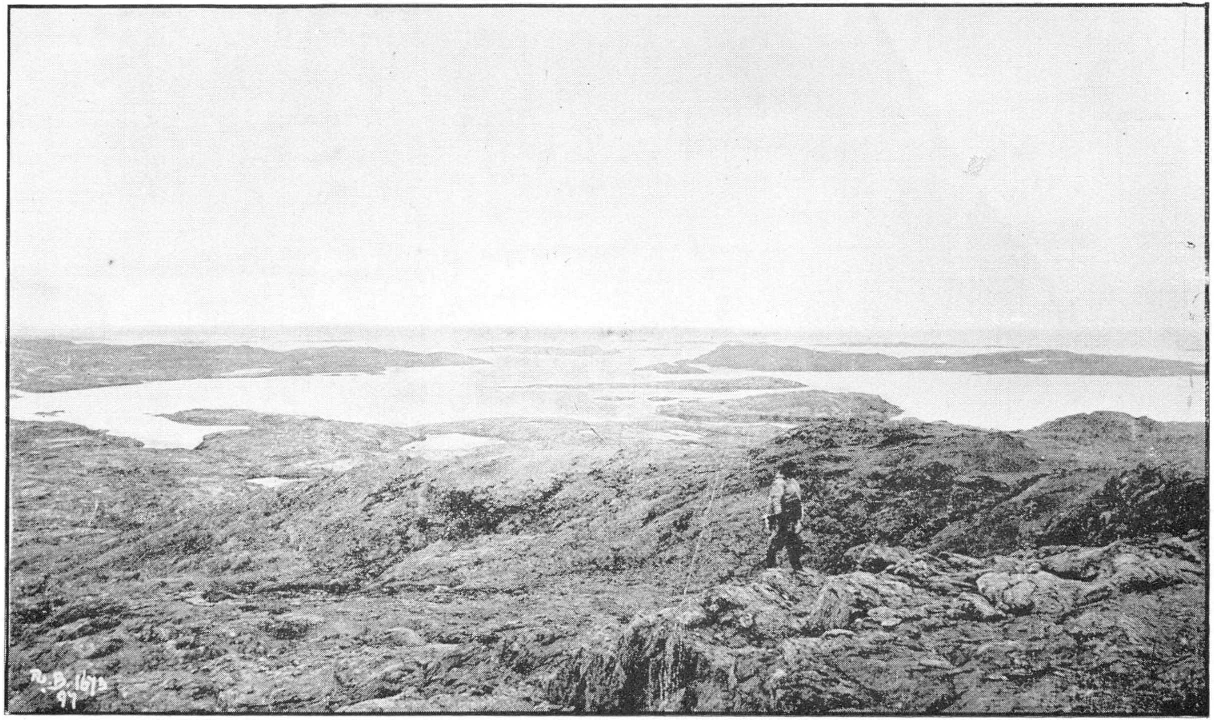
Before the fossiliferous limestone at the head of Frobisher Bay was known to be confined to this hill, it was supposed by Dr. Franz Boas, that it might be an extension of the flat-lying limestone of the basin of lakes Amadjuak and Nettilling. It appears now, however, this is not only not connected with the latter, but, judging from the loose pieces which I found in abundance not far from the south side of the former lake, the rocks of the lake region are more probably of middle Silurian age. In 1885, I collected fragments of shaly marl and gray limestone containing fossils of the Trenton group on the surface of ice pans off Big Island. It was thought at the time that these might have come from Trenton beds in some of the bays on the north side of

* Dr. A. Petermanns Mitteilungen, Ergänzungsheft, Nr. 80, November 1885.

† Narrative of the second Arctic Expedition by C. F. Hall, Washington, 1879, Appendix III., on the Geology of Frobisher Bay.

‡ Proceedings of the U.S. National Museum, Vol. XXII., pp. 143-177, No. 1192.

§ Am. Journ. Sci., 4th series, vol. VII. (1899) p. 433.



R. Bell, Photo., 1897.

NEAR BRUCE HARBOUR, LOOKING EAST
Showing characteristic coast scenery

the strait, but the examination of these bays in 1897 proved that no fossiliferous limestone *in situ* occurs there. The fragments referred to corresponded in character with the Trenton marl and limestone of Silliman's Fossil Mount. A good sized stream is described as running through and cutting off a portion of the mount, and this probably carries quantities of marl and limestone débris out upon the shore-ice in spring. As above mentioned, the small icebergs from Pak-a-lui-a on the south-west side of Frobisher Bay, are known by the Eskimos to float from thence through Gabriel Strait, and up the north-east side of Hudson Strait, and the shore-ice, when loosened, would naturally follow the same course. The above facts, taken together, would fully account for the presence of the Trenton fragments on the surface of ice-pans on the northern side of Hudson Strait.

Limestone of Fox Basin.

The scanty information we possess goes to show that Fox Basin is partly bordered on both sides by comparatively low land occupied by undisturbed fossiliferous Silurian limestone. Dr. Franz Boas ascertained the existence of these limestones on Lake Nettilling and he states that southward of the lake they rise into low hill-ranges. He also says: 'We will not be far astray if we connect this extensive Silurian district with the limestones which occur to the south of Igluling and which form the flat eastern half of Melville Peninsula.' Referring to those limestones in a letter to me in 1885, he says: 'The most interesting geological problem of the country is a study of the line of division between the Silurian plains and the eastern highlands. I suppose the Silurian rocks will be found either in the remotest corner of White Bear Sound, or close to it. Probably the strata will be found lying horizontally and then soundings in the lakes Amadjuak and Nettilling will be of great importance. It must be important for the problems of glaciation to survey the *inner* rim of the enormous basin formed by the chain of mountains of Davis Strait, the plateaus of Nugumit, Kingnait, Sikosuilat, Southampton Islands and Melville Peninsula.'

Southampton Island.

Limestones like those of the east and west shores of Fox Basin appear to occur also on the northern side of Southampton Island. I have obtained Devonian fossils from the limestone of the southern side of this large island. A high backbone of Laurentian rocks appears to run through its central part. Fox Basin therefore seems to lie in the middle of a very extensive flat trough of horizontal fossiliferous Silurian limestone, surrounded in a general way on all sides by high Laurentian hills. The Eskimo guide who accompanied me to Lake Amadjuak in 1897, informed me that he had passed round the

Lakes Amadjuak and Nettilling.

western end of the lake and had visited Lake Nettilling. This latter name means 'flat-floor,' and my guide said that flat-lying beds of rock similar to those around Nettilling extend to Lake Amadjuak, as well as to Fox Basin. The fossils which I collected from the horizontal limestones of Mansfield Island in 1884 indicate the Niagara formation, while those occurring in the drift fragments of limestone of similar colour and character, which are abundant for a short distance southward of Lake Amadjuak, belong to the same formation. It is, therefore, probable that the great limestone trough of Fox Basin is chiefly, if not altogether, of Silurian age.

Niagara formation.

Northern Baffin Land.

Referring to the northern parts of Baffin Land, Dr. Franz Boas says: * 'Let us in conclusion cast a glance on the geological structure of the last mentioned territory [the northern part of Baffin Land]. The nucleus of the mountain masses appears to be everywhere gneiss, which I found especially at Kingnait and Panguirtung. In closest combination with the gneiss, granite also occurs, which especially large-grained, appears in the coast ranges and islands, Anarmtung and Newakdjuak in Cumberland Sound; Padloping, Kexertaxdjuin, Nudlung, Tupirbikdjowitjung and Siorartijung on Davis Strait.'

Cumberland Sound.

'In Cumberland Sound, as well as in the Naguimiut plateau, which latter is mostly composed of fine-grained granites, there are found at isolated places, diorites and trap-granulites which have broken through the granite. The occurrence of these to the south on Blunt Peninsula has been confirmed. In Cumberland Sound I found them at Panguirtung, and in a well-marked dyke in Akuliaxling eastward from Kexerten. The same diorite appears also in the mountain Kalingujang to the east of Kingnait.'

Other localities.

'The Silurian limestones overlying the old crystalline rocks, have been already mentioned. The same are found besides in [Cyrus] Field Bay, and they compose nearly the whole northern coast of Baffinland. Hall found sandstone at Lok's Land, which perhaps belongs to the Carboniferous formation. It is said to resemble that found by Parry at Antridge Bay [Fury and Hecla Strait.] Here may also be mentioned the samples of sandstone found by Bessels at Point Garry. From accounts by Captain Walker, of the ship Erik, coal is found in loose boulders in a stream at Eclipse Sound and on Aggidjeu [Durban Island.]'

Rocks of the east coast of Baffin Land.

In the Quarterly Journal of the Geological Society of London, vol. ix., 1853, p. 299, there is a note by Dr. P. C. Sutherland, on the

* Dr. A. Petermanns Mitteilungen Ergänzungsheft Nr. 80, Gotha, Nov., 1885, page 57.

geology of the eastern side of Baffin Land, in which he says the crystalline rocks occupy the whole coast from Cape Walter Bathurst, on the south side of Lancaster Sound to Cumberland Sound, and probably considerably beyond it, and adds: 'To this I believe there is one exception at Cape Durban, on the 67th parallel, where coal has been found by the whalers; and also at Kingnait, two degrees to the south-west of Durban, where, from the appearance of the land as viewed from a distance, trap may be said to occur on both sides of the inlet. Graphite is found abundant and pure, in several islands situate on the 65th parallel of latitude in Cumberland Strait [Sound] and on the west side of Davis Strait.'

Rocks from Cumberland Sound.

In November, 1887, Dr. Franz Boas sent me a small collection of rock-specimens* from the island of Umanaktuak and vicinity on the south-west coast of Cumberland Sound, all believed to have been taken from the rock *in situ*, with the exception of one specimen, which was from a boulder in the bed of a torrent at this island and consisted of 'compact limestone, almost black and somewhat argillaceous. It weathers dark-gray, and shows on the surface slightly projecting fine parallel lines of stratification from one-quarter to one-half inch apart. No trace of fossils can be detected either by inspection or microscopic sections. Under the microscope it is seen to consist of gray, rounded, fine calcareous grains with a few black ones, all apparently deposited from water.†' The other specimens in this collection included the following: 'graphite with rusty surfaces and holding drusy white quartz; a decomposing black crystalline rock, which on microscopic examination, proves to consist of graphite with hornblende, a triclinic felspar and a little quartz; hornblendic gneiss of a rather coarse "pepper-and-salt" appearance consisting of about equal parts of quartz and felspar forming the white portion and of black hornblende with smaller quantities of brown mica, the black; light-gray gneiss of medium texture, composed of about equal parts of orthoclose and quartz, with a subordinate portion of fine scales of black mica; gray gneiss, consisting of layers of mixed orthoclase and quartz, alternating with others composed of scales of brown mica; rusty mica-shist of medium texture, the quartz in small proportions; a very light-coloured variety of granite, apparently from a small vein.' There was also a specimen of foliated graphite with rusty surfaces and partings which had been found by an Eskimo about forty miles inland in a south-westerly direction from Umanaktuak. In connection with my exam-

* Science, vol. X., Dec., 1887, p. 287.

†This would correspond with the rock holding Utica fossils from Frobisher Bay, (noticed further on) as described to me by Professor B. K. Emerson.

ination of this collection, I stated that: 'These specimens indicate the ordinary Laurentian system of much the same character as on the north side of Hudson Strait, where the rocks appear to be allied to those of the lower Ottawa valley, and to be somewhat newer and more modified than the great mass of the Laurentian in the Hudson Bay territories.' My exploration of 1897 amply confirmed this determination of the horizon of the rocks of the north side of Hudson Strait.

Graphite.

On the occasion of the visit of the *Diana* to the whaling station called Black Lead in Cumberland Sound in 1897, specimens of graphite from the neighbourhood were obtained by members of our party. The occurrence of graphite in the various localities above mentioned around Cumberland Sound is interesting in connection with the abundance of the mineral at many places among the crystalline rocks on the north side of Hudson Strait and it is a fact tending to show that the rocks around that sound are also referable to the Grenville series.

Fossiliferous Rocks of Baffin Land.

Rocks from Frobisher Bay

In appendix III., to the 'Narrative of the Second Arctic Expedition made by Charles F. Hall,' (Washington, 1879,) Professor B. K. Emerson, of Amherst College, who examined the geological specimens brought by Hall from Frobisher Bay, enumerates granite, mica-schist, different gneisses, also crystalline limestone, magnetite, apatite, bornite and pyrite. He informs me that the specimens of crystalline limestone appeared to be loose pieces which had been picked up on the shore. They may have been carried from the interior to the bay by the ancient land ice coming from either side of the bay or down the valleys terminating at its head. In any case they indicate an extension in this direction of the crystalline limestones such as I found in great force along the north side of Hudson Strait.

Utica formation.

Silliman's Fossil Mount at the head of Frobisher Bay, already described, was so named by Captain Hall, who also brought Utica and Trenton fossils from localities to the eastward of the Mount and from the north shore of Frobisher Bay. These have been reported upon by Professor Emerson in the above mentioned narrative of Hall's expedition. Small collections of fossils have been brought since Hall's time from Silliman's Fossil Mount by various collectors. All of these, as well as the Amherst College collection, have been lately critically examined and reported on by Professor Charles Schuchert, of the United States National Museum.* In the last-named collection he finds seven distinctly Utica species in a 'flinty bituminous limestone,'

Fossils examined by Prof. Schuchert.

* On the Lower Silurian (Trenton) Fauna of Baffin Land. Proceeding of the U.S. National Museum, vol XXII., pp. 143-177. With plates XII-XIV.

which Prof. Emerson informs me weathers gray. The locality where these were collected is supposed to be Jones Cape in Frobisher Bay. Hall's collection also contains thirteen Trenton species from Cape Stevens (?) in the same bay. Prof. Schuchert's lists show that 72 species of fossils are now known from Silliman's Fossil Mount and that 28 of these are not known to occur elsewhere. The majority of all the species, or 57 per cent, correspond with those of the Galena or Trenton formation of the Minnesota and Manitoba region, while 17 are known to occur in the Trenton of the Ottawa valley and the State of New York. About 20 of the species are new to palæontology and most of these are described and figured in Prof. Schuchert's paper. He adds: 'The lithological similarities of the Minnesota Galena and Silliman's Fossil Mount, light-coloured shales predominating in both areas, may explain in a large measure the close identity of these widely separated faunas. This little fauna likewise brings out the fact that the corals, brachiopods, gasteropods and the trilobites are slow in their evolutional change, and the species can therefore spread over very large areas, while the cephalopods, and particularly the pelecypods, are more sensitive to change and are thus restricted to localities.... The Baffin Land fauna had an early introduction of Upper Silurian genera in the corals, *Halysites*, *Lyellia*, and *Plasmopora*. In Manitoba similar conditions occur in the presence of *Halysites*, *Favosites* and *Diphyphyllum*. Other Upper Silurian types do not appear to be present.'

Galena formation.

In Minnesota.

The Rev. Edmund Peck, a missionary in Cumberland Sound, obtained from the drift at Lake Kennedy (Nettilling) four species of fossils which may be considered as of Trenton age. They are probably from the eastern extremity of this large lake, which lies close to Cumberland Sound, and if the Trenton occurs *in situ* in that region, it is probably overlain by the Niagara towards the west end of the lake, since that formation would appear to occur there (see ante). Among the Arctic islands northward of Baffin Land large areas of Upper Silurian rocks are known to occur associated with strata of Lower Silurian age.

Fossils from Lake Nettilling.

Laurentian of the North side of Hudson Strait.

The rocks of the northern side of Hudson Strait examined by myself from North Bay to Chorkback Inlet and inland to Lake Mingo consist of well stratified hornblende- and mica-gneiss, mostly gray in colour, but sometimes reddish, interstratified with great bands of crystalline limestones, parallel to one another and conformable to the strike of the gneiss, which in a general way may be said to be parallel to the coast in the above distance. The direction, however, varies

General character of the rocks.

Strikes along the coast.

somewhat in different sections of the coast. On either side of North Bay it appears to converge to a central line running south-south-eastward. From the south-east point of Big Island to Fair Ness the strike is parallel to the shore or about N. 60° W. From Fair Ness to Edmund Bay on the mainland, 25 miles farther to the northward, the direction inclined a little more easterly or inland, being about north-northwest. Here an anticline or a line along which the strike changes, appears to run inland in a north-easterly direction and from this line to the east side of Amadjuak Bay the general strike is about west. Beyond Amadjuak Bay, as far as we went, the strike was pretty uniformly parallel to the trend of the coast or about N. 60° W.

Strikes in th interior.

In going inland from Amadjuak Bay to Lake Mingo, the strike which was at first about north-west gradually changed to about west, which it maintained for the greater part of the distance A list is given further on showing the direction and amount of the dip together with the character of the rocks in a large number of places along the coast and inland to the north of Amadjuak Bay. It will be seen from this list that except when the strata are vertical, the dip is uniformly to the inland or northward side, except in one part of Markham Bay, and at Macdonald and Rawson islands, where it is in the opposite direction. The character of the rocks being given in each instance in this list no further remarks about them are required. In some instances where the dip was vertical as nearly as could be judged by the eye it is here given as 90°.

Dips of Laurentian Strata, North Side of Hudson Strait. (Astronomical Bearings.) Localities Arranged from South-east to North-west.

Dips of Laurentian strata.

1. West side of Glasgow Island in North Bay. Crystalline limestone and gray gneiss.................................N 34° E < 45°
2. Bruce Harbour, opposite east point of Big Island. Gray gneiss with rusty bands.............................N 16° W < 20° to 60°
3. Prominent hill on east side, Bruce Harbour. Gray gneiss...N 16° E < 35°
4. Twimi Islands, in mid-channel between east point of Big Island and Bruce Harbour. Fine-grain reddish gray gneiss.N 40° E < 45°
5. Middle of north-east side of Big Island. Gray gneiss......N 34° E < 45°
6. East side Reeves Harbour. Gray gneiss.................N 10° W < 90°
7. North-west side, Reeves Harbour. Gray gneiss..........N 10° to 50° E < 20° to 30°
8. North-east side Ashe Inlet. Dark gray gneiss rather finely ribboned with lighter streaks............................N 10° E < 30°
9. East side Ashe Inlet. Gray micaceous gneiss.............N 45° E < Mod'te
10. East side Ashe Inlet, 1 mile north-west of Station. Gray gneiss...N < about 25°
11. West side Ashe Inlet. Dark gray gneiss, composed o quartz and felspar in even beds (Rept. G. S. 1884, p 21 DD)....N < 40°
12. East side North Bluff. Dark gray gneiss..................N < low
13. West side North Bluff. Dark gray gneiss..................N 30° W < 10° to 20°

Dips of Laurentian strata.

14.	Group of islands 9 miles north of North Bluff. Reddish gray gneiss	N 56° W < 80°
15.	Main shore of Big Island 8 miles north of North Bluff. Red and gray gneiss. Disturbed. Average dip	N 36° W < high
16.	The same. 10 miles north of North Bluff. Banded gray and red gneiss	N 10° W < 75°
17.	North-east side Big Island near its north-west point. Gneiss and crystalline limestone	N 34° E < 40°
18.	Central part of Big Island. Common varieties of gray gneiss. (Rept. Geol. Survey, 1884, p. 21 DD.) General dip	N
19.	Beaumont Harbour. (Opposite N. W. point of Big Island.) Light-gray crystalline limestone and red-weathering gray gneiss	N 27° E < at diff't places 15° to 50°
20.	South point of entrance to Crooks Inlet. Rusty gneiss with white limestone	N 38° E < 90°
21.	South side Crooks Inlet, between entrance and a point mid-way up. Brown-weathering or rusty gneiss and light gray crystalline limestone. Average dip	N 40° E < 30°
22.	South side and upper half of same inlet. Gray fissile gneiss, stained reddish brown, but with yellow patches and associated with several thick bands of crystalline light coloured limestone	N 33° E Average < 45°
23.	Large promontory of north side of same inlet. White crystalline limestone	N 28° E < 30° to 45°
24.	2 miles inland (N.) from head of same inlet. Gray gneiss	N 30° E < 60°
25.	3 miles inland from, Do. Gray gneiss	N 23° E < 50°
26.	Bay opposite east end Strathcona Islands. White crystalline limestone and dark hornblendic gneiss	N 14° E < 25°
27.	Promontory at Red Islands, opposite middle of Strathcona Islands. Rusty gray gneiss with crystalline limestone	N 14° E to N 34° E < 45°
28.	Island off south-east point of Glencoe Island. Gray gneiss	N 14° E < 30°
29.	Mainland opposite east end Glencoe Island. Rusty decomposing micaceous gneiss, also crystalline limestone	N 24° E < 25°
30.	Mainland, opposite west end of Glencoe Island. Gray gneiss	N 14° E < 25°
31.	Wharton Harbour. Great band of white crystalline limestone running E.S.E. up a valley	N 24° E < 60°
32.	Spicer Island. Light-gray quartzose gneiss, some of it holding light purple garnets	N 24° E < 90°
33.	Entrance to Akuling Inlet. Gray gneiss	24° E < 60° to 80°
34.	West side Akuling Inlet. Gray gneiss	N 29° E < 60°
35.	First point south of Bedford Harbour. Gray gneiss	N 34° E < 45° to 60°
36.	Cape Montrose, Markham Bay. Gray gneiss	N 34° E < 45°
37.	Between Bedford Harbour and Fair Ness. Gneiss and limestone streaked with red	N 34° E < 45° to 60°
38.	East side of Bedford Harbour. Gray gneiss	N 34° E < 60°
39.	West side Bedford Harbour. Bedded felspar and quartz rock, with red rusty streaks	N 14° E < 75°
40.	Beds of white crystalline limestone and felspar alternating with gneiss or schist, weathering rusty red	N 34° E < 40° to 70°
41.	Ta-muck-ta-may (or south bight of Markham Bay). Gneiss interstratified with crystalline limestone	N 30° to 40° E < 45°
42.	Around Blandford Bay. Crystalline limestones and associated red-weathering rocks	N 35° E < about 40°
43.	Near Point Robert, Markham Bay. Gneiss and crystalline limestone	S 80° W Average < 45°

Dips of Laurentian trata.

44. Albert Bay, near centre of Markham Bay. Gray gneiss with white beds (limestones ?)..... ....S 80° W < 90°
45. Island between Albert and Lubbock Bays. Gneiss and light gray limestone, much oxidized..........................S 80° W < 80°
46. Long Island at entrance of Lubbock Bay. Grey gneiss containing much light purple garnet as disseminated crystals.N 59° E < 90°
47. Head of Lubbock Bay. Medium and fine-grained massive gray gneiss, hummocky and much oxidized..............N 14° E < 90°
48. North-eastern of the Islands of God's Mercie. Gray gneiss..N 10° W < 45°
49. Peck Island in Edmund Bay. (Next west of white Bear Bay.) Rather fine-grained light gray quartzose gneiss..........N 6° W < 90°
50. Point opposite (N.E. of) Macdonald Island. Gray gneiss...N 10° W < 60°
51. Macdonald Island. Gray gneiss..........................S 10° E < 25°
52. Small island 5 miles north of Macdonald Island. Light reddish gray gneiss.................................S 84° W < 70°
53. Top of knob 450 feet high at mouth of Alice River. Gray gneiss.N 34° E < 90°
54. Rawson (Harbour) Island. Gray gneiss..... ....{N 6° W < variable and high
55. Island 13 miles S.W. of Rawson Island. Gray gneiss........S 17° W < 70°
56. Fairfax Harbour, near Tilted Hat Mountain. Gray gneiss..N 44° E < 65°
57. Geikie Point, near Chorkback Inlet. Gray gneiss...........N 34° E < 60°
58. Around Port DeBoucherville on southern point of Nottingham Island. Gray and reddish gneiss. (Rept. Geol. Survey, for 1884, p. 28, DD.) Average dip.....................N 45° W < high

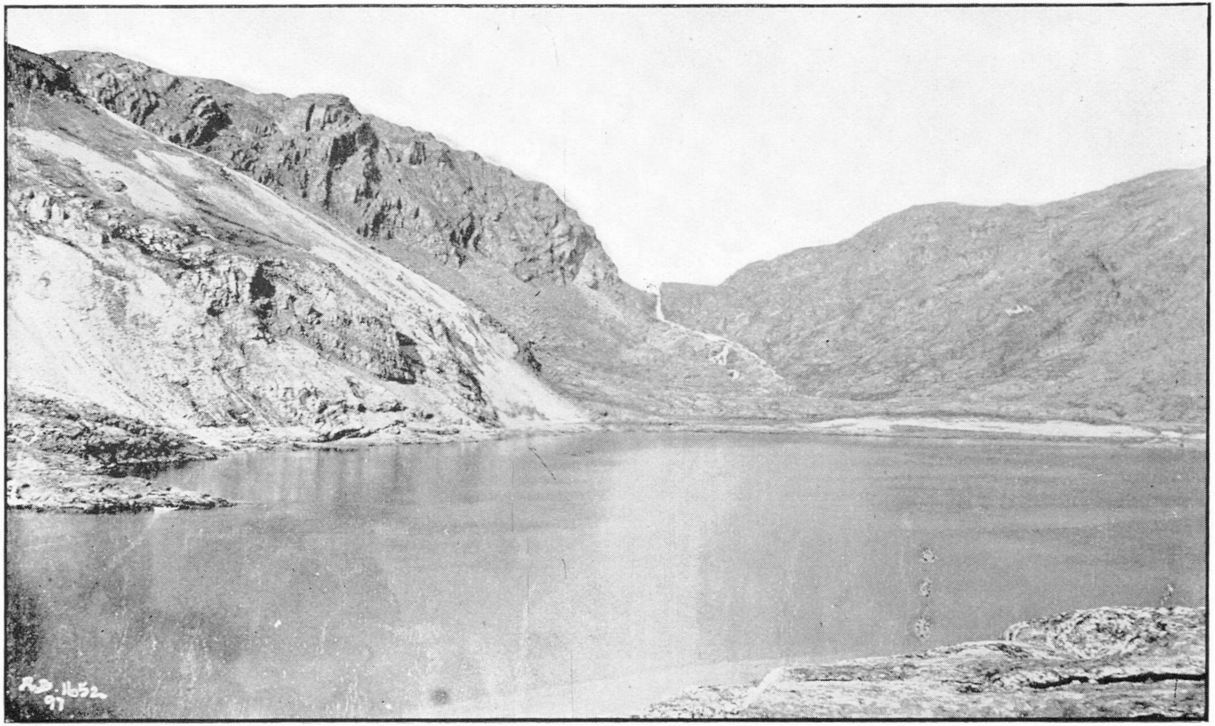
Between Amadjuak Bay and Lake Amadjuak.

59. Gertrude Lake, midway up. Gray gneiss.................N 80° E < 90°
60. Head of Gertrude Lake. Band of light crystalline limestone and felspar about 1000 feet thick immediately overlying rusty gneiss.... ....N 54° E < 60°
61. Orton Lake. White limestone. Local dip..... ....N 12° E < 70°
62. White-streak Mountain, part of Franz Boas Lake. Band of white limestone of great thickness. General dip.........N 56° E < 90°
63. Foot of Greely Lake. Gray gneiss....... ....N 19° E < high
64. East side Greely Lake, opposite Boulder River. Gray gneiss.N 14° E < high
65. Portage between Stevenson and Gilbert Lakes. Gray gneiss.N 11° W < 90°
66. Between Gilbert and Walcott Lakes. Gray gneiss. General dip..{N 34° to 64° E < high

It will be seen from the above list that the dip is often vertical or nearly so and that in the great majority of cases it is inland or northward, being in the opposite direction at only two localities.

Crystalline Limestones.

The distinguishing feature in the geology of the southern part of Baffin Land is the great abundance, thickness and regularity of the limestones associated with the gneisses. At least ten immense bands, as shown on the accompanying map, were recognized, and it is probable that the two others, discovered in North Bay, are distinct from any



R. Bell, Photo., 1897.

FORKED FALL AT THE HEAD OF CANYON INLET, 468 FEET HIGH.

Crumbling white crystalline limestone on the left.

of these. There would, therefore, appear to be twelve principal bands as far as known, to say nothing of numerous minor ones, between Icy Cape and Chorkback Inlet. The limestones are, for the most part, nearly white, coarsely crystalline and mixed with whitish felspars The individual crystals in some parts of the limestone masses would measure two or three inches in diameter and the crystallization of the felspar is occasionally equally coarse. The latter is generally somewhat irregularly disseminated, but sometimes it has a sort of parallelism with the bedding, although seldom entirely unmixed with the limestone. The limestones usually contain scattered grains of graphite and among the other minerals which commonly occur in the various bands are mica, garnet, magnetite, pyrite and hornblende. Serpentine of a dark colour was abundantly disseminated as grains and small irregular masses in a band which crosses the head of Cañon Inlet. Disseminated specks of bright green and blue serpentine were found in another band at White Bluff Harbour and similar specks of both colours occur in the eastern band at the head of North Bay. The late Mr. Ashe gave me a crystal of sphene, an inch and a half in diameter, which had been brought to him by an Eskimo from North Bay—probably obtained from the limestone there.

Twelve bands.

Associated felspars.

Included minerals.

Although white is the prevailing colour of these limestones, this, in some localities is replaced by light-gray and occasionally by mottled varieties. The coarsely crystalline band which forms the (three small) Red Islands, opposite the Strathcona Islands, has a uniformly salmon-red or flesh colour. Some handsomely variegated kinds are to be found on the point just west of Glasgow Island in North Bay.

Colour.

The limestone bands have not suffered greater denudation than the gneisses, and they form hill and dale alternately with the latter. It is not easy to fully explain why the limestones have not been more deeply eroded than the gneisses, as is the case with the limestone bands in the counties of Ottawa, Labelle and Argenteuil on the north side of the Ottawa River, but the difference may be due partly to the limestone being more solid or having fewer joints and fissures than the gneisses, thus preventing the entrance of the surface waters which caused deeper decay in the latter during preglacial times, and partly to the fact that the dip is inland or northward from the strait, or directly towards the advance movement of the ice, and that this circumstance would shield every band from its denuding action. On the other hand, in the lower Ottawa region, just referred to, the run of the limestone bands corresponds to the direction of the glaciation and this has

No special erosion of the limestones.

Possible reasons.

favoured the wearing out of the valleys by the movement of the ice and its accompanying rock-débris.

Limestones are conspicuous.

Owing to the scantiness of the vegetation in Baffin Land, the white colour of the limestones on the sides and tops of the hills and ridges renders them very conspicuous in the landscape. Seen from a hill-top at a distance of fifteen or twenty miles they might be mistaken for glaciers. The débris of the decomposing limestones forms crumbling slopes resembling coarse salt on a grand scale. Among the localities where these limestone bands are well exposed, may be mentioned the head of North Bay, the north-east side of the upper part of Big Island and the adjacent islands as well as the mainland opposite, on both sides of Crooks Inlet, at the entrance to Cañon Inlet, on the Strathcona Islands and main shore opposite, around the northern and eastern parts of Markham Bay, at Wharton Harbour, Akuling Inlet, islands off Fair Ness, Aberdeen Bay, and along the shore southward of Amadjuak Bay; also along the route from this bay to Lake Amadjuak, at Orton Lake and White-streak Mountain at the foot of Franz Boas Lake. The high slopes about the north-western end of Big Island, were the first examples we saw of these white limestones, and at first sight we supposed the light colour to be due to snow on the hill-sides.

Localities of limestones.

Crooks Inlet.

Crooks Inlet is about twenty miles in length and it crosses the general strike at right angles. About half the total length of its shores appear to consist of crystalline limestones belonging to five different large bands. Owing to the shortness of the time at my disposal and the necessity of hastening to explore the coast to the north-westward, it was impossible for me to measure the width of these bands, but as the dips were at considerable angles and always in the same direction, (north-eastward), it was estimated that their total thickness may be 20,000 feet, if not more. The wide and conspicuous bed of coarsely crystalline whitish limestone and felspar, which runs from Wharton Harbour east-southeastward up a valley, afforded a better opportunity for estimating the thickness than any of the other bands we saw. It appeared to have a horizontal width of a mile and a quarter, or 6,600 feet. The dip is northward at an angle of about 60° and hence the bed would have a thickness of about 5,700 feet at right angles to the stratification.

Thickness.

Total volume.

As to the total thickness of the twelve bands of crystalline limestone which have been mentioned as occurring in this part of Baffin Land, the available data on the subject are not sufficient to form a correct estimate, but on adding together their probable approximate widths it seems to be no exaggeration to place their possible total volume, great as it may appear, at about 30,000 feet, or an average of 2,500 feet for each of the principal bands, taking no account at all of the smaller ones.

It was stated in my summary report on the geology of this region that the series of rocks under consideration, including the limestones, seems to be made up of altered sediments. The enormous thickness, great length and regularity of the limestone bands would show that they have been precipitated evenly on the level bottom of the primeval ocean, and further that the sea must have been deep and the conditions uniform for great lengths of time. At the period when the limestones were formed, the temperature and the composition of the sea were no doubt very different from what they have been in the later geological times, and the precipitation of such vast quantities of carbonate of lime may have been due to such causes as the mingling of ocean currents with slight differences in the composition of their waters, the ebullition of gases from the bottom, or possibly from some change in the temperature of that part of the sea. Sedimentary origin.

Thin, short and uneven layers of limestone consisting of lenticular and nodular forms along a certain plane in the stratification of large masses of crystalline rocks containing lime, may have been formed by concretionary action during or subsequent to consolidation, but in the present case, apart from the above reasons, the bands are too thick in proportion to the interstratified rocks to favour such an hypothesis, even if the minerals entering into the composition of the gneiss contained any considerable amount of lime in any form, which they do not. Concretionary action.

The ten large and parallel bands of limestone which have been described, in their extension to the south-eastward, probably continue to curve to the southward, eventually coming out upon the shore of the strait at various places between North Bay and the Middle Savage islands. In 1884, while seeking for a suitable place at which to establish an observatory station, the expedition steamer *Neptune* coasted as near as possible to the land, from the Middle Savage islands to Cape Best or Hattons Headland and we went ashore at some points. I had then an opportunity of seeing that the rocks in this interval of coast were Laurentian gneisses which showed considerable regularity in their stratification. It has been already mentioned that among Captain C. F. Hall's specimens from Frobisher Bay, crystalline limestone and apatite occur, and although these were probably picked up as loose fragments, they indicate the occurrence of these minerals *in situ* within the watershed of this bay and they are further evidence South-east extension of limestones. Crystalline limestone at Frobisher Bay.

of the extensive development of the Grenville series in the southern part of Baffin Land.

Associated rocks.

The limestones are constantly associated with rocks which, in the fresh state, seem to consist of thinly laminated micaceous and graphitic gneiss, but which upon the surface generally appear as decomposed reddish brown ochrey masses with yellowish patches, the whole being the result of the action of the weather upon the pyrite which is abundantly disseminated throughout these strata. The hills formed of such rocks adjoining the limestone bands often look like great heaps of brownish ochre. By digging through the soft oxidized surface the partially decomposed pyritiferous rock containing much graphite can generally be reached at the depth of a few feet. Boulders are usually absent from these hills. The crystalline limestones of the Grenville series on both sides of the Ottawa River have decomposable rocks like the above associated with them and this constitutes an interesting resemblance pointing to a correspondence in age of the two sets of rocks. I have no doubt that a more detailed examination of the Baffin Land series would bring out other points of resemblance tending to prove their contemporaneity. If this were established it would be of great importance, since the rocks of the Grenville series are known to be elsewhere productive of a variety of economic minerals.

Ochrey covering.

Surface Geology.

Erratics.

In the portion of Baffin Land explored by myself, there is abundant evidence of the former existence of land-ice in the form of till and rounded and angular erratics. The latter are generally, but not universally, scattered in great numbers upon the surface of the rocks alike on the hills and lowest grounds. The rounded boulders are often thrown together in immense quantities, without any admixture of finer material, in the shape of ridges and heaps like small hills, especially along the sides and towards the bottoms of valleys. In some cases, as at Boulder River, Stevenson Lake, they are spread evenly and continuously over many acres, completely concealing the rock or ground beneath. They may generally be seen conspicuously perched on the flanks and tops of hills and on the brinks of precipices. Frequently they are gathered into groups in a variety of situations. With few exceptions the boulders at any place throughout the country consist of gneisses like those of the surrounding district and they have probably not been transported any great distance. Very large boulders are not common and few of extraordinary size were seen.

How they occur.

Osars.

Osars or dry heaps and ridges of sand and gravel without boulders

R. Bell, Photo., 1897.

LOOKING DOWN CANYON INLET FROM ITS HEAD.
A heap of glacial débris in foreground.

or even large stones were seen at several places on my journey to Lake Amadjuak, especially about the northern part of Stevenson Lake and west of Gilbert Lake. The till was nearly always much oxidized and it partook of a gravelly and sandy rather than a clayey character in the great majority of cases. It was present in considerable quantities at the head of inlets and on the slopes or the bottoms of most of the valleys examined. On our tramp to and from Lake Amadjuak we walked most of the way along the bottoms and sides of valleys, and here one of the characteristic features was the frequency with which our course was crossed by rivulets of perfectly transparent icy water, gurgling over stony bottoms in narrow channels cut through the till. Their flow appeared to be regular and constant and their supply of water seemed to be derived from the gradual thawing, during the summer weather, of the frozen ground along the numerous branches of the rivulets on the higher parts of the valley-slopes.

Till.

Many rivulets.

The general contours of the hills show that the country has been ice-swept at some period, but the other distinct signs of glaciation are not so strongly marked as they are along the eastern coast of Hudson Bay, or more particularly on the northern shores of Lakes Huron and Superior. The ochrey covering on many hills resulting from the superficial decay of certain rocks which accompany the great limestone bands has been already described. This is an evidence that these hills have not been recently glaciated. The frequent, if not general absence of boulders on such hills is an interesting circumstance in this connection. The surfaces of the gneisses exposed to the weather on the hills in various places where I went inland was considerably eroded, leaving the more resisting layers standing out several inches above the general surface.

Glaciation.

Distinct glacial striæ were seldom seen and then, as a rule, only near the level of the sea or of some lake. The bearings, in such cases as were observed, are given in the following list. In the interior, the general tendency of the striæ appears to be to follow the lowest levels towards Hudson Strait, while on the shore of the strait itself the glaciation has been south-eastward or parallel to its general course. On the southern side of the strait similar phenomena occur, that is, the glaciation runs from the interior northward to this great channel and on reaching it turns down its course towards the Atlantic. It would appear that before the advent of the glacial epoch this part of the continent stood at a considerably greater elevation above the ocean than the present, and that the bed of Hudson Strait and its continuation in the deep water of the southern part of Fox Basin, formed a straight land valley about 100 miles wide and 700 miles long, reaching

Glacial striæ.

Submerged valley of Hudson Strait.

from the Frozen Strait to the line of the present Atlantic coast of Labrador. This now submerged valley deepens as it goes towards the Atlantic, and as shown by the surroundings, its bottom is much lower than that of Hudson Bay. As I have elsewhere mentioned* the glaciation along the northern part of the present bottom of the eastern side of the latter was northward. The glacier which filled the valley now occupied by Hudson Strait would thus derive a portion of its ice from the bed of Hudson Bay.

Drift of Nottingham Island.

Before the discovery of direct evidence of the northward movement of the ice in the north-eastern part of the bed of Hudson Bay I suggested that the débris of rocks of the Manitounuck formation of the East Main Coast, which forms nearly half of the drift material on the southern part of Nottingham Island and embracing all varieties of the rocks of the series, might have come from somewhere to the west of this island†, but with our present knowledge on this subject, it appears more probable that the material has been derived from the eastern coast of Hudson Bay, as Nottingham Island would lie directly upon the course of the ice coming from this coast.

Terraces.

Wherever soft materials occur in the situations which were exposed to the action of the waves when the sea stood at relatively higher levels, or rather when the land was depressed, terraces may be seen marking periods of rest during the general uprising of the land which has been going on since the glacial epoch, and still continues. The time at my disposal did not permit of much attention being paid to this branch of the geology of the region explored, but a few facts were noted. At one mile north from the head of Crooks Inlet an ancient gravel and sand beach occurs at 360 feet above the sea, according to the barometer. A remarkable terrace with an inward semicircular curve stretches from side to side of a valley at a distance of about two miles from the shore, eastward of Glencoe Island. On a mountain side, half a mile west of Akuling Inlet and one mile in from the entrance, old beaches or terraces, marked by gravel, sand and rounded stones occur at 378 and 528 feet above high tide as determined by the barometer. At Ta-muck-ta-may, a bay on the south side of Markham Bay, there are wide, sandy and gravelly plains behind the present sea-shore and overlooking the same small bay a remarkable set of terraces on a north-facing slope, occur at various elevations up to about 400 feet. Distinct terraces were seen at different heights around the lakes of the chain drained by Alice River, which

* On Glacial Phenomena in Canada, Bull. Geol. Soc. of Am., vol. I., 1890, p. 298. Report of Progress Geol. Surv., Can., 1882-3-4, p. 37, DD.

† Report of Progress, Geol. Surv., Can., 1882-3-4, p. 29, DD.

was followed on our way to Lake Amadjuak. In connection with this subject, Mr. Drinkwater of the *Diana* expedition, informed me that he had climbed the hills above O'Brien Harbour at Cape Chidley, and found a horizontal line of rolled stones, plainly marking a raised beach at an elevation of about 600 feet above the sea.

Little could be done in the way of searching for fossils in the pleistocene deposits, but shells of *Saxicava rugosa* and *Mya truncata* were noticed in the till in a valley on the north-eastern of the Islands of God's Mercie at 200 feet from the sea, and at Lakes Gertrude and Greely *Saxicava rugosa* occurred in the drift at 110 feet above the same level in each case. At one place on the former lake the stony clay had been pushed and disturbed by ice since the shells were deposited. In all the harbours and sheltered places where we anchored we found a stiff stony clay and mud bottom at convenient depths. Pleistocene fossils.

Giant pot-holes in gneiss were observed on the west-facing slope at the east side of the narrow entrance to Cañon Inlet, of the following dimensions in the order of their occurrence from the extremity of the point southward: One between high and low tide, 8 feet in diameter; one of hollow spherical form and 15 feet in diameter, partly open at the side, whose top was 30 feet above tide; one between high and low tide, 20 feet in diameter, and one with top about 50 feet above tide, and about 18 feet in diameter Giant pot-holes.

Glacial Striæ, North Side of Hudson Strait, Astronomical Bearings.

1. Northern Inlet of North Bay	S. 27° W.
2. Around Ashe Inlet (Rept. of Geol. Surv, 1885, p. 22, DD)	S. 65° E.
3. Crystalline limestone ridge across entrance to Cañon Inlet, the striæ run up and over a steep slope	S. 34° W.
4. West side Big Island, 9 miles north of North Bluff, about	S. 15° E.
5. Entrance to Akuling Inlet	S. 57° W.
6. North side Albert Bay, Markham Bay	S. 34° W.
7. Amadjuak Harbour	S. 34° W.
8. Gertrude Lake	S. 4° W.
9. Foot of Franz Boas Lake	S. 39° W.
10. Foot of Greely Lake	S. 44° W.
11. Walcott Lake	S. 59° W.
12. Top of a mountain 1 mile S.W. of Mount Mingo and facing N.E.	S. 54° W.
13. Rawson Harbour Island	S. 54° W.
14. North-eastern of the Islands of God's Mercie, on vertical wall and rounded rocks	S. 44° W.
15. Eastern sides of Islands of God's Mercie	S. 11° W.
16. Long Island lying across entrance to Lubbock Bay, up steep slope and over the rounded ridge of the island	S. 59° W.
17. Head of Lubbock Bay	S. 16° E to S 24° W.
18. Fairfax Harbour (on mainland 5 miles east of Hobart Island).	S. 54° W.
19. North end of Jubilee Island	S. 49° W.

20. Geikie Point, near Chorkback Inlet........................ S. 4° W.
21. Low southern extremity of Nottingham Island. Average of 20 situations around Port De Boucherville. (Rep. Geol. Survey, 1885, p. 29, DD)....... .... S. 87° E.
22. In a valley at the head of Port De Boucherville. (Rep. Geol. Surv., 1885, p. 29, DD) about.......................... S. 45° E.

APPENDIX I.

ASTRONOMICAL OBSERVATIONS.

LATITUDES in Baffin Land from observations by Dr. Robert Bell, in 1897 used in the compilation of the accompanying map of Hudson Strait.

1.	Sunday,	22nd August,	1897.................	Latitude	64° 14′ 19″
2.	Wednesday,	11th "	1897...................	"	63° 57′ 57″
3.	"	18th "	1897...................	"	63° 58′ 07″
4.	Monday,	23rd "	1897...................	"	63° 44′ 33″
5.	Saturday,	31st July,	1897...................	"	63° 17′ 28″
6.	Wednesday,	25th August,	1897...................	"	63° 08′ 20″
7.	Tuesday,	27th July,	1897...................	"	63° 00′ 42″
8.	Friday,	27th August,	1897...................	"	62° 45′ 35″
9.	Friday	13th "	1897...................	"	64° 18′ 35″
10.	Saturday	14th "	1897...................	"	64° 25′ 02″

Localities of the above Observations.

1.—Point S. 4° E., 2½ miles from southwest end Diamond Island.
2 and 3.—In harbour, at head of Amadjuak Bay.
4.—Point N. 25° E., 4 miles from north end of Hector Island.
5.—On Spicer Island, 1 mile from north end.
6.—Point N. 60° W., 12 miles from northwest end Glencoe Island.
7.—Point on shore, N. 26° W., 5 miles from Cape Colmer.
8.—Point due south 4 miles from west end Emma Island.
9.—On Amadjuak Lake route, at north end of Gilbert Lake.
10.— " " 1½ miles south of Mount Mingo

LONGITUDES in Baffin Land from observations by Dr. Robert Bell in 1897, used in the compilation of the accompanying map of Hudson Strait.

Calculations by J. G. G. Kerry, McGill University.					Revised Results from Corrected Latitudes.		
Number.	Date.	Assumed Latitude.	Approx. Long.	Reduced Longitude.	Corrected Latitude.	Long'de.	Difference with map.
	1897.	°					
1	Aug. 22	64° 10′	75° 00′	73° 29′ 39″	64° 06′ 10″	73° 33′ 29″	Abt. ½ mile E.
2	" 10	64° 20′	75° 30′	72° 26′ 49″	63° 50′ 22″	72° 56′ 27″	" ½ " W.
3	" 23	64° 00′	73° 00′	72° 52′ 57″	63° 49′ 23″	73° 03′ 34″	" ½ " W.
4	" 25	63° 10′	71° 00′	71° 33′ 49″	63° 00′ 11″	71° 43′ 38″	" 4½ " W.
5	" 27	62° 55′	71° 00′	70° 56′ 21″	62° 47′ 45″	71° 03′ 36″	" 5⅜ " W.

Localities of the above observations.

1.—Point N. 78° E. 3 miles from west end Chamberlain Island.
2.—Point N. 14° W. 4½ miles from north end McDougall Island.
3.—Point S. 4° W. 7½ miles from Rawson Harbour.
4.—Point S. 25° W. 3½ miles from northwest end Glencoe Islands.
5.—Point S. 28°. 2½ miles from west end of Emma Island.

APPENDIX II.

LIST OF PLANTS COLLECTED IN HUDSON STRAIT BY DR. ROBERT BELL IN 1897.

The Phænerogams determined by J. M. Macoun, the Cryptogams by Prof. John Macoun.

The first column in the following list includes the species found around Prince George's Sound on the south side of Hudson Strait;

the second column the species collected in Baffin Land between Amadjuak Bay and Chorkback Inlet.

	I.	II.
Ranunculaceæ.		
Ranunculus nivalis, L.	*	....
" pygmæus, Wahl	*	....
" hyperboreus, Rottb.	...	*
" affinis, R. Br.	....	*
Papaveraceæ.		
Papaver alpinum, L.	*	....
Cruciferæ.		
Cardamine pratensis, L.	....	*
" bellidifolia, Hook	*	....
Draba nivalis, Lilj	*	....
" Wahlenbergii, Hartm	....	*
Arabis alpina, L.	....	*
Eutrema Edwardsii, R. Br.	*	....
Caryophyllaceæ.		
Silene acaulis, L.	*	....
Lychnis affinis, Vahl.	*	....
" apetala, L.	....	*
Stellaria longipes, Goldie.	....	*
Cerastium alpinum, L	*	*
Leguminosæ.		
Oxytropis campestris DC. var. cærulea, Koch	*	....
" leucantha, Pers	...	*
Rosaceæ.		
Rubus Chamæmorus, L.	*	....
Potentilla nana, Willd.	*	....
Dryas integrifolia, Vahl	*	*
Saxifragaceæ.		
Saxifraga oppositifolia, L.	*	....
" Aizoon, Jacq	....	*
" cæspitosa, L.	....	*
" rivularis, L.	....	*
" cernua, L.	...	*
" nivalis, L.	....	*
" stellaris, L. var. comosa, Poir.	....	*
" Hirculus, L.	*	*
" tricuspidata, Retz.	*	*
" aizoides, L.	....	*
Onagraceæ.		
Epilobium latifolium, L.	*	*

Compositæ.	I.	II.
Erigeron uniflorus, L.	*	*
" eriocephalus, J. Vahl	....	*
Antennaria alpina, Gærtn.	....	*
Arnica alpina, Olin.	*	*
Chrysanthemum arcticum, L.	...	*
Artemisia borealis, Pall.	....	*
Taraxacum officinale, Weber. var. alpinum, Koch	*	*
Campanulaceæ.		
Campanula uniflora, L.	*	*
Ericaceæ.		
Vaccinium uliginosum, L.	*	*
" Vitis-Idæa, L	*	....
Arctostaphylos alpina, Spreng.	....	....
Cassiope tetragona, Don.	*	....
Loiseleuria procumbens, Desv.	....	*
Bryanthus taxifolius, Gray	*	*
Ledum palustre, L.	*	....
Pyrola minor, L	....	*
Plumbaginaceæ.		
Armeria vulgaris, Willd	*	*
Scrophulariaceæ.		
Pedicularis Lapponica, L.	*	....
" Langsdorffi, Fisch. var. lanata, Gray.	..	*
" hirsuta, L.	*	..
" flammea, L.	*	*
Polygonaceæ.		
Polygonum viviparum, L.	*	*
Oxyria digyna, Hill.	*	*
Cupuliferæ.		
Betula glandulosa, Michx.	*	....
" nana, L.	*	....
Salicineæ.		
Salix arctica, R. B.	....	*
" glauca, L.	*	....
" herbacea, L.	....	*
" reticulata, L.	*	*
" myrsinites, L. var. parviflora, Pursh	...	*
" Uva-ursi, Pursh.	....	*
" Richardsoni, Hook	....	*
Empetraceæ.		
Empetrum nigrum, L.	...	*

	I.	II.
Liliaceæ.		
Tofiledia borealis, Wahl	*	*
Juncaceæ.		
Luzula spicata, Desv.	*	
Cyperaceæ.		
Carex misandra, R. Br	...	*
" saxatilis, L	*	*
Eriophorum Scheuzeri, Hoppe	....	*
Gramineæ.		
Glyceria vilfoidea, Fries	*	....
Arctagrostis latifolia, Griseb	..	*
Hierochloa alpina, R. and S.	*	....
Alopecurus alpinus, L.	*	*
Equisitaceæ.		
Equisetum arvense, L	....	*
Lycopodiaceæ.		
Lycopodium Selago, L	....	*
Musci.		
Ceratodon purpureus, Brid	....	*
Racomitrium lanuginosum, Brid	....	*
Barbula fragilis, Bruch and Schimp	..	*
Amphoridium Lapponicum, Schimp	....	*
Tetraplodon mnioides, Bruch and Schimp	.	*
Webera nutans, Hedw	....	*
Bryum arcticum, Bruch and Schimp	....	*
Aulacomnium palustre, Schwær	....	*
Lichens.		
Cetraria islandica, (L.) Ach	....	*
" nivalis, (L.) Ach	....	*
Alectoria jubata var. chalybæ formis, Ach	....	*
" ochroleuca var. rigida, Fr	...	*
Umbilicaria proboscidea, (L.)	....	*
" hyperborea, Hoffm	....	*
Peltigera aphthosa, (L.) Hoffm	....	*
Solorina crocea, (L.) Ach	*	....
Placodium vitellinum (Ehrh)	....	*
Placodium elegans (Link.) DC	. .	....
Lecanora pallescens, (L.) Schær	....	*
Pertusaria glomerata, (Ach.) Schær	....	*
Stereocaulon paschale, (L.) Fr.	....	. .
" condensatum, Hoffm	....	*
Cladonia rangiferina var. sylvatica, L	....	*

Fungi.

Scleroderma, sp.
Lycoperdon Belli, Peck. Collected also at Digges Island, south side Hudson Strait.

APPENDIX III.

List of Lepidoptera taken in Baffin Land by Dr. Robert Bell, in 1897.

Determined by Dr. James Fletcher, Government Entomologist, Ottawa.

July 23.—Big Island:—
Argynnis Chariclea, Schneid, (4 specimens).
Colias Hecla, Lef. Female.
July 25.—Beaumont Harbour:—
**Chionobas Taygete*, Hub. Male.
Colias Hecla, Lef. Male.
Lycæna Aquilo, Bdv. (=*L. Franklinii*, Curtis).
Argynis Chariclea, Schneid. (4)
Anarta Richardsonii, Curtis. Female.
Laria Rossii, Curtis, (Larva).
July 26.—Head of Crooks Inlet:—
Argynnis Chariclea, Schneid, male and female.
" *Polaris*, Bdv.
Colias Hecla, Lef. 3 males and female.
" *Pelidne*, Bdv. 3 males.
July 27.—*Lycæna Aquilo*, Bdv.
Argynnis Polaris, Bdv. One male and one female.
July 29.—Koong-neow Inlet:—
Chionobas Assimilis, But. Female.
Colias Pelidne, Bdv. Female.
August 12.—Route from Amadjuak Bay to Lake Amadjuak:—
Chrysophanus Hypophlœas, Bdv.
Lycæna Aquilo, Bdv.
August 14.—Near Lake Mingo:—.
Chrysophanus Hypophlœas, Bdv.
Colias Nastes, Bdv.
" *Hecla*, Lef. Male.
Anarta Richardsonii, Curtis.

Two species of bumble-bees were also collected which Dr. Fletcher has determined as *Bombus strenuus*, Cr. and *Bombus sylvicola*, Kirby.

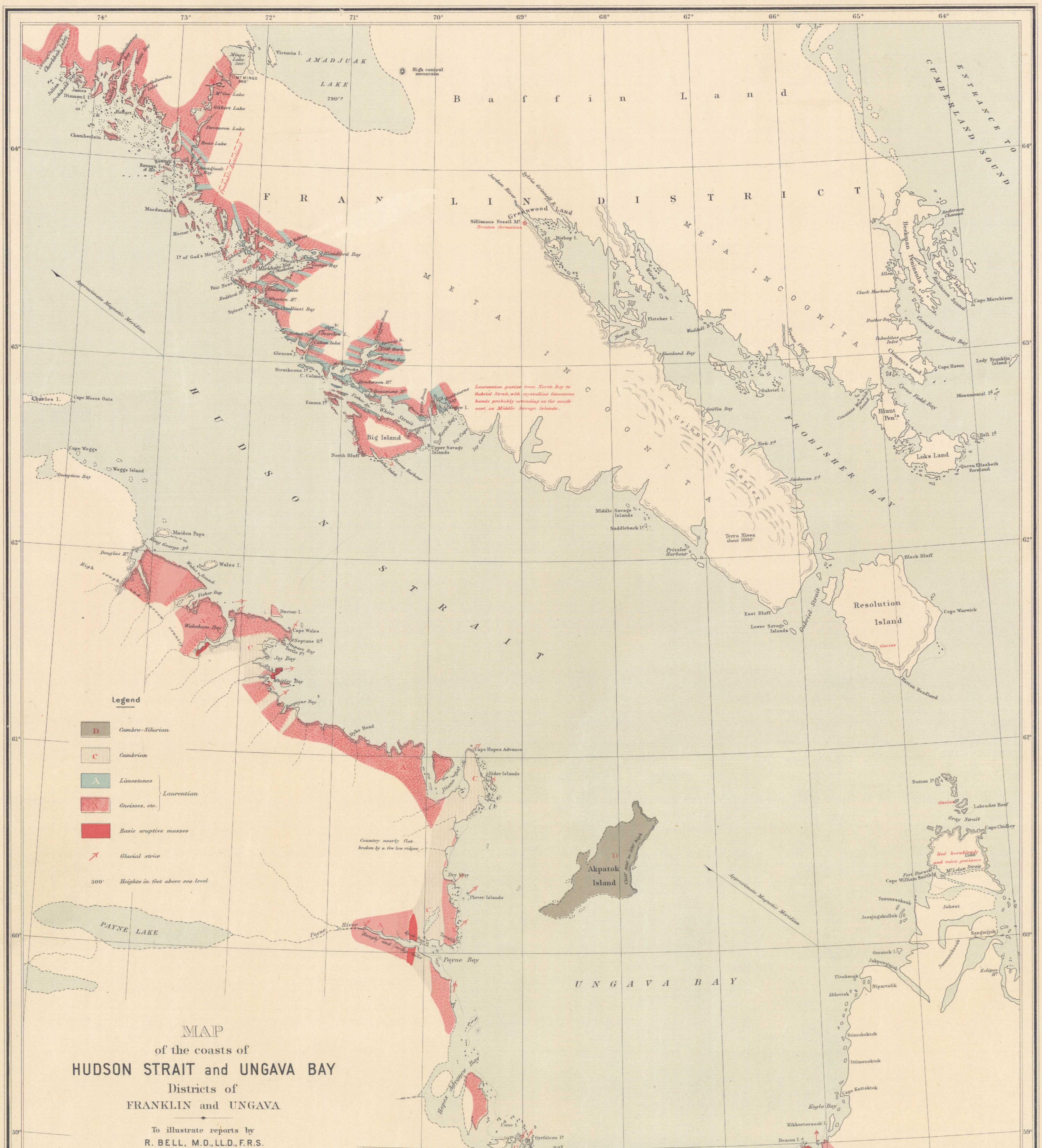
---

* Although this species is quite within the range where it might be expected to be found, this, I believe, is the first actual Canadian record published.—J. F.

Geological Survey of Canada

GEORGE M. DAWSON, C.M.G., LL.D., F.R.S., DIRECTOR.

1900



C.O. Senécal, Chief Draughtsman
L.N. Richard and O.E. Prud'homme, Draughtsmen

699

Hudson Str. & Ungava Bay
5.1.9
A. Geol.

1900
699