DET NORSKE VIDENSKAPS-AKADEMI I OSLO

RESULTATER

AV DE NORSKE STATSUNDERSTØTTEDE SPITSBERGENEKSPEDITIONER

BIND I

Nr. 10

THOR IVERSEN:

HOPEN

(HOPE ISLAND), SVALBARD

UTGITT PÅ
DEN NORSKE STATS BEKOSTNING
VED SPITSBERGENKOMITEEN

REDAKTØR: ADOLF HOEL

OSLO
I KOMMISJON HOS JACOB DYBWAD
1926

No. 10.

HOPEN

(HOPE ISLAND), SVALBARD

RESULTS OF A RECONNAISSANCE IN THE SUMMER 1924

BY

THOR IVERSEN

WITH CONTRIBUTIONS FROM W. BODYLEWSKY, B. CASPERSEN,
OVE ARBO HØEG, E. JØRGENSEN, JOHANNES LID, BERNT LYNGE
AND W. WERENSKIOLD

WITH 10 PLATES AND 10 TEXT-FIGURES

Contents.

A. W. BRØGGERS BOKTRYKKERI A/S

Illustrations.

Plate I. a. Two hundred metres south of cairn on Werenskiold Hill, looking towards Iversen Hill. Kvasstoppen (Sharp Peak) in the foreground.
b. From cairn on Koller Hill. Bearing to cairn on Werenskiold Hill, S 36° W, and to the highest point of Iversen Hill, S 17° W.

— II. a. From cairn on Koller Hill. Bearing to the west brink of the northernmost hill, N 28° E.
b. One hundred paces north of cairn on Koller Hill, looking north.

— III. a. From east edge of Koller Hill, looking south. Height: 240 metres. The Tovik is seen lying at anchor.
b. From the east edge of Koller Hill, looking north. Height: 240 metres.

— IV. a. From Werenskiold Hill looking towards Koller Hill. Björnsletta (Bear Plain) is seen on the left.
b. From the base of Koller Hill on the west side of Husdalen (House Valley) looking south.

— V. a. From the eastern edge of Werenskiold Hill, 242 m. above sea level, looking towards Iversen Hill. Bearing to the extremity of Koefoed Point, S 2° E, and to Iversen Hill, S 22° W.
b. The slope in the Bekkeskard (Brook Gully), looking south.

— VI. a. A little to the south of the hut in Husdalen (House Valley). Shows hut and landing place.
b. From the lowest cairn on Iversen Hill, looking north.

— VII. a. About one naut. mile SSE of Iversen Hill.
b. Hoel Point from SSE, about one naut. mile off nearest shore.

— VIII. a. Panorama of Hope Island from the anchorage off Husdalen (House Valley).
b. Panorama of Hope Island from about two naut. miles off House Valley.

— IX. a. From the west edge, close by the cairn, on Werenskiold Hill, looking towards the beach below.
b. Plant fossils from Hope Island. Nos. 1 and 2, Pterophyllum sp. Nos. 3, 4 and 5, stalks of Equisetales. Nos. 1, 3 and 4 belong to the Prince of Monaco, Nos. 2 and 5 to Mr. Iversen's collection.

— X. Map of Hope Island by Thor Iversen. Scale 1 : 200000.

Figure 1. Position of Hope Island on different charts. Scale 1 : 1 400 000. I. W. Jansz. Blaeu 1623. II. Thomas Edge 1625. III. Giles & Rep 1710. IV. W. Scoresby 1820. V. Dunér & Nordenskiöld 1865. VI. Norwegian General Chart 303, 1923. VII. British Admiralty Chart 2751, 1924. VIII. Position determined by Captain Thor Iversen 1924. On the first three charts, the position of Hope Island is laid down from distances and bearings from Negerpynten (Negro Point or Swarte Hoek); on the others, from latitude and longitude on chart.

— 2. M/C "Blaafjeld".

— 3. M/C "Tovik".

— 4. Hope Island from SSE., six naut. miles off Iversen Hill.

— 5. Hunting cabin in House Valley from E.

— 6. Cairn on Werenskiold Hill, 270 m. above sea-level. Thor Iversen standing.

— 7. Hope Island from SW., about four and a half naut. miles distant from the south point (Cape Thor).

— 8. Hunting cabin on Koefoed Point.

— 9. Hope Island from SSE., 13 naut. miles distant, from a drawing by Thor Iversen.

— 10. Map showing location of photographic stations.

Preface.

Our knowledge of Hopen (Hope Island), off the south-east coast of Spitsbergen, has been very scanty. The shape of the island varied widely on different charts, the position — especially the longitude — was not fixed, and the topography of the interior was practically unknown.

In the summer of 1924, Captain THOR IVERSEN led the Norwegian Government's fishery investigations in the Arctic Seas. While cruising in the waters to the east of Sørkapp (South Cape), Spitsbergen on board the M/C "Tovik", he succeeded with Mr. EINAR KOEFOED, in landing on Hope Island. He ascended the hills in the extreme south of the island, and made a preliminary survey. The topography of the northern part of the island was sketched from a running survey along the eastern coast, on board M/C "Tovik". Mr. EINAR KOEFOED and Captain IVERSEN also took a large number of photographs, from both land and sea stations.

The map has been constructed by Mr. IVERSEN, from measurements, compass bearings, estimates of the speed of the ship, and from the photographs. The contour lines have been redrawn by Lieutenant-Colonel K. G. GLEDITSCH, Chief Topographer, Norwegian Geographical Survey, from Mr. IVERSEN'S original, with the help of the photographs and descriptions. Mr. IVERSEN'S observations of longitude and latitude have been worked out by Mr. B. CASPERSEN, and the computations have been checked by Mr. A. HERMANSEN, Naval Captains. The final calculations have been made by me.

The maps have been redrawn and prepared for publication by Mr. B. H. LUNCKE, C. E., a member of the staff of the Norwegian Svalbard Expeditions.

Mr. IVERSEN'S manuscript has been revised, and the illustrations selected from a very large number of photographs, by me.

Messrs. IVERSEN and KOEFOED also made various collections, which have been submitted for examination by specialists, namely: OVE ARBO HØEG, Custodian, Botanical Department, Trondhjem Museum (plant fossils); E. JØRGENSEN, Lecturer, Cathedral School, Bergen (mosses); JOHANNES LID, Custodian, Botanical Museum, Oslo (flowering plants);

BERNT LYNGE, Ph. D., Lecturer in botany, University, Oslo (lichens); L. R. NATVIG, Custodian, Zoological Museum, Oslo (insects; the work is not finished). Some fossil shells have been sent to Mr. V. J. BODYLEWSKY, of Leningrad, for examination.

Mr. IVERSEN has made a great many soundings in the Barents and Spitsbergen Seas, during his cruises in the summers of 1923 and 1924. These have been added in an appendix.

W. Werenskiold.

Introduction. Discovery and Representation on Charts.

Hope Island (Pl. X) is a lonely, hilly island situated 125 miles[1] due east of South Cape (Sørkapp), West Spitsbergen, and 47 miles south-southeast of Edge Island.

As far as I know, the oldest chart on which the island is fairly accurately plotted in relation to Spitsbergen, is the one by Edge from 1625 (Fig. 1). Edge relates that the island was discovered in 1613.

Dr. F. C. WIEDER (1919), the Dutch writer, maintains in his book that Hope Island was probably discovered as early as 1596 by JAN CORNELISZ. RIJP during his second voyage north, from Bear Island. RIJP mentions a lonely island which he calls Visch Eylandt.

Dr. WIEDER also attempts to show in his book that the island called Verlaten Eyland on the newly-discovered chart by PETRUS PLANCIUS printed in 1612, must be Hope Island, in spite of the fact that it is plotted 20 degrees longitude too far east.

On the chart by HARMEN and MARTEN JANSZ, engraved by ABRAHAM GOOS in 1620, the "Hoop Eylandt" is fairly correctly placed in relation to the nearest promontory of Edge Island (Egdeøya), the "Swarte Hoeck"; that is, of course, Negro Point or Negerpynten; but they have both been misplaced very far to the east, and the promontory has no connection with other parts of Spitsbergen. This also applies to the chart published by W. JANSZ. BLAEU in 1623.

At any rate, Hope Island has been known ever since the hunting of Greenland whale began in the waters around Spitsbergen. Its form has been drawn much more correctly on many of the old charts than on the recent ones. However, the position of the island has varied much on the old charts; it has been changed frequently.

On the chart by JAN JANSZ, 1651, an anchorage is marked outside the north point and the south-west point, and the island is drawn long and narrow.

J. Az. COLOM's chart of 1652 shows along the east side many crosses and points designating shoals or rocks.

HENDRICK DONCKER's chart of 1663 shows Hope Island rather broad, with anchorages in the same places as the earlier charts, and with

[1] In this paper, "mile" always denotes nautical mile.

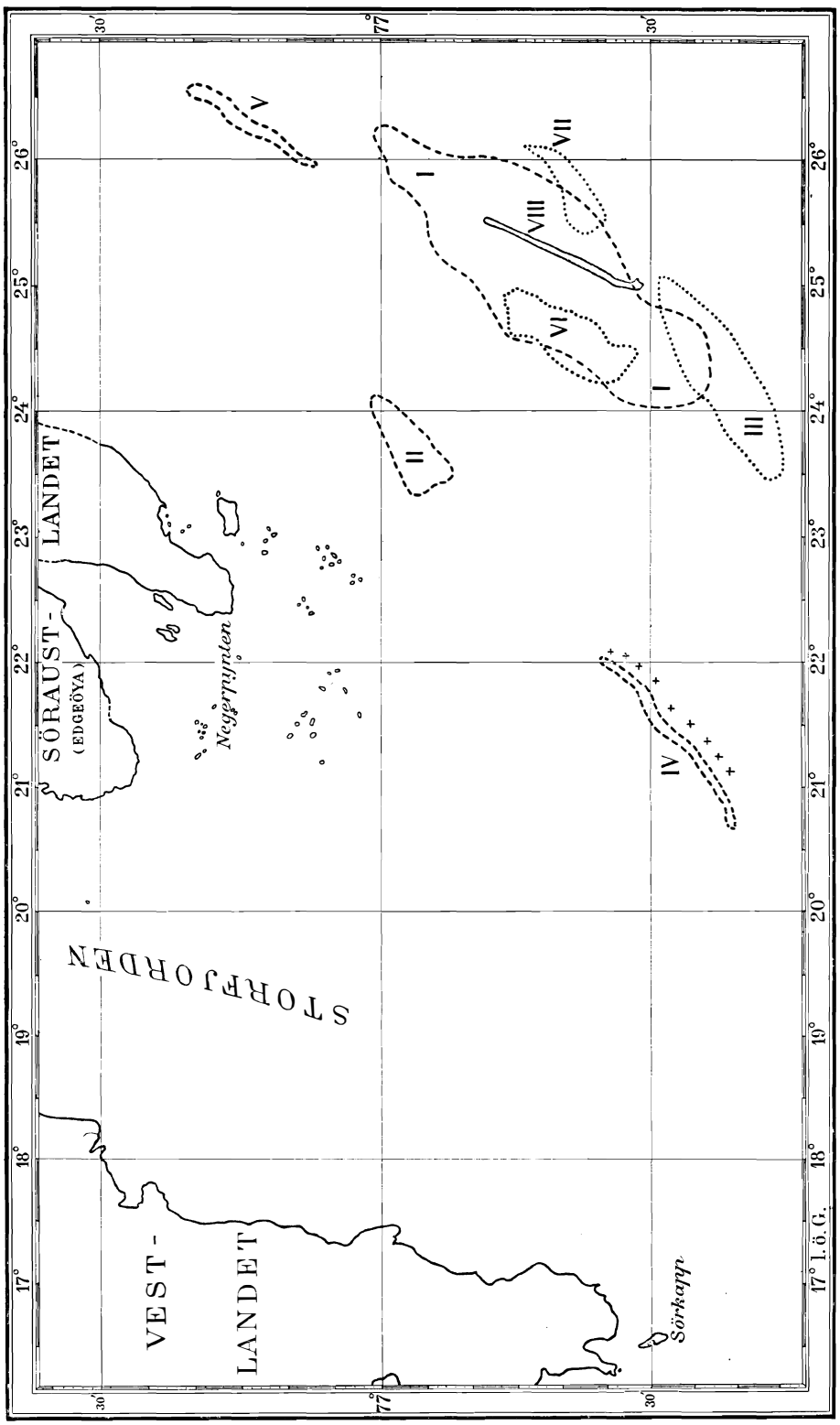

Fig. 1. Position of Hopen (Hope Island) on different charts. Scale 1: 1 400 000. I. W. Jansz. Blaeu 1623. II. Thomas Edge 1625. III. Giles & Rep 1710. IV. W. Scoresby 1820. V. Dunér & Nordenskiöld 1865. VI. Norwegian General Chart 303, 1923. VII. British Admiralty Chart 2751, 1924. VIII. Position determined by Captain Thor Iversen 1924. On the first three charts, the position of Hope Island is laid down from distances and bearings from Negerpynten (Negro Point or Swarte Hoek); on the others, from latitude and longitude on chart.

crosses for shoals on the east side. The chart also gives four soundings on the west side of the island.

JOHANNES VAN KEULEN's chart of 1682 indicates, besides anchorages and soundings, also five mountain peaks. On a later chart (GILES & REP'S) published by the same author about 1710, several new soundings are given and the island is drawn narrower than before.

On W. SCORESBY's chart of 1820 the island has about the same location as on the one just mentioned, and also about the same form; it is only somewhat longer and narrower.

Recent Visits to Hope Island.

PAYER and WEYPRECHT tried to approach the island in the latter part of July during their Arctic expedition in 1871 on board the "Isbjørn" of Tromsø, but were stopped by ice. About this the following statement is given in PAYER's narrative (1876, p. 675) ". . . . suddenly we caught sight of the long plateau of Hope Island, the latitude of which according to the observations of Lieutenant WEYPRECHT is given about 40 minutes wrong on the Swedish charts. The real location of the south-west point of the island is 76° 29' N. lat. and 25° E. long".

On the 18th of August they returned with the "Isbjørn" to Hope Island (idem p. 683): ". . . . We landed on the south-east coast of the desolate island. Here an unusually strong current ran towards the south-west at a speed of two miles, the ship at first dragging her anchor.

We had sufficient reason to be careful as we approached land in the whaling boat; for all around Hope Island there are shoals and rocks not shown on any charts. Geologically the island is completely like the mountains south of Whales Bay. Brown coal was also found, but the brief stay made it impossible to discover the coal-seams. Drift wood consisting of Siberian larch and spruce was lying in great quantities on the beach".

On the 22nd of July 1898 NATHORST tried to land on the island in a boat, probably on the east side far north. He hoped to be able to spend one or two days on the island in order to get it mapped and geologically explored. About this boat trip he states (1900, vol. 1, p. 65). "There was quite a heavy sea and the wind increased as we approached the shore. We got in among numerous shoals surrounded by large breakers, and we found that the beach, which looked low from a distance, was really rather high, in places formed by an overhanging "ice foot", and was washed by a powerful swell which sent high spray into the air and made landing impossible. We tried several other places, but found them worse instead of better, with a heavy swell everywhere, and in the high and growing sea there was nothing to do but to return to the ship."

Meanwhile the weather had become clear and latitude and longitude were determined (76° 45',3 N. Lat.; 25° 55',5 E. long).

Prince ALBERT OF MONACO landed on the island later in the same year, and brought back some plant fossils, which were examined by NATHORST.

On his visit to Hope Island, the PRINCE OF MONACO was accompanied by Mr. W. S. BRUCE. An account of the voyage is given by Mr. J. RICHARD (1899, pp. 68—71).

In 1920 The Norwegian Svalbard Expedition under Mr. ADOLF HOEL (1922, p. 18) attempted to get to Hope Island on board the gunboat "Farm" in order to work ashore, but landing was made impossible by the swell, the drift-ice, and the fog.

Thor Iversen's Work on Hope Island.

The first time I saw Hope Island was in the middle of August 1923, during one of the cruises with the M/C "Blaafjeld" (about 50 gross tons), Fig. 2, which was chartered by the Norwegian fisheries administration for exploration work in the waters around Svalbard. I saw it from the west with the mountain tops shrouded in fog. The ocean west of the island was quite ice-free; only scattered chunks of ice were seen, some floating, others grounded, and appeared like the wake of a ship in the strong tidal current.

In 1924 exploration work was undertaken on board the M/C "Tovik" (about 50 gross tons) Fig. 3, the waters east and south of Hope Island being specially examined.

On July 9, 1924, I saw Hope Island from the east, covered with snow, and with drift-ice lying about 15 miles from the shore along the east side.

During the repeated cruises between South Cape and Hope Island it appeared, according to reckoning, that the present charts gave the position of Hope Island somewhat too far west, and as I passed along the island I soon found out that also the shape of the island was quite different from that given on the charts. These circumstances, and the fact that Hope Island had never been carefully explored before, provoked a desire to visit the island, if possible. I was further prompted by the fact that our fishery exploration work that year was to include the banks surrounding Hope Island.

First Visit.

July 30, 1924.

During a cruise from South Cape eastward towards the south point of Hope Island, we sighted the southern hill of the island 30 miles off on July 30. Hydrographic stations were taken all the way between

South Cape and Hope Island. As we approached the south point of the island, fog came on and a brisk south-west wind sprang up. We approached the east side and let the ship drift along the coast in smooth water for a time while the fog was clearing. At noon we cautiously approached the island, using the lead constantly, and anchored in 12 metres of water, about 465 metres from the shore off Husdalen (House Valley) about 4 miles north of the south point. At 3,15 p. m. KOEFOED and I went ashore with a crew, steering the boat in a north-easterly

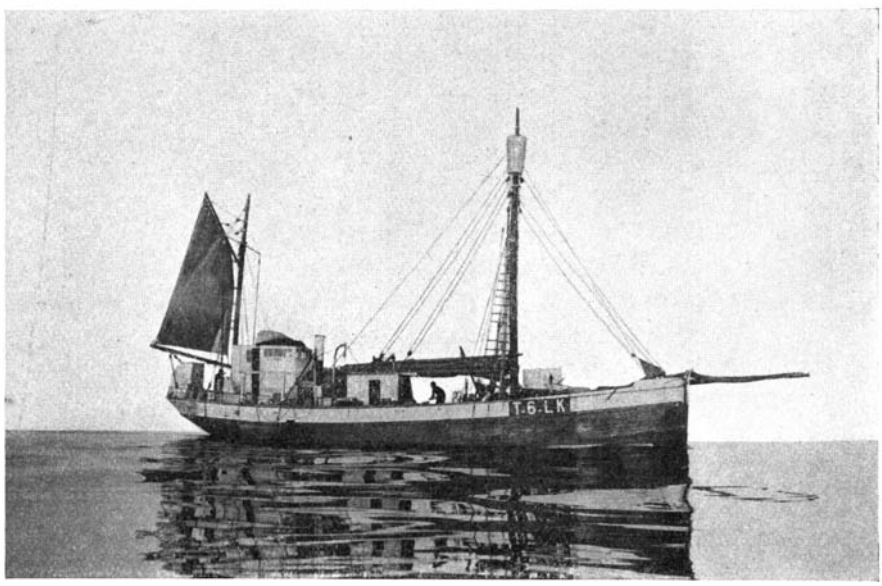

Fig. 2. M/C "Blaafjeld".
Iversen phot. 26/8 1923.

direction towards the hut; this seemed to give the best passage through the breakers.

The water was very shallow as far as 100—200 metres from land, the sea breaking in many places. The hut (Fig. 5) lies on a level plain where quantities of drift wood, most of it rotten, are scattered all over the surface, especially north of the hut. Some distance south of the hut a brook, Husbekken (House Brook), runs into the sea; at the time of our visit it was nearly dry. Close by the brook there were remnants of timber structures built of drift wood, probably used by hunters to support spring guns for shooting bears. Near the shore the brook has formed a deep ravine in the solid rock. Higher up in House Valley it has a meandering run, there also forming a deep ravine with steep sides of talus cut through the terraced east side of House Valley.

The ravine of the brook begins near the centre of the plain in the House Valley. The ground of this plain is rather soft, boggy, covered

with a comparatively rich vegetation. In one place its elevation was measured at 64 metres above sea-level.

We went up the mountain side on the south side of House Valley in the middle of the island. The lower part of the slope up to about 190 metres above sea-level is rather steep and covered with loose blocks and gravel, which made ascent difficult at the point we had selected. Above the 190 metres altitude the slope of the mountain is much less steep and it shows indications of terraces.

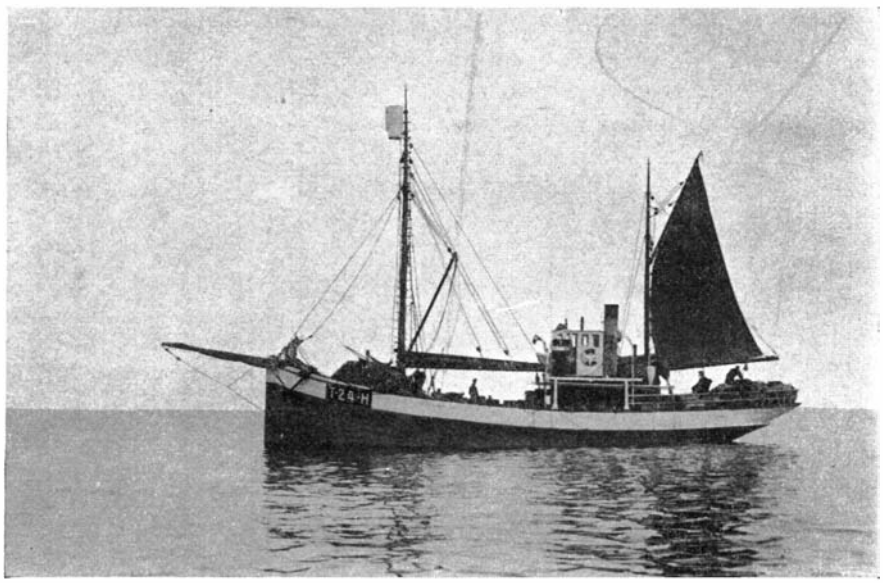

Fig. 3. M/C "Tovik".
Iversen phot. 16/7 1924.

Just as we reached the 213 metres altitude and were about to take photographs of the mountains to the north, we suddenly encountered a fog accompanied by a bitter wind from the south-west. We then sought shelter towards the eastern brink of the hill, where we built a little wall and cairn of rocks, which we called "Stormly" (storm shelter). For three hours we waited in vain for the fog to lift. We then descended the mountain at a point near the east brink not so steep as where we climbed up. Collecting some plants and geological specimens we returned to the ship at 10 p. m. hoping to find a better opportunity for exploration some other time.

In the morning of the 31st of July the fog had lifted and the air was quite clear. From our anchorage I took the photograph, Pl. VIII a, from House Valley towards the north. The location of the hut is indicated by an arrow, and the mouth of the House Brook by a cross.

The photograph, Pl. VIII, b, shows the island from a point a little north of House Valley and northward. It is taken about 2 miles east of the valley after we had left our anchorage for the open sea.

The photograph Fig. 4 is taken the same day SSE. of Iversen Hill, 6 miles off.

Second Visit.

Aug. 11 to 13, 1924.

On the 11th of August, in the afternoon, while engaged in trial fishing east of Hope Island, steering west 1/4 north we sighted the island straight ahead, 33 miles off. We then made for the island, taking soundings and hydrographic stations on the way, till we were close to the shore, off Blaafjell (Blue Hill), whereupon we steered along the island towards the south, making several soundings, till we were off House Valley; thence we headed for the hut, using the lead on the way towards land, and anchored on the 12th of August at 1,15 a. m. in 10,5 metres of water.

During the night, while we were sailing along the shore, the air was clear; there was new-fallen snow on the southern part of the island, but not on the northern part.

Soon after we anchored in calm weather a heavy fog came on, and lasted all the day. During this time temperature measurements were made in the water at the bottom of the anchorage, and the changing directions of the current were observed in the course of 15 hours.

Early in the morning of the 13th of August the fog lifted; the air became perfectly clear; the sun was favorable and the horizon clear. At 6. 11. 23 a. m. I took a series of three observations of the sun's altitude at intervals of one minute and at 7. 6. 12 a. m. another series of three observations, reading the time by my watch (a new one from the International Watch Co, Schaffhausen, with Lutecia works). According to the observations the anchorage (station VIII a) lies at 25° 6' E. long. and 76° 3' N. lat.

At 8 a. m. KOEFOED and I went ashore with 3 men. We dug a little well in the gravel at the outlet of the House Brook south of the hut. After a while so much water had collected, that we could signal to the crew on board the ship to fetch a supply. I went with two men to make collections in the mountains, while KOEFOED with one man examined the valley (House Valley) itself and the lower regions.

I ascended the hill south of the valley (Werenskiold Hill), following the same route as we did down the hill on our first visit. On the slope above "Stormly" (190 metres above sea-level) a little moss and grass was observed, and at an altitude of 220 metres there was a fairly level terrace with the same kind of vegetation. At 230 metres above sea-level there was again a level terrace covered with big stones and mosses. The top of the hill formed a plateau sloping gently towards

the east. It was covered with soft soil and patches of moss. At the highest point, 270 metres above sea-level, 21 m. east of the very steep western brink, we built a cairn of earth and moss re-inforced by some stones and with a piece of bamboo in the centre, Fig. 6. In the cairn we deposited a bottle containing information on a slip of paper.

From the cairn a bearing was taken of the highest hill towards the south in the direction S. 14° W.

To the north, the west brink of the nearest hill was sighted in the direction N. 26° E. The photograph, Pl. IX, a, is taken from the very edge of the brink near the cairn in a downward direction towards the beach. The photograph, Pl. I, a, is taken from a point 200 metres (paces) south of the cairn towards the south showing the southernmost mountain of Hope Island (Iversen Hill) with the little pointed peak, Kvasstoppen (Sharp Peak), in front of it.

I measured the distance between the east and west brinks in the direction E. 36° S., using a bamboo pole, 6 metres long. The width of the plateau was found to be 480 metres from the cairn to the east brink, and 501 metres from one brink to the other. The plateau sloped down eastwards, reaching 242 metres above sea-level at the east brink.

From the east brink a bearing was taken to the extreme point of the low plain on the south east side of Hope Island, Koefoedodden (Koefoed Point), in the direction S. 2° E.; to the highest top of Iversen Hill in the direction S. 22° W. (see photograph Pl. V, a), and to the beach northward in the direction N. 35° E.

From the cairn near the west brink, Negro Point on Edge Island was sighted in the direction N. 35° W.

We left the cairn at noon and went north down the mountain slope, taking the photograph, Pl. IV, a, from an elevated point where the entire northern part of the island, including both shores, could be seen. In the middle foreground of the picture, two men appear, one on each side of the picture. The men were 100 paces from the camera and the distance between them was 61 paces. On the left side of the mountain (Koller Hill) the mountain foot protrudes, forming a gently sloping plain, Bjørnsletta (Bear Plain) with considerable vegetation. To the left of Bear Plain breakers are seen over the shelving bottom, although there was only a slight swell that day.

On the way from the cairn on the mountain top I collected some botanical and geological specimens. From "Stormly" we continued the descent to House Valley, from whence we went north and climbed the next mountain (Koller Hill). The side of this mountain was not very steep; it was dry and had considerable vegetation right up to the summit.

This mountain top also formed a plateau, gently sloping with several low terraces towards the east. At the highest point a cairn was built,

15 metres within the steep west brink. The stone for the cairn was taken out of the solid rock on the west brink. The cairn is located on a fairly level, dry plain covered with small stones, moss, and grass at an altitude of 285 metres above sea-level.

From the cairn, bearings were taken of the cairn on Werenskiold Hill in S. 36° W., of the highest top of Iversen Hill in S. 17° W., and of the west brink of the northenmost hill in N. 28° E., Pl. I, b; II a. From a point 100 metres from the cairn in the direction N. 14° E. I took the photograph, Pl. II, b, of the mountains to the north.

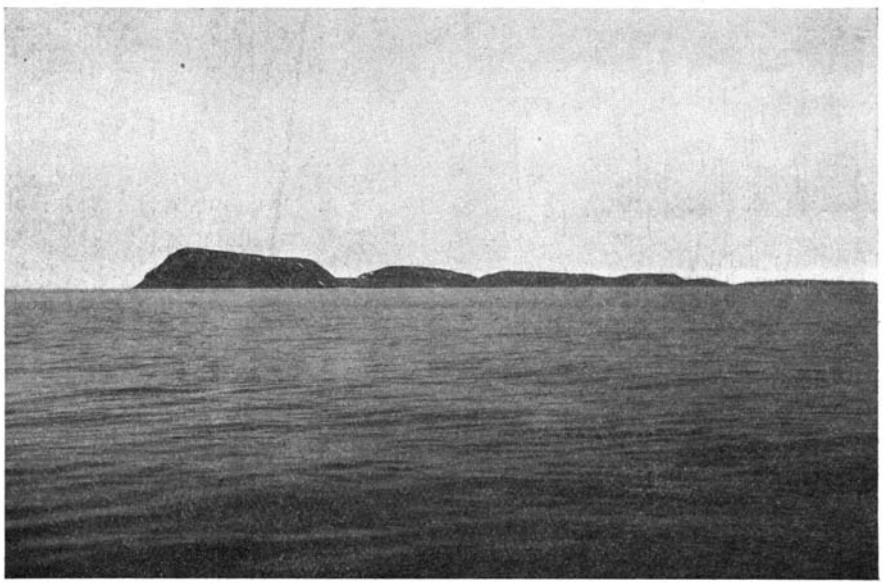

Fig. 4. Hope Island from SSE., six naut. miles off Iversen Hill.
Iversen phot. 31/7 1924.

Pacing 1150 metres from the west brink, in about east-southeast, I came to a ravine with a path of snow extending downwards along the steep east side of the mountain. This ravine was connected with a branched, snow-covered depression extending almost across the entire plateau, with one branch running north-west and the other one south west. This depression, which was about 20 metres wide, looked like a frozen river[1].

The ravine was cut about 150 metres from the outer edge of the west brink, the distance between the two brinks thus being about 1300 metres. The altitude of the east brink was 240 metres above sea-level. The photograph, Pl. III, a, is taken southward from the outer edge of the east brink. In the direction of Koefoed Point our ship "Tovik" is seen at the anchoring place off House Valley. The photograph, Pl.

[1] This snow-filled ravine was also noticed by Mr. RICHARD in 1898.

III, b, is taken northward from a point farther north than the viewpoint of the preceding picture.

The lower eastern part of the mountain plateau was almost devoid of vegetation. The surface was in part covered by frost-shattered masses of rocks, but mostly by soft earth with polygonal forms. Some of the polygon fields had small polygons surrounded by small stones, others had large polygons surrounded by larger stones. The polygons had a variable form; some were quite square.

We descended the hill side southward along the slope of the western

Fig. 5. Hunting cabin in House Valley from E.
Iversen phot. 30/7 1924.

brink. On the way we saw a mangy-looking fox. Just at the foot of the hill immediately below the lowermost large patch of snow, which is seen on the photograph Pl. IV, a, on the west side of House Valley, I took the photograph Pl. IV, b, showing the beach to the south. Ou this beach there were large quantities of drift wood. The slope from House Valley down to the more level plain of the beach was rather steep, but still passable; it was largely covered by old snow.

From the point where the photograph, pl. IV, b, is taken, I estimated the distance to the west beach at 150 metres. From the same point across House Valley, down the ravine of House Brook as far as to the east beach, I paced 750 metres. Thus the distance acrosss the island must be about 900 metres at this place.

The photograph, Fig. 5, taken on the 30th of July, 1924, shows the hut from the east. The hut was used by FRIDTHJOF NICOLAYSEN and

HENRI RUDI from Tromsø in the winter 1908—1909; a note to that effect was found inside. It was largely built of drift-wood, and covered with gravel for protection on the outside. It was roughly built and very small.

The photograph Pl. VI, a, taken south of the hut, shows the landing place with Koller Hill in the background.

On our return to the hut at 6 p. m. we found that KOEFOED and his men had made good collections of plants from House Valley and the level places near the hut. A boat from the "Tovik" had been ashore for a supply of fresh water from the little well at the outlet of House Brook.

Fig. 6. Cairn on Werenskiold Hill, 270 m. above sea-level; Thor Iversen standing. Iversen phot. 13/8 1924.

At 7 p. m. we went on board, rowing in 5 minutes from the beach to the ship at a speed of 3 miles, which makes the distance 465 metres.

The weather had been fine for 12 hours with bright sunshine all the time, the air being clear enough to make Edge Island easily visible from the hill tops. The surroundings of Hope Island were then ice free. After that the island was again enveloped in a dense fog.

Third Visit.

Aug. 25, 1926.

On the 25th of August in the morning, again steering a course for Hope Island from South Cape, we sighted the south point of the island 19 miles off. The photograph, Fig. 7, taken on that occasion on our approaching the island from the southwest, shows the nearest land about 4 1/2 miles off. The photograph Pl. VII, a, is taken a little less than one mile south-southeast of Iversen Hill.

At 1,30 p. m. we anchored in 14 metres of water in Tovikbukta (Tovik Bay), on the north side of Koefoed Point, 500 or 600 metres from land. An hour later KOEFOED and I went ashore with three men. We landed near the north side of the brook gully. Soon after we landed fog set in. KOEFOED and one man went along the beach to make collections on the flat peninsula to the south (Koefoed Point), while I went with two men up through the glen, till I found a place on the south side where it was possible to climb up along a steep slope covered with gravel and big stones.

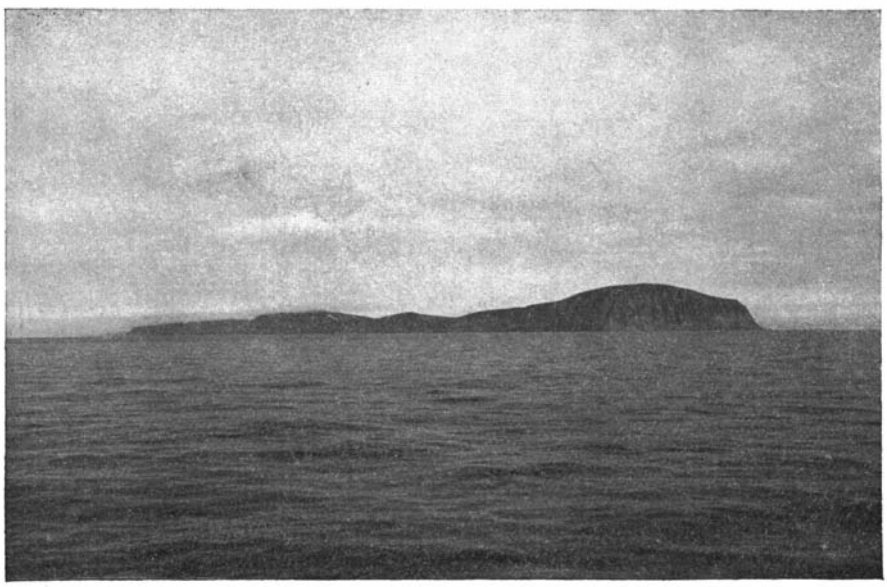

Fig. 7. Hopen Island from SW., about four and a half naut. miles distant from the south point (Cape Thor).
Iversen phot. 25/8 1924.

Just above the edge of the glen there was a fairly large plain, sparsely covered with plants. The altitude of the plain at a point near the glen and also near the steep east brink was measured at 70 metres above sea-level.

The fog was dense, and as we proceeded we placed stones and tufts of grass to mark our way back.

We walked in the direction S. 60° W. by the compass, and came to a plateau 92 metres above sea-level. Continuing in the same direction we found a very deep valley with steep bluffs on either side at an altitude of 124 metres above sea-level. The valley here ran approximately S. 47° W. It was a continuation of the glen, which had a branch running more NNW. farther north. We followed the valley to a height of 165 metres above sea-level, continued in a direction about south to west, and finally reached a plateau with dry ground in which solid rock

was exposed. I thought we had reached the summit, but on the fog lifting for a moment, I caught sight of the highest top farther away, probably in the direction SSW. The depression between these two tops and the slope towards the highest point was covered with dry, clayey earth devoid of vegetation, excepting two tufts of grass about half a foot wide, which grew far apart, and were white with frost on one side, but otherwise green and vigorous. (One of them was included in the collections).

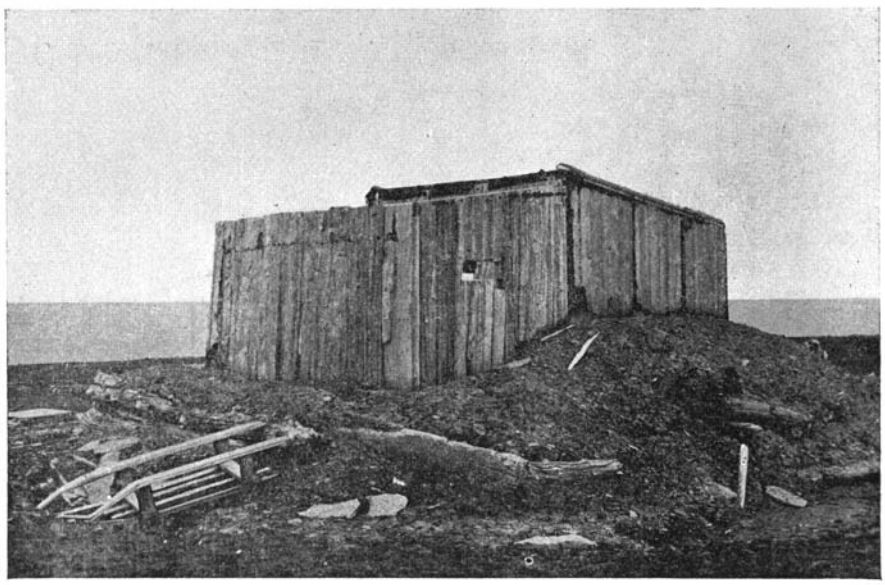

Fig. 8. Hunting cabin on Koefoed Point.
Koefoed phot. 25/9 1924.

We built a cairn on the highest top, 9 metres within the brink of the mountain (365 metres above sea-level).

The material used for this purpose was a rather hard clay, re-inforced with big stones collected on the plateau in the neighbourhood. A small bamboo pole was put down in the middle and a little bottle containing a written note was buried in the cairn. In order to be visible from the sea the cairn had to be made fairly high, because the edge of the brink had a higher elevation than the point where the cairn was built, the surface of the plateau sloping inwards at this point. At this place the brink ran about S. 42° E.

While we were building the cairn the fog lifted for a very short while, and I got bearings of the nearest mountain to the north (Werenskiold Hill) in N. 12° W., of the second top northward (Koller Hill) in N. 17° E., of the third top (Johan Hjort Hill) in N. 22° E., and of the east side of the land northward in N. 27° E. For a brief moment Negro Point

on Edge Island was sighted in N. 34° W. A photograph was taken northward, but fog had unfortunately already begun to set in. As far as could be seen the sea around Hope Island was free from ice.

We returned through the fog to the point at first thought to be the highest top. For shelter from the cold we built a cairn of blocks broken out of the frost-shattered rock. Its altitude is 342 metres above sea-level, but unfortunately I could not determine its position as I had not observed with sufficient accuracy the course taken from the cairn we built to the south of it.

For a brief moment the entire northern part of the island was free from fog and I took the photograph Pl. VI, b, from the stone cairn.

On the way down I made botanical and geological collections, and a little way up on the slope leading down to the brook glen, at the same place where we went up, I took the photograph Pl. V, b, showing the opposite side of the glen.

In the meantime KOEFOED had made collections on Koefoed Point, where the vegetation was comparatively rich. He visited the hunting cabin on the peninsula, also used by NICOLAISEN and RUDI from Tromsø in the winter of 1908—09. Also this hut was in a state of decay, (see photograph, Fig. 8). Some distance SW. of the hut there was built a drift wood scaffold for spring guns used for killing bears.

On the beach near the landing place, just a little north of the brook glen, we found a fragment of coal with some carbonaceus shale. Whether this belongs to the geological formations of Hope Island or has been brought to the island will probably be determined with certainty when the entire geological material has been examined by Mr. ADOLF HOEL. We did not discover any coal-seams, but it may nevertheless be possible to find such seams through a closer examination undertaken by experts. — At 10.30 p. m. we returned to the ship.

We left Hope Island on the 26th of August at 4.30 a.m., first steering a straight course until we were 1 1/2 miles out, and then, after taking a sounding, laying our course northward along the island, sounding off every glen and taking photographs of the land across the course.

At Hermansenskardet (Hermansen Gap) between Johan Hjort Hill and Småhumpen (Small Hummock) a hunting cabin was seen on the beach a little to the left of the deepest depression. It is said to have been used by Norwegian hunters in the winter of 1923—24.

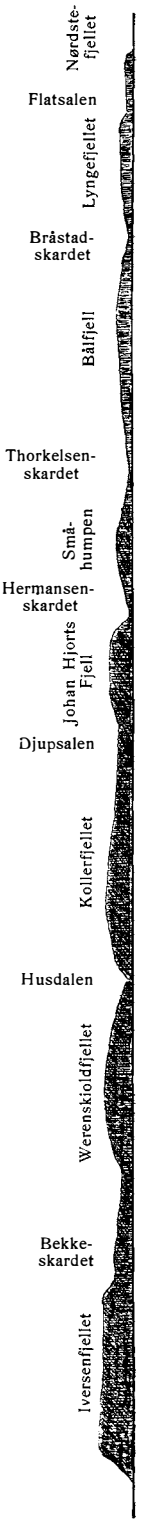

Fig. 9. Hope Island from SSE., 13 naut. miles distant, from a drawing by Thor Iversen.

The photograph Pl. VII, b, shows the northermost point of Hope Island (Hoel Point) seen from SSE. from a point about one mile off the nearest land between Hoel Point and Northernmost Hill.

A bitter wind was blowing from the NNW and there were white-capped seas a good distance out from Hoel Point. I suppose these were due to the wind and current rounding the point. — We then laid our course east for the open sea.

Results.

During the various landings on Hope Island a considerable number of botanical and geological specimens were collected; a large number of photographs were taken; and an attempt was made to determine the exact location and the shape of the island, as fas as this could be done with simple means and without an expert knowledge of surveying.

The observations for the determination of the longitude of Hope Island were made by me on the 13th of August 1924, in the morning, from our anchorage 4 miles NNE. of the south point of the island. The depth at the anchorage was 10,5 metres at a distance of 465 metres from the shore (VIII a, Fig. 10). The altitude of the sun was measured with an octant, the time read by my watch, which is very reliable with an even rate. The measurements of the sun's altitude were made in perfectly clear air and with a clear and distinct horizon. The error of the watch was controlled 4 days afterwards on the 17th of August by comparison with the chronometer of the M/C "Blomstersæl" commanded by Lieutenant THORKELSEN of Mr. HOEL's expedition. The "Blomstersæl" was hailed at the mouth of Ice Fjord; its chronometer had been controlled the day before at the wireless station of Green Harbour by time signals from Paris. The recalculation of the observations has been made by Captain B. CASPERSEN of the Norwegian Navy (see p. 34).

Unfortunately I did not get any opportunity to make observations for determining the latitude during my visit to Hope Island. The latitude stated is therefore somewhat uncertain. It is computed from bearings to Negro Point on Edge Island from certain mountain tops on Hope Island, and by reckoning back from the 14th of August at noon, when I got an observation of latitude west of the south point of Hope Island, 15 hours after having passed this point bound for South Cape.

I determined the distance between the south and north points of Hope Island and the distances between the different mountains and depressions by sailing along the coast and using the patent log. These determinations cannot be quite accurate, especially considering the necessity of making corrections to allow for the strong current which is running along the island.

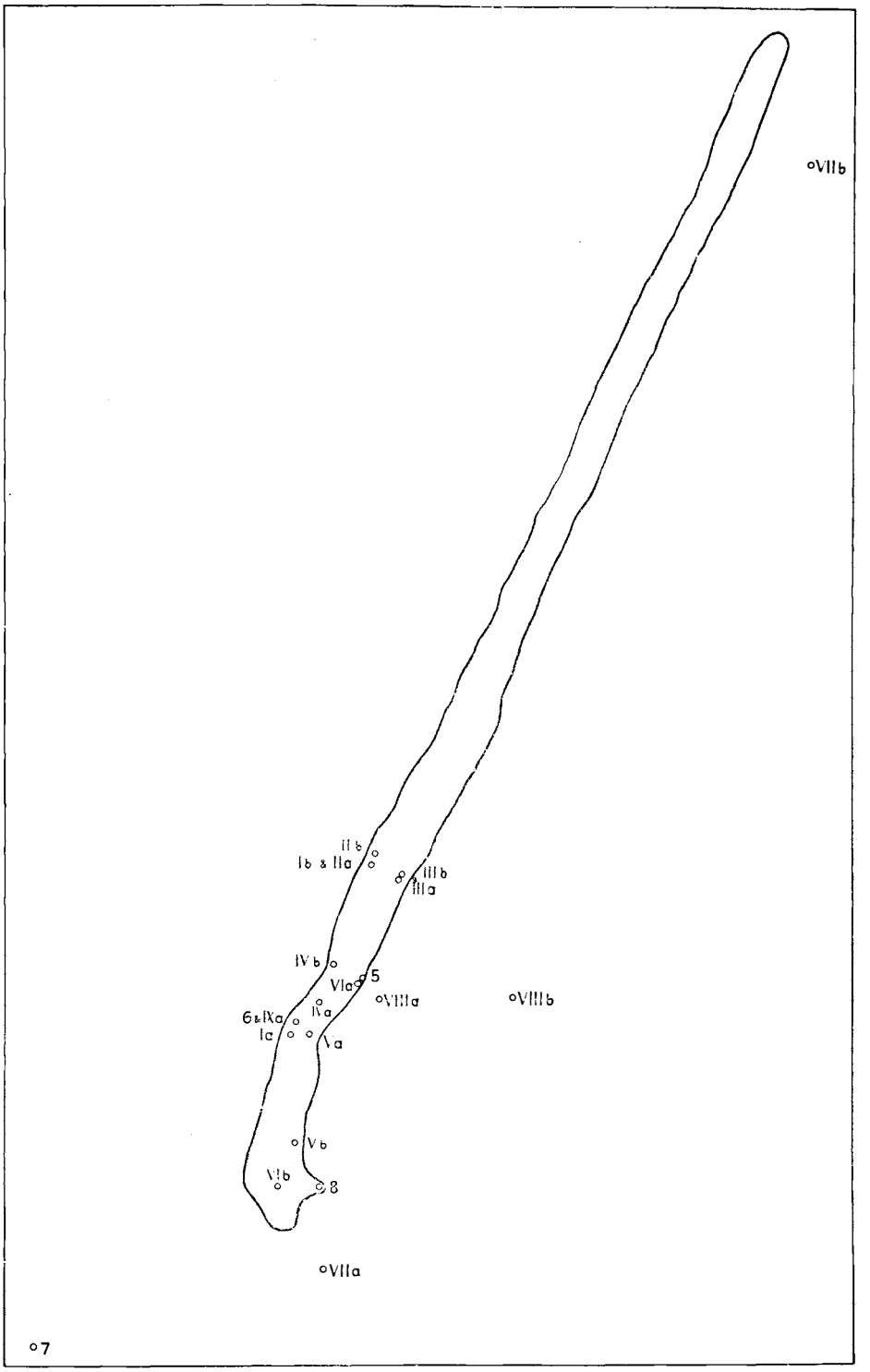

Fig. 10. Map showing location of photographic stations. The numbers and letters correspond to those of the plates and text-figures.

The width of the island at different places was determined by means of a bamboo pole 6 metres long, and also by pacing. Thus I measured with the pole the plateau on the top of Werenskiold Hill from the western to the eastern brink, and the plateau on the top of Koller Hill I also paced across from east to west. In the same way, I paced the entire width of the island across the depression between the two mountains mentioned, with the exception of about 150 metres on the west side which had to be estimated.

The longitudinal direction of the island was determined by sighting with a geological pocket transit from some of the mountains tops, from where I have also taken photographs that give a good picture of the shape of the island.

On the tops of the three relatively large mountains to the south I had cairns erected, determining the altitudes of these and other points with a compensated aneroid pocket barometer.

On the basis of the observations mentioned I have made a sketch map of Hope Island which I believe shows the configuration and location of the island more correctly than previous maps. I have also plotted many soundings taken on the east and south sides of the island.

It will appear from the sketch map (Pl. X) that Hope Island is 20 miles (37 km.) long and only 1/2 to 1 mile (0,9 to 1,8 km.) wide; the area is about 46 sq. kilometres. The mountain tops vary in height from 200 to 365 metres above sea-level. — Seven depressions separate the mountains. Both the eastern and the western mountain sides are steep and inaccessible, while the slopes leading down to the depressions between the hills are more slightly inclined. Often the mountain sides have precipitous cliffs towards the sea without intervening beaches, but in many places there are flat beaches even below the precipices, especially in the southern part of the island. Along the entire island there is a zone of shallow water 100 or 200 metres wide. Here, even small waves form breakers and make it difficult to land in boats. Isolated rocks are visible at the surface in scattered places. Off the flat peninsula on the southeast side (Koefoed Point) there is a row of rocks, Skumskjerane (Foam Skerries), visible at the water's edge from the land. At the south point of the island, where there is a steep precipice towards the ocean, some jagged, isolated rocks protrude above the surface of the water quite near the shore. The mountain tops form plateaux sloping gently down towards the east. The accompanying drawing (Fig. 9) and the photographs illustrate the mountain forms quite well. The hills are built up of horizontal beds of sandstones and shales.

Vegetation occurs in scattered places only, and the number of species is small. The richest occurrences are found in the lower regions, but some vegetation is also found on certain of the mountain tops. Thus there was a considerable growth of plants on Koller and Weren-

skiold Hills, whereas the plateau of Iversen Hill was almost sterile, covered by stones and clay formed by the disintegration of shales.

The collection of botanical specimens was in charge of Mr. EINAR KOEFOED, the zoologist, who was a member of the 1923 and 1924 expeditions. According to his report, the collections included 15 species of flowering plants, besides a number of mosses, fungi, and lichens.

The island is the habitat of the following birds: guillemots *(Uria)*, glaucous gulls (*Larus hyperboreus*), kittiwakes (*Rissa tridactyla*), skuas (*Stercorarius*), and occasional flocks of eiderducks (*Somateria mollissima*). Sandpipers (*Erolia maritima*) were tripping about on the beach.

Of mammals we saw only white or blue foxes, but in the winter, or when drift-ice surrounds the island, polar bears also appear. It is, in fact, the polar bear and the fox that have induced hunters to winter on this desolate island. They have built three huts on the east side, namely one on Koefoed Point, one in House Valley, and one in Hermansen Gap. Two Norwegian hunters wintered on the island in 1908—09 and two others again in 1923—24.

On the relatively flat beaches considerable quantities of driftwood have accumulated. On Koefoed Point a large number of walrus skulls from earlier hunting expeditions were found scattered about and partly buried beneath the moss. Near the water, a few metres above sea-level, and close by the hut in House Valley, we found the skull of a large whale protruding from a deep covering of gravel.

During the taking of oceanographic observations, and trial fishing operations for the testing of different kinds of tackle, it is necessary to make numerous soundings in order to find out the nature and condition of the bottom.

On the cruise with the M/C "Blaafjeld", during the latter part of August, 1923, a hydrographic section was made from South Cape, Spitsbergen, to the west side of Hope Island, thence along the ice edge east of King Karl Land up to the northwest island of Franz Josef Land, thence 2° Lat. south, and finally towards the east side of Hope Island.

Especially in the northern section of this cruise little or nothing was known about the depths of the ocean. The soundings made from the "Blaafjeld" are therefore of interest.

In 1924, the oceanographic work was continued, with the M/C "Tovik". Many hydrographic stations were taken along various sections in the Barents Sea, especially in the waters to the east and west of Hope Island.

The soundings made in this region are also of interest because the depths obtained must be considered more reliable than those given in the present charts. This is however mainly true of the region east and south east of Hope Island. A list of all these soundings is given in an appendix (p. 39.)

Geographical Names.

The geographical names are new, except the name of the island, and have been proposed by me, and sanctioned by The Spitsbergen Naming Committee appointed by the Norwegian Government. Here follows a list of the names:

Norwegian	English equivalent	Notes
Bekkeskardet	Brook Gully	
Bjørnsletta	Bear Plain	
Blåfjell	Blue Hill	The M/C "Blaafjeld".
Bråstadskardet	Bråstad Gap	J. BRAASTAD, Dr. Ing., Mining Engineer, geologist, Norwegian Svalbard Expeditions.
Djupsalen	Deep Saddle	
Flatsalen	Flat Saddle	
Hermansenskardet	Hermansen Gap	A. HERMANSEN, Naval Captain, hydrographer, Norwegian Svalbard Expeditions.
Hoels Odde	Hoel Point	ADOLF HOEL, Lecturer of geology, the University, Oslo; leader of the Norwegian Svalbard Expeditions.
Husbekken	House Brook	Here is a hunting cabin.
Husdalen	House Valley	
Iversenfjellet	Iversen Hill	THOR IVERSEN, Captain, Inspector of Fisheries, Bergen; leader of the Norwegian Government's fishery investigations in the Arctic Seas.
Kapp Thor	Cape Thor	Norwegian christian name.
Koefoedodden	Koefoed Point	EINAR KOEFOED, Mag. Sc., scientific assistant to the Director of Fisheries, Bergen. Mr. IVERSEN's collaborator on the cruises to Hope Island.
Kollerfjellet	Koller Hill	ALFRED KOLLER, Civil Engineer, topographer, Norwegian Svalbard Expeditions.
Johan Hjorts Fjell	Johan Hjort Hill	JOHAN HJORT, Ph. D., Professor of marine biology, the University, Oslo.
Kvasstoppen	Sharp Peak	From the shape.
Lyngefjellet	Lynge Hill	BERNT LYNGE, Ph. D., Lecturer of botany, the University, Oslo.
Nørdstefjellet	Northernmost Hill	
Skumskjerane	Foam Skerries	
Småhumpen	Small Hummock	
Thorkelsenskardet	Thorkelsen Gap	KNUT THORKELSEN, Naval Lieutenant, hydrographer, Norwegian Svalbard Expeditions.
Tovikbukta	Tovik Bay	The M/C "Tovik".
Vesterodden	West Point	
Werenskioldfjellet	Werenskiold Hill	W. WERENSKIOLD, Ph. D., Professor of physical geography, the University, Oslo; geologist and topographer, Norwegian Svalbard Expeditions.

Contributions to the Natural History of Hope Island.

Physical Geography and Geology; Coal Deposits.

By

W. Werenskiold.

As already mentioned in the introduction, Professor NATHORST tried to land on Hopen in the summer of 1898. He writes: "The geological structure is very simple, the layers being nearly horizontal. — — As the furrows formed by the erosion of running water during the melting of the snow are arranged closely together, the rocks are evidently rather soft; and to judge from the appearance — — — they consist most likely of clay-shales or slaty sandstones, with interbedded layers of harder sandstones. Prince Albert of Monaco, who succeeded in landing on the island later in the summer, has brought home some plant fossils, which have been submitted to me for examination. They are too badly preserved to admit of any closer determination, but seem to indicate that they belong to the beds which overlie the Aucella division in Spitsbergen, and which must therefore be supposed to form the transition between the Jurassic and the Cretaceous Systems, or to belong to the oldest division of the Cretaceous System".

Physical Geography and Geology. In 1920, a party of the Norwegian Svalbard Expedition, including the leader, Mr. ADOLF HOEL, and myself, tried to land on Hope Island, as already mentioned by Mr. IVERSEN. We got quite near to the southernmost point and had a fine view of the geological section, which is so well exposed in the cliff that forms the west side of Iversen Hill, towering in a steep wall from the sea to the very top of the mountain, 365 metres high. The same wall extended northwards as far as we could see. From the character of the succession of beds — alternating stripes of light and dark rocks, hard and loose layers, we inferred that the island was built up of rocks belonging to the Neocomian division of the Cretaceous System. This opinion was founded upon the close resemblance between the sections of Hope Island, and sections in Spitsbergen, which are known, from fossil finds, to belong to this system.

Mr. IVERSEN has now brought home some rock specimens from the southernmost part of the island, shales and loose sandstones, of the same appearance and general character as those found in the Neocomian beds of Spitsbergen. The rocks contain some indistinct traces of plant fossils, and also some shells. Hope Island may therefore be considered

to consist of beds belonging to the Neocomian. The results obtained by Mr. BODYLEWSKY, from his examination of the fossil shells, agree very well with Mr. NATHORST's conclusion based on his examination of plant fossils.

These rocks are generally soft, and yield easily to the attacks of the strong disintegrating forces of the Arctic regions. The beds are almost horizontal. The curious outline of the island, a narrow strip with almost parallel sides, might lead to the conclusion that it had been formed between dislocations, but, as none have been proved to exist, it is safer not to introduce these unknown factors as essential agents in the development of the island.

The most striking feature of the island is the contrast between the even surface of the hill-tops, and the steep slopes towards the coast. On old charts the range of seven hills is clearly shown. The hills are quite flat at the the top, for instance Koller Hill, figures in Pl. III & IV. The southernmost hill seems to be an exception to this rule, and possibly this is the case with the northernmost hill, too. In the Arctic regions, the weathering of the rock is chiefly due to frost action, and the transport of the waste is performed by the process called solifluction. Beds containing clayey matter are dissolved into a mire by the weathering process, and the water-soaked clay creeps in slow streams down the slopes, especially during the melting of the snow. This process continues until the denudation reaches a solid layer, a bed of sandstone or limestone, which can delay the weathering so long that a plateau is formed. In this way the formation of plateaus on the hill-tops is determined by the occurrence of resistent beds. To judge from photographs, the hills from Werenskiold Hill and northwards belong to this type, but the highest hill, Iversen Hill, seems to have an upper surface which is rather independent of the character of the layers. It may be that the even slopes on the top of this hill represent a remnant of an old surface, as the whole island is obviously only a remnant of much larger land, broken down and reduced by the attacks of frost and surf. It is impossible to say anything definite as to the formation of the gaps or saddles which separate the hills. These features are also relics of former conditions. The recent river erosion is limited to some ravines leading down to the shore.

Along a great part of the coast the hills rise as cliffs from the very shore. Farthest towards the southwest Iversen Hill forms a sheer precipice from the sea up to the very top. This is the case with other hills farther north along the west coast. The eastern slopes seem to be less steep, except in the northernmost part of the island, (Hoel Point, Pl. VII, b).

There are, however, stretches of low land at several places along the coast. On the west coast, Bjørnsletta (Bear Plain) lies opposite

Husdalen (House Valley), and it seems that the lower passages which separate the hills correspond to flatter parts of the shore on both sides of the island. As proved by the occurrence of drift timber, shells and whalebones, above the actual shore line, the island has been elevated to some degree in recent times — perhaps some 20 metres. The low rims along the coasts are thus explained as raised beaches.

The water along the shore is very shallow all along the island. At our attempted landing in 1920, the sea was breaking heavily over some big rocks that had tumbled down from the precipitous side of the hill. The cliffs are constantly being undermined by the combined action of frost and surf, and the slopes of the hills are constantly cut landward, slow but relentlessly, and in due time the whole island will be reduced to a shoal. This process has, however, been very much retarded by the recent upheaval of the island. Until the rim of low lands has been carried off, the sea cannot reach the base of the old cliffs, and when the gnawing of the disintegrating forces at the foot of the wall is discontinued, the action of the frost will transform the precipice into a talus covered slope, with some resistant ledges projecting through the cover.

Coal deposits. Mr. IVERSEN brought back some chips of coal, but they were not found in situ. Otherwise nothing is known about these occurrences. The coal has been analysed by Dr. J. GRAM (HOEL 1925, pp. 36 and 79).

Shore on the east side. The piece contained bright and dull coal.

	Bright coal	Dull, slaty coal
	Per cent	Per cent
Moisture	0,60	0,50
Ash	15,40	13,02
Fixed Carbon	48.90	50,38
Volatile Matter	35,10	36,10
Calorific Value	7 297	7 759
B. t. u.	13 134	13 976

	River bed House Valley	Summit of Iversen Hill
	Per cent	Per cent
Moisture	1,9	2,2
Ash	18,5	35,7
Fixed Carbon	47,4	37,5
Volatile Matter	32,2	24,6

Flowering Plants.

By
Johannes Lid.

During their visit to Hope Island in 1924 Messrs. IVERSEN and KOEFOED brought together a fine collection of phanerogams which was kindly given to me for determination. The plants now belong to the Botanical Museum of the University of Oslo, except one set which is in the Bergen Museum.

As far as I know, botanical investigations have been made only once before in Hope Island. During Mr. B. LEIGH SMITH's cruise to the Arctic Sea in 1873, the Rev. A. E. EATON (1876, pp. 41—44) collected the following 12 flowering plants in the island.

Alopecurus alpinus
Deschampsia alpina
Draba alpina
Luzula arcuata
Papaver radicatum
Poa arctica
Potentilla emarginata
Puccinellia phryganoides[1]
Ranunculus sulphureus
Saxifraga cernua
Saxifraga groenlandica
Saxifraga nivalis.

In the collection of IVERSEN and KOEFOED 8 of EATON's species are represented, and besides these there are 8 new ones. The number of species is thus raised to 20. I am giving below a list of the plants collected in 1924. The localities cited in the list are given on the map. H = Husdalen (House Valley), I = Iversenfjellet (Iversen Hill), K = Koefoedodden (Koefoed Point), W = Werenskioldfjellet (Werenskiold Hill).

Alopecurus alpinus SM. Flowering July 30. H.
Catabrosa algida (SOL.) FR. Flowering August 13. Common on the island, to the very summit of Iversen Hill 365 m. above sea-level H. I. K. W.
Cerastium alpinum L. Only one specimen obtained, not flowering August 13. W. 270 m. above sea-level.
Cerastium Regelii OSTENF. Only specimens without flowers. H. K. W.
Deschampsia alpina (L.) R. et S. A single specimen with young ear, August 13. H.
Draba alpina L. With fruit August 25. H. K. W.
Cochlearia officinalis L. Flowering July 30. Fruiting August 25. H. K.
Papaver radicatum ROTTB. Flowering August 13 and 25. H. K.
Poa sp. A sterile *Poa* without culms. H. K.
Ranunculus pygmaeus WG. Flowering July 30. H.

[1] A. G. NATHORST (1883, p. 31) suggests that EATON's "*Glyceria maritima*, WALH. var. *festuciformis* HARTM.??" is this plant.

Ranunculus sulphureus SOL. Flowering July 30 and August 13. H. K.
Saxifraga cernua L. The most common phanerogam in Hope Island, according to Mr. KOEFOED. Flowering August 13 and 25. H. I. K. W.
Saxifraga groenlandica L. Flowering July 30 and August 13. H. K.
Saxifraga oppositifolia L. Flowering July 30. H. K.
Saxifraga rivularis L. Next *Saxifraga cernua* the most common one in Hope Island according to Mr. KOEFOED. Flowering July 30, August 13 and 25. H. K. W.
Saxifraga tenuis (WG.) H. SMITH. With flower buds August 25. K.

Mosses.

By

E. Jørgensen.

In the 44 samples of mosses collected by Messrs. IVERSEN and KOEFOED at Hope Island in 1924, I have found the 35 species stated in the list below. Most of the samples contain several species, so that the total number of determinations is 153. In spite of the small number of samples, they suffice to give some idea of the frequency of the different species. The most common ones seem to be *Calliergon stramineum* and *Drepanocladus uncinatus*. Then follow *Haplodon Wormskioldii*, *Racomitrium canescens* and *Cinclidium stygium*. In the list, the localities are designated thus: H = House Valley, K = Koefoed Point, W = Werenskiold Hill.

Cephaloziella arctica (BRYHN & DOUIN) K. MÜLL.	H.
Aulacomnium palustre (L.) SCHWAEGR.	K.
Aulacomnium turgidum (WG.) SCHWAEGR.	H. K. W.
Bartramia ityphylla BRID.	H.
Brachythecium turgidum HARTM.	K.
Bryum Duvalii VOIT.	K.
Bryum obtusifolium LINDB.	H.
Calliergon sarmentosum (WG.) KINDB.	K.
Calliergon stramineum (DICKS.) KINDB.	H. K. W.
Calliergon turgescens (TH. JENS.) KINDB.	H.
Camptothecium trichoides (NECK.) BROTH.	H.
Campylium polygamum (BR. EUR.) BRYHN	H.
Campylium stellatum (SCHREB.) BRYHN	H. K.
Cinclidium arcticum (BR. EUR.) C. MÜLL.	K.
Cinclidium stygium SW.	K.
Dicranoweisia crispula (HEDW.) LINDB.	H.
Distichium capillaceum (L.) BR. EUR.	H.

Drepanocladus brevifolius (LINDB.) WARNST.	H.
Drepanocladus latifolius (LINDB.) WARNST.	H.
Drepanocladus revolvens (SW.) WARNST.	H.
Drepanocladus uncinatus (HEDW.) WARNST.	H. K.
Haplodon Wormskioldii (HORN.) R. BR.	K.
Hygrohypnum polare (LINDB.) BROTH.	H.
Hylocomium alaskanum (LESQ. & JAM.) KINDB.	H. K.
Oncophorus Wahlenbergii BRID.	H.
Orthothecium chryseum (SCHWAEGR.) BR. EUR.	H.
Philonotis fontana (L.) BRID.	K.
Philonotis tomentella MOL.	H. K.
Pohlia commutata (SCHIMP.) LINDB.	H. K.
Pohlia cruda (L.) LINDB.	H.
Polytrichum alpinum L.	H.
Polytrichum alpinum L. *var. septentrionale* (SW.) LINDB.	H.
Racomitrium canescens (TIMM.) BRID.	H. W.
Racomitrium hypnoides (L.) LINDB.	H. K.
Timmia austriaca HEDW.	H.

Lichens.

By

Bernt Lynge.

When travellers who are not botanists or lichenologists collect lichens they usually bring home some conspicuous species, as *Cetrariae*, *Parmeliae* or *Gyrophorae*. I was therefore much astonished to find in the collection of Messrs. IVERSEN and KOEFOED only a few plants of such genera and a considerable number of crustaceous lichens. This shows an excellent power of observation.

I have determined the following species:

1. *Candelariella vitellina* (EHRH.) MÜLL. ARG. Only a sterile fragment, but the substratum and the colour suggest this species and not *C. cerinella*.
2. *Catillaria (Biatorina)* sp. House Valley, most probably a new species.
3. *Cetraria crispa* ACH. East side of House Valley.
4. *Cetraria Delisei* (BORY) TH. FR. East side of House Valley.
5. *Cladonia elongata* (JACQ.) HOFFM. East side of House Valley.
6. *Ionaspis schismatopis* (NYL.) HUE. Iversen Hill and House Valley. The gonidia are distinctly *Trentepohlia*. The plants had a very poorly developed thallus. One of them contained no ripe apothecia. The other had young apothecia of the carneous type, their texture agreed well with the Bear Island plants formerly determined by me.

7. *Lecanora flavida* HEPP. House Valley and a locality near the house, several plants. It is well known for its thin thallus: "wie eine dünn angeflogene Lage erdigen Schmutzes" (KOERBER). But the thallus of these plants was thinner than any other *L. flavida* thallus which I have seen, sometimes only small apothecia surrounded by a hardly perceptible thallus.
8. *Lecanora gelida* (L.) ACH. A sterile fragment from the summit of Iversen Hill. Found in almost every Arctic collection.
9. *Lecanora lacustris* (WITH.) TH. FR. Iversen Hill, small, but well developed.
10. *Lecidea albocoerulescens* ACH. Summit of Iversen Hill.
11. *Lecidea conferenda* NYL. Mountain north of House Valley.
12. *Lecidea macrocarpa* STEUD. There are two plants from the mountain north of House Valley. One of them is almost athalline with plane apothecia (TH. FRIES' *a. platycarpa* (ACH.) TH. FR. Lich. Scand. p. 505), the other has a thicker thallus with convex apothecia (var. *superba* (KOERB.) TH. FR. l. c.).
13. *Peltigera canina* var. *membranacea* ACH. Koefoed Point.
14. *Placynthium asperellum* (ACH.) TREV. Only a minute initiating plant from a locality near the house, House Valley.
15. *Polyblastia intermedia* TH. FR. Same locality.
16. *Rhizocarpon expallescens* TH. FR. Iversen Hill.
17. *Rhizocarpon lavatum* (FR.) ARN. House Valley, on the mountain side north of the valley. — These two species are both almost athalline, and it is only with much hesitation that I have ventured the determination. But the structure of the apothecia agrees perfectly with Norwegian plants.
18. *Stereocaulon alpinum* LAUR. Koefoed Point.
19. *Verrucaria aethiobola* WBG. North of House Valley a locality near the house, and on Iversen Hill. Some of the plants were found together with *Lecanora lacustris*, suggesting an irrigated substratum. Found on hard rocks, not on limestone.

The present writer is of opinion that the above mentioned *Catillaria* is a new species. Very few *Catillariae* have been recorded from the Arctis. He will give his final opinion on it with a full description in a later paper.

Botanists determing Arctic lichens often find it extremely difficult owing to the poorness of the thallus. The present writer has worked much on Arctic lichens, but he has never seen a collection in which the thallus was so poorly developed as in these plants; they resemble the lichens from the nunataks where the thallus is often so miserable that the plants must be left as undeterminable. Some of the determinations are therefore open to criticism. But that is a question of more

special botanical interest, and it will be fully discussed in a paper on some lichens from Spitsbergen, which is in preparation.

The collection has evidently been collected quite incidentally, and it gives no full idea of the lichen flora of Hope Island. But it is sufficient to suggest a very interesting lichen flora, and it is much to be desired that this very isolated island could be explored lichenologically. It is quite probable that the number of lichens could be raised to more than 100, and that it would include some endemic species.

Fossil Plants.

By

Ove Arbo Høeg.

In 1924, some rock specimens, a few of which contained plant fossils, were brought home from Hope Island by the Norwegian Fishery Investigation Expedition led by Mr. THOR IVERSEN. Collections of this kind have, as far as I know, only once before been made at Hope Island: The Palæobotanical department of the Riksmuseum in Stockholm has some few undetermined specimens from this island, belonging to the PRINCE OF MONACO. In his report on the expedition of the Prince of Monaco in 1898 J. RICHARD (1899, p. 70) states: "L'examen des roches recueillies par M. Neuville a permis à M. le professeur Nathorst de confirmer son opinion que l'île Hope est jurassique et que les échantillons rapportés au carbonifère par M. G. Dollfus y ont été introduits par les glaces flottantes comme certains blocs de granit et de gneiss."

Besides this, nothing has to my knowledge been written about these fossils from Hope Island. Mention should, however, be made of the fact that NATHORST (1894), on his geological map of Spitsbergen 1894, has regarded Hope Island as Triassic.

I intended to describe these specimens in connection with the other Mesozoic plants from Svalbard. Since I am to give a short report on the Norwegian material, at the request of Dr. WERENSKIOLD, it will be reasonable to describe all the specimens from Hope Island jointly.

The plants may be divided into two groups:

1. *Pterophyllum.* Two specimens are found, one in each collection. The rocks are extremely different, but the species are, curiously enough, perhaps the same in both cases. One specimen (Pl. IX, b, 1), belonging to the PRINCE OF MONACO, lies in a light chocolate brown, very finely clastic rock; particulars as to the locality are wanting. It has a broad rachis, and the segments, each of which is somewhat narrowed near the basis, are slightly confluent along the rachis. — The Norwegian

specimen (Pl. IX, b, 2) lies in a somewhat yellowish grey sandstone, rather coarse; the rock closely resembles the type which is common in the plant-bearing Triassic beds of Spitsbergen. The piece is obviously one half of a pebble from the beach or a river, the whole flat side being covered with the Pterophyllum leaf. Locality: First terrace above the beach, House Valley, July 30, 1924. The rachis is stout, but narrower than in the other specimen. The segments are not distinctly connected. — As it will appear from the figures, the two leaf fragments are rather alike in size and form, and they may with some probability be considered to belong to the same species, in spite of the difference of the rocks. To which of the numerous and very difficult Mesozoic species of the genus they belong cannot be determined with certainty, at least for the present.

The genus *Pterophyllum* is especially characteristic of the Upper Triassic and the lower Jurassic beds, but is known to occur sparingly down to the Upper Carboniferous, and up to the Cretaceous System. NATHORST does not mention any species of this genus in his paper on the Mesozoic plants of Spitsbergen (1897). But in 1910 (p. 357) he mentions *Pt. cf. aequale* BRONGN. among the plant fossils found in the Triassic sandstones of Mt. Bertil in 1909, on the west side of Ekman Bay; *Pterophyllum* has also been found in Van Keulen Bay, in Triassic sandstones. — These are mostly forms with broader leaflets, but some specimens with more slender ones have also been found, and these bear a close resemblance to those at Hope Island.

2. Equisetaceous stems (Pl. IX, b, 3—5). — Among the material belonging to the PRINCE OF MONACO, two pieces of sandstone are found bearing impressions of stalks. Among the Norwegian material, collected along the beach below Iversen Hill north of the mouth of the House Valley, some specimens are found, partly of the same sandstone, partly of a still coarser rock, almost conglomeratic, and in a piece of the latter there is an extremely ill-preserved impression of a stalk, with one nodus and stripes of the vascular bundles. — An accurate determination of the species is impossible; it is rather similar to *Equisetites scanicus* STERNB. from the Rhaetian of Scania although it may also be some other of the many Mesozoic Equisetales. — The impressions cannot be distinguished from those found in the Triassic sandstone from Mt. Bertil, Spitsbergen; but it need not therefore be of the same species. Similar forms have also been found at other places in the Triassic beds of Spitsbergen: in Van Keulen Bay, from which locality NATHORST mentions *Equisetites cf. scanicus*, very badly preserved.

If one may judge from the scanty material, it may at least be suggested that rocks belonging to the Upper Triassic beds should probably be expected to occur at Hope Island.

Fossil Shells.

Letter from Mr. W. BODYLEWSKY of Leningrad, to Professor J. KJÆR of Oslo.

The collection from Hope Island sent by you has come to hand just as I am about to leave Leningrad. I have therefore been able to spend only a short time on the examination. In the collection the following lamellibranchiata are present:

Mytilus-like forms

Panopaea(?)

and gastropoda:

Natica(?)

Pleurotomaria(?)

which could not be more exactly determined, and furnish no data for a closer fixing of the age of the fossiliferous beds. A comparsion with the collections from Spitsbergen does not bring me much nearer to the goal, as the fossils from Hope Island are not absolutely indentical with any of those from Spitsbergen. The lamellibranchiata, however, bear the nearest resemblance to the forms from bed No. 32 of the "Festning" section in Spitsbergen; studied by ADOLF HOEL in 1908, 1912, and 1913; cfr. SOKOLOV 1922; but these latter are not more closely determinable either. This zone lies above the beds containing *Elatides*, *Pityophyllum*, *Gingko*, the age of which has been determined as Lower Aptian by D. N. SOKOLOV.

Of course, no stress can be laid on such a determination of the age of the fossils from Hope Island. If there is no hurry as to the returning of the material I have received, I will take permission to prepare the material from Hope Island in the Autumn, hoping to be able to get a closer determination then.

Yours etc.

(sign.) W. Bodylewsky.

Determination of Position.

By

B. Caspersen.

With a note by

W. Werenskiold.

Hope Island, east side, southern part, 465 metres from shore, off Husdalen (House Valley). Position by dead reckoning: N. Lat. 76°34′; Long. 24°30′ E. Gr. Observations by THOR IVERSEN, Aug. 13, 1924.

Watch correction:

Aug. 17 Watch too fast	$1^h\ 2^m\ 35^s$	Eq. t. $4^m\ 44{,}7^s$
- 18 - - -	1 2 32	Corr. + 3
- 19 - - -	1 2 28,5	$4^m\ 47{,}7^s$
Change of clock, two days .	6,5	
- - per day ...	3,25	
- - four days .	13	Dec. ⊙ 14° 41′ N
	1 2 35	Corr. + 5
Aug. 13 Watch too fast	$1^h\ 2^m\ 48^s$	*d* 14° 46′ N

First observation:

W. T.	$6^h\ 11^m\ 23^s$ A. M	Obs. alt. ⊙...	16° 43′ (Error for
	6 12 14		16 48 16° 45′)
	6 13 37		16 52
Mean W. T. ..	$6^h\ 12^m\ 24{,}7^s$	Mean obs. alt.	16° 48′,3
C—W.	1 2 48	Corr.	10′,2
G. M. T.	$5^h\ 9^m\ 36{,}7^s$	Obs. *h*	16° 58′,5
Eq. t.	÷ 4 47,7	Calc. *h*	16° 50′,8
G. A. T.	$5^h\ 4^m\ 49$	Alt. diff.	8′,3
Long. ass. pos.	1 38 E.		
L. A. T.	$6^h\ 42^m\ 49^s$		
t	5 17 11		

The values: N. Lat. 76° 34′; d = 14° 46′; t = $5^h\ 17^m\ 11^s$ give the calculated *h* = 16° 50′,2.

Second observation. Same place, same day.

W. T.	$7^h\ 6^m\ 12^s$ A. M.	Obs. alt. ⊙...	19° 49′
	7 7 11		19° 52′
	7 8 13		19° 54′
Mean W. T. ..	$7^h\ 7^m\ 12^s$	Mean obs. alt.	19° 51′,7
C—W.	÷ 1 2 48	Corr.	10′,7
G. M. T.....	$6^h\ 4^m\ 24^s$	Obs. *h*	20° 2′,4
Eq. t.	÷ 4 47,3	Calc. *h*.....	19° 54′,7
G. A. T.....	$5^h\ 59^m\ 36^s{,}7$	Alt. diff.	7′,7
Long. ass. pos.	1 38 E.		
L. A. T.	$7^h\ 37^m\ 36^s{,}7$		
t	4 22 23,3		

Eq. t.....	$4^m\ 44^s{,}7$
Corr.....	+ 2,6
	$4^m\ 47^s{,}3$

Dec. ⊙ ..	14° 41′ N.
Corr.....	4,5
d	14° 45′,5 N.

The values: N. Lat. $76^\circ\,34'$; $d = 14^\circ\,45',5$; $t = 4^h\,22^m\,23^s,3$ give the calculated $h = 19^\circ\,54,7'$.

Note on the determination of position from two altitudes observed at the same place, but at different times. By W. Werenskiold.

If, as usual: d = declination, t = hour angle, h = altitude of star observed, and φ = latitude of place of observation, then the fundamental equation connecting these quantities is:

$$\sin d \sin \varphi + \cos d \cos \varphi \cos t = \sin h$$

Differentiation gives:

$$(\sin d \cos \varphi - \cos d \sin \varphi \cos t)\,\Delta\varphi - \cos d \cos \varphi \sin t\,\Delta t = \cos h\,\Delta h$$

If the sun's azimut a is introduced, the formula becomes:

$$\cos a\,\Lambda\,\varphi + \sin a \cos \varphi\,\Delta t + \Delta h = 0$$

If azimuth tables are used, this form is, of course, more convenient. As each observation gives an equation between the unknown corrections $\Delta\varphi$ and Δt, these can be found from two observations. Using natural sines and cosines, and a computing machine, the equations are:

$$(\mathrm{I}) \qquad 0{,}115470\,\Delta\varphi - 0{,}220728\,\Delta t + 7{,}94418 = 0$$
$$(\mathrm{II}) \qquad 0{,}329429\,\Delta\varphi - 0{,}204576\,\Delta t + 7{,}23969 = 0$$

The eliminations give: $\Delta\varphi = 0{,}55$

$\Delta t = -\,36',34$

The hour angle is reckoned positive towards the west, and should be diminished. The result is:

Appr. Lat. $\varphi = 76^\circ\,34'$		Appr. Long. $L = 24^\circ\,30'$	E.
Corr.	0,55	Corr. $\Delta L = \div\,\Delta t = +\,36{,}34$	
Final values $\varphi = 76^\circ\,34',5$		$L = 25^\circ\,6',3$	

For proof, the altitudes are computed from these values:

(I)	Calc. h $16^\circ\,58',4$		(II)	$20^\circ\,2',4$
	Obs. h 16 58,5			20 2,4
	Difference	0',1		0,0

These differences are within the errors of computation.

The position computed by. Mr. Caspersen is:

	$\varphi = 76^\circ\,32'$		$\lambda = 25^\circ\,3'$	
Here obtained:	76 34,5		25 6,3	
Difference:	$\Delta\varphi =$	2,5 N	$\Delta\lambda =$	3,3 E.
in nautical miles:		2,5 N		0,8 E.

The longitude is well determined, but the latitude is still uncertain, the sun being near the prime vertical at the time of the observations.

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Appendix. Lists of Soundings.

I. Soundings taken by Thor Iversen on the "Blaafjeld" 1923.

South Cape — Hope Island — Franz Josef Land.

Lat. N.	Long. E. Gr.	Depth in metres	Deposit
76° 24′	16° 48′	33	
76° 25′	17° 12′	157	
76° 25′	18° 34′	229	Stone
76° 27′	20° 5′	215	Clay
76° 28′	21° 28′	277	"
76° 29′	22° 53′	116	"
76° 40′	23° 53′	37	Stone Shell
76° 48′	24° 7′	37	" "
77° 7′	24° 30′	64	Clay
77° 22′	26° 5′	193	"
77° 32′	26° 50′	160	"
77° 44′	27° 36′	183	"
78° 6′	28° 47′	339	"
78° 18′	29° 31′	302	"
78° 31′	30° 12′	324	"
78° 38′	30° 23′	296	"
78° 47′	31° 20′	280	"
78° 56′	32° 19′	270	"
79° 4′	33° 11′	230	"
79° 14′	34° 5′	240	"
79° 20′	35° 26′	283	"
79° 24′	36° 40′	300	"
79° 35′	37° 43′	322	"
79° 46′	38° 40′	327	"
79° 58′	39° 2′	355	"
80° 11′	39° 30′	375	"
80° 24′	39° 53′	407	"
80° 28′	41° 17′	363	"
80° 32′	41° 43′	385	"
80° 26′	42° 16′	383	"
80° 18′	43° 19′	378	"
80° 3′	43° 21′	338	"
79° 48′	43° 43′	251	"
79° 33′	43° 52′	133	"
79° 19′	44° 6′	90—108	Stone
79° 3′	44° 20′	180	" Clay
78° 48′	44° 31′	226	Clay

Lat. N.	Long. E. Gr.	Depth in metres	Deposit
78° 35′	44° 45′	214	Clay
78° 21′	44° 52′	258	„
78° 14′	43° 48′	273	„
78° 6′	42° 43′	236	„
77° 53′	40° 42′	220	„
77° 40′	38° 33′	254	„
77° 29′	36° 31′	176	„
77° 17′	34° 30′	147	„ Stone
77° 6′	32° 23′	225	
77° 4′	32° 2′	238	„
76° 55′	30° 10′	261	„ Stone

II. Soundings taken by Thor Iversen on the "Tovik" 1924.

Spitsbergen Waters.

Lat. N.	Long. E. Gr.	Depth in metres	Deposit
70° 1′	29° 45′	224	
70° 30′	31° 2′	109	
70° 53′	31° 0′	314	Clay
71° 17′	30° 58′	289	„
71° 39′	30° 57′	325	
72° 1′	30° 56′	352	
72° 23′	30° 55′	294	
72° 46′	30° 54′	296	
73° 10′	30° 53′	327	
73° 33′	30° 48′	368	
73° 57′	30° 42′	343	
74° 22′	30° 37′	337	
74° 47′	30° 30′	384	
75° 10′	30° 19′	379	
75° 33′	30° 7′	348	
75° 55′	29° 57′	303	
76° 17′	29° 42′	280	
76° 45′	29° 22′	261	
76° 45′	28° 36′	184	Clay
76° 45′,5	27° 52′	140	„
76° 46′	27° 7′	112	„
76° 46′,5	26° 43′	104	
76° 32′	26° 40′	83	
76° 22′	26° 38′	148	Clay
76° 12′,8	26° 37′	160	„
76° 10′	26° 47′	195	„
76° 7′,8	26° 54′	205	„
76° 5′,5	26° 43′	189	„

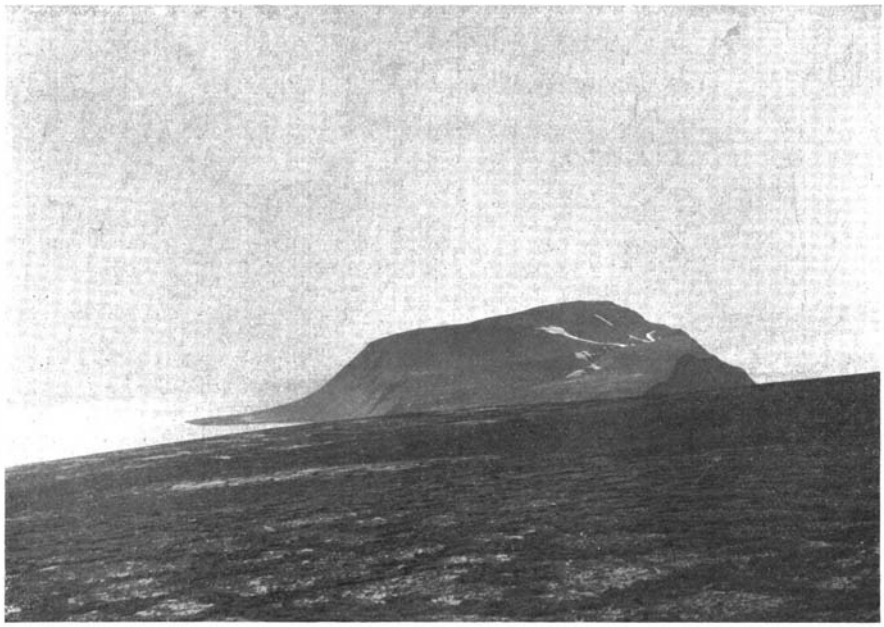
Lat. N.	Long. E. Gr.	Depth in metres	Deposit
75° 25′	26° 28′	175	Clay
75° 23′	26° 33′	192	„
75° 8′,5	28° 2′	295	„
74° 42′	30° 55′	363	„
74° 37′	31° 27′	302	„
74° 35′	31° 35′	295	„
74° 25′	32° 40′	210	„
73° 56′	32° 16′	268	
73° 55′	30° 57′	337	
73° 54′,5	29° 34′	365	
73° 53′,5	27° 1′	422	
73° 55′	24° 30′	445	
73° 57′	22° 1′	469	
73° 58′	21° 24′	298	
76° 23′,5	17° 12′	65	
76° 24′	17° 22′	168	
76° 23′	18° 32′	211	
76° 23′	20° 2′	225	
76° 23′	21° 30′	254	
76° 23′	22° 59′	91	
76° 24′	23° 57′	60	
76° 27′	24° 55′	46	
76° 26′	25° 4′	52	Stone
76° 8′	26° 28′	155	„ Clay
76° 5′	26° 47′	192	„ „
75° 54′,3	26° 50′	172	Clay
75° 53′	26° 58′	187	„
75° 42′	26° 59′	197	„
75° 32′	27° 0′	228	„
75° 29′	26° 51′	219	„
75° 27′	26° 43′	197	„
75° 24′,5	26° 44′	198	„
75° 21′,5	26° 43′	199	„
75° 19′,5	26° 43′	209	„
75° 21′,8	26° 33′	193	„
75° 25′,8	26° 33′	197	„
75° 29′,4	26° 31′	184	„
75° 33′,5	26° 28′	171	„
75° 36′	26° 29′	145	„
75° 36′,8	26° 37′	162	„
75° 36′,8	26° 43′	194	„
75° 39′,8	26° 43′	169	Coral. Clay
75° 40′,1	26° 45′	170	Clay
75° 39′,8	26° 47′	191	„
76° 13′	26° 48′	172	„
76° 15′	26° 57′	157	„
76° 15′	27° 10′	151	„
76° 15′	27° 29′	136	Stone
76° 14′,5	27° 38′	131	Clay

Lat. N.	Long. E. Gr.	Depht in metres	Deposit
76° 15′	27° 56′	131	Clay
76° 12′	27° 47′	140	„
76° 9′	27° 35′	218	„
76° 4′	28° 4′	142	„
76° 2′	28° 15′	158	„
76° 0′	28° 35′	208	„
76° 0′	28° 43′	223	„
76° 3′	28° 43′	207	„
76° 6′	28° 43′	203	„
76° 12′	28° 43′	182	„
76° 16′	28° 43′	164	„
76° 22′	29° 45′	290	„
76° 28′	30° 47′	298	„
76° 33′	31° 47′	307	„
76° 39′	32° 50′	269	„
76° 45′	33° 55′	186	Stone
76° 42′	33° 42′	189	
76° 39′	33° 27′	208	
76° 34′,5	33° 37′	273	
76° 34′,5	33° 55′	272	
76° 35′	34° 14′	257	
76° 37′	34° 27′	255	Clay
76° 28′	34° 40′	302	„
76° 17′	34° 57′	252	
76° 5′	34° 53′	234	
75° 53′,5	34° 53′	201	„
75° 49′	34° 35′	207	„
75° 46′,5	34° 4′	228	„
75° 44′	33° 34′	268	„
75° 39′	33° 14′	278	„
75° 26′	32° 48′	324	„
76° 23′	25° 9′	64	Stone Coral
76° 20′,3	25° 14′	70	„ Shell
76° 16′,8	25° 21′	81	„ Clay
76° 15′	25° 30′	91	Clay
76° 12′,8	25° 50′	99	„
76° 10′,3	26° 8′	145	Stone Clay
75° 14′	32° 46′	306	Clay
74° 48′	32° 53′	207	„
74° 37′	32° 10′	271	„
74° 27′	31° 27′	318	„
74° 1′	21° 10′	198	Stone
74° 12′	21° 52′	248	Coral
74° 31′	22° 52′	197	Clay
74° 53′	24° 33′	139	„
74° 55′	24° 52′	145	
74° 56′	25° 10′	153	
74° 57′	25° 28′	157	
74° 58′	25° 49′	174	Clay

Lat. N.	Long. E. Gr.	Depth in metres	Deposit
74° 57′	26° 8′	197	Clay
76° 41′	28° 50′	177	„
76° 34′	28° 40′	170	„
76° 37′	28° 16′	155	„
76° 37′,5	27° 33′	117	„
76° 38′,8	26° 50′	81	Stone
76° 39′,3	26° 28′	76	Sand, Clay
76° 39′,8	26° 7′	58	
76° 40′,2	25° 46′	35	
76° 40′,4	25° 35′	29	
76° 40′,6	25° 29′	26	
76° 38′,6	25° 26′	30	Stone
76° 36′,6	25° 23′	34	Sand
76° 34′,7	25° 21′	35	Stone
76° 32′,8	25° 18′	33	„
76° 31′	25° 16′	45	Sand
76° 31′,3	25° 12′	35	Stone
76° 31′,6	25° 8′,5	25	„
76° 31′,9	25° 5′,3	17	„
76° 32′	25° 3′	11	
76° 31′	25° 3′,7	18	Sand
76° 29′,8	25° 4′	27	Stone
76° 28′,8	25° 3′	37	„
76° 28′,1	25° 1′	25	„
76° 27′,5	24° 57′	41	
76° 27′,5	24° 52′	52	Coral
76° 20′,7	16° 38′	70	
76° 21′,5	15° 55′	120	
76° 22′	15° 13′	255	
76° 22′	14° 32′	840	
76° 29′	25° 5′	40	Stone Shell
76° 31′,3	25° 9′,2	30	„ „
76° 36′,3	25° 18′	22	Stone
76° 38′,4	25° 21′,8	22	„
76° 42′,3	25° 28′	22	„
76° 44′,9	25° 32′,5	25	„
76° 41′	28° 0′	148	Clay
76° 41′	28° 15′	155	„
76° 40′,5	28° 29′	158	„
76° 40′,3	28° 37′	162	„
76° 38′	28° 40′	166	„
76° 37′,5	28° 40′	171	„
76° 18′	28° 25′	143	„
76° 19′	28° 46′	173	„
76° 19′	28° 56′	190	„
75° 58′	28° 47′	229	„
75° 58′	28° 28′	197	„
75° 58′	27° 30′	250	
75° 58′	27° 10′	210	

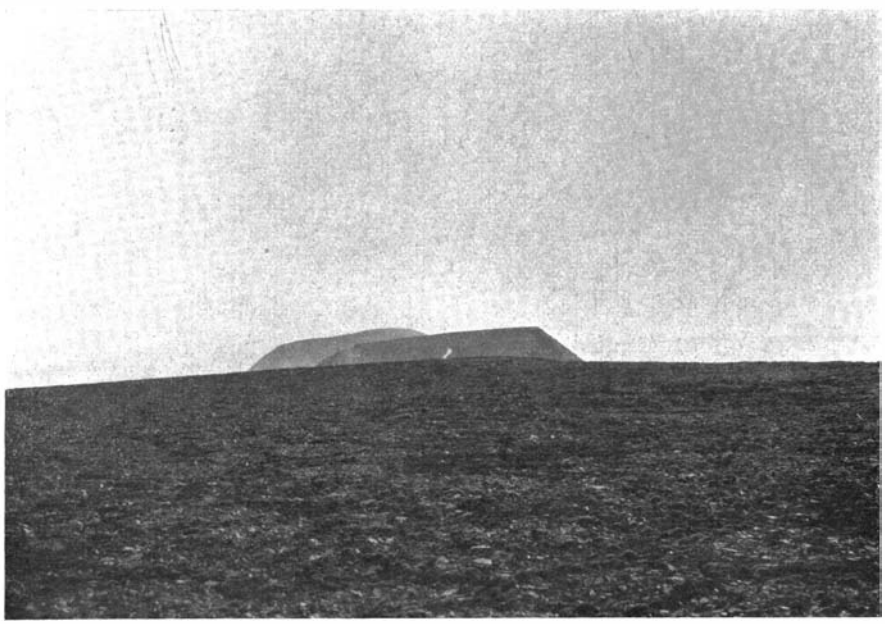
Lat. N.	Long. E. Gr.	Depht in metres	Deposit
75° 58′	26° 52′	201	
75° 30′	27° 0′	227	Clay
75° 28′	26° 43′	207	
73° 49′	32° 7′	330	Stone Clay
73° 45′	33° 54′	330	
73° 42′	34° 38′	306	
73° 38′	36° 18′	265	
73° 34′	38° 8′	230	
73° 29′	40° 2′	277	
73° 19′	41° 12′	326	
72° 57′	39° 55′	317	
72° 31′	39° 5′	301	Stone Clay
72° 4′	38° 14′	301	
71° 42′	37° 34′	303	
71° 20′	36° 43′	248	
71° 16′	35° 32′	186	
71° 12′	34° 0′	223	
70° 59′	32° 35′	236	
70° 54′	31° 37′	251	
70° 54′	30° 17′	310	
70° 57′	29° 4′	245	
71° 1′	28° 40′	97	

Printed, November 26th, 1926.



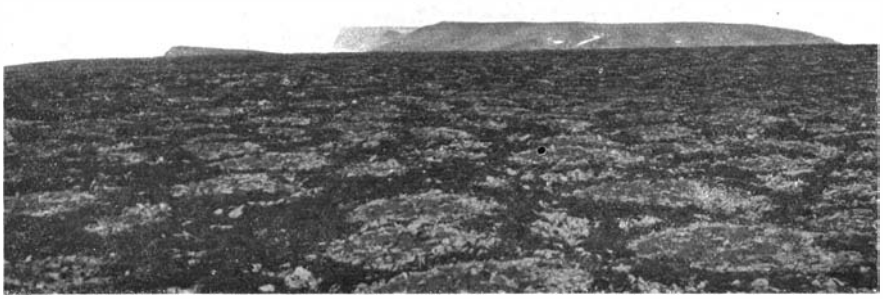
a. Two hundred metres south of cairn on Werenskiold Hill, looking towards Iversen Hill. Kvasstoppen (Sharp Peak) in the foreground.

Iversen phot. 13/8 1924.

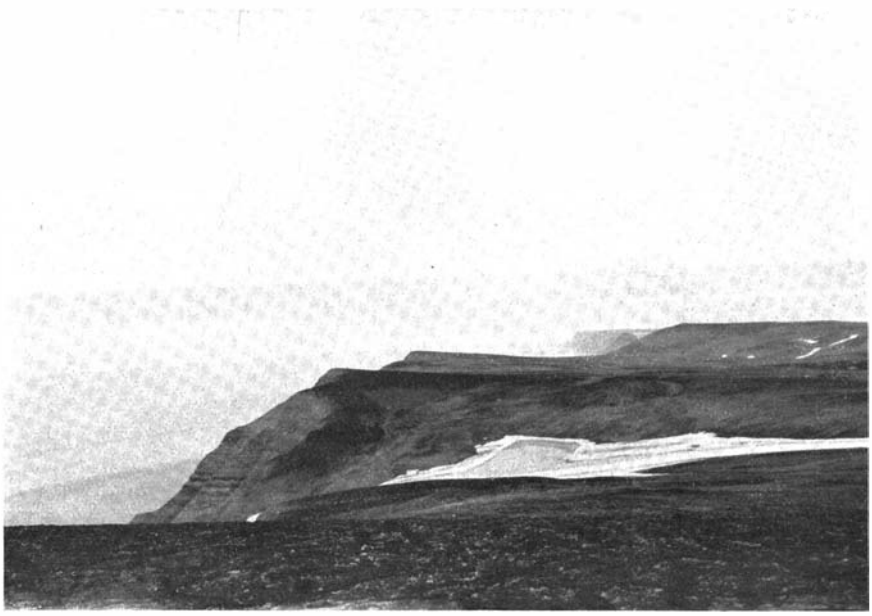


b. From cairn on Koller Hill. Bearing to cairn on Werenskiold Hill, S 36° W, and to the highest point of Iversen Hill, S 17° W.

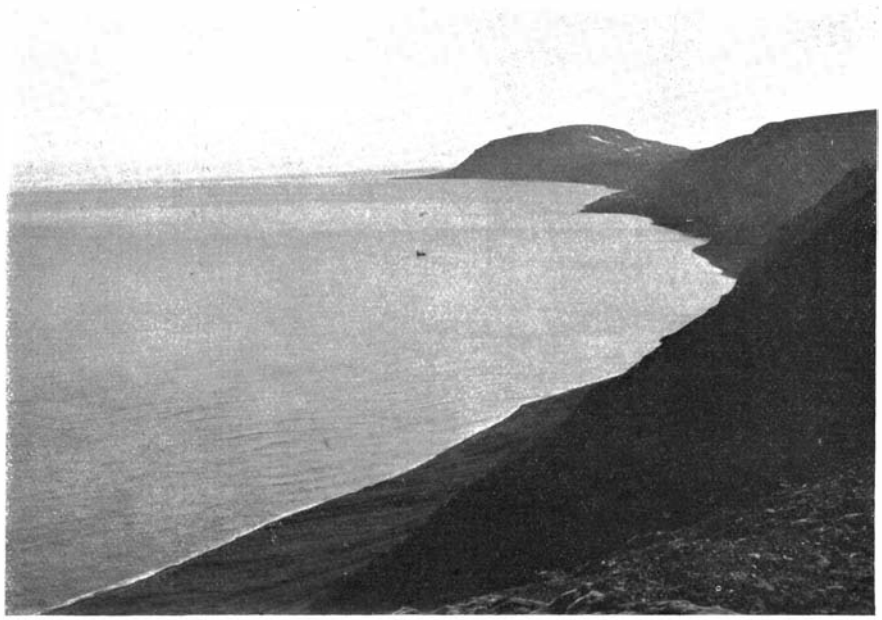
Iversen phot. 13/8 1924.



a. From cairn on Koller Hill. Bearing to the west brink of the northernmost hill, N 28° E. Iversen phot. 13/8 1924.

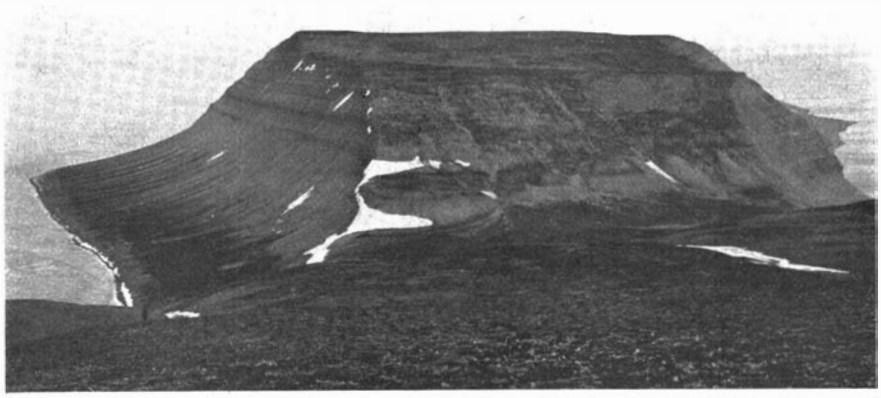


b. One hundred paces north of cairn on Koller Hill, looking north.
Iversen phot. 13/8 1924.



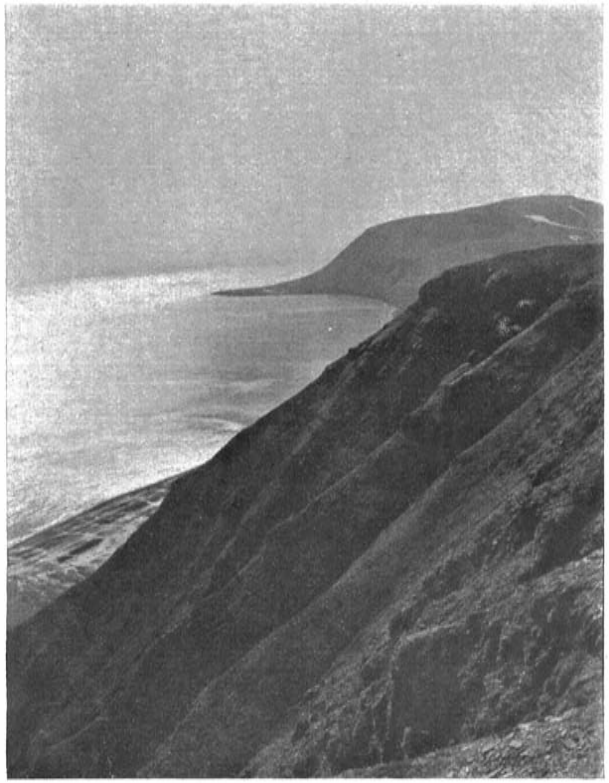
a. From east edge of Koller Hill, looking south. Height: 240 metres. The Tovik is seen lying at anchor. Iversen phot. 13/8 1924.

b. From the east edge of Koller Hill, looking north. Height: 240 metres.
Iversen phot. 13/8 1924.

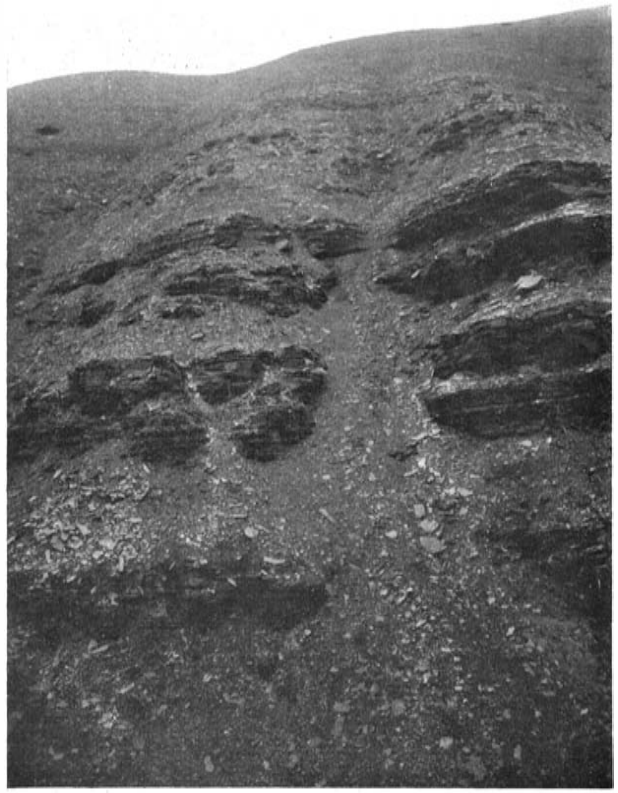


a. From Werenskiold Hill looking towards Koller Hill. Bjørnsletta (Bear Plain) is seen on the left. Iversen phot. 13/8 1924.

b. From the base of Koller Hill on the west side of Husdalen (House Valley) looking south. Iversen phot. 13/8 1924.



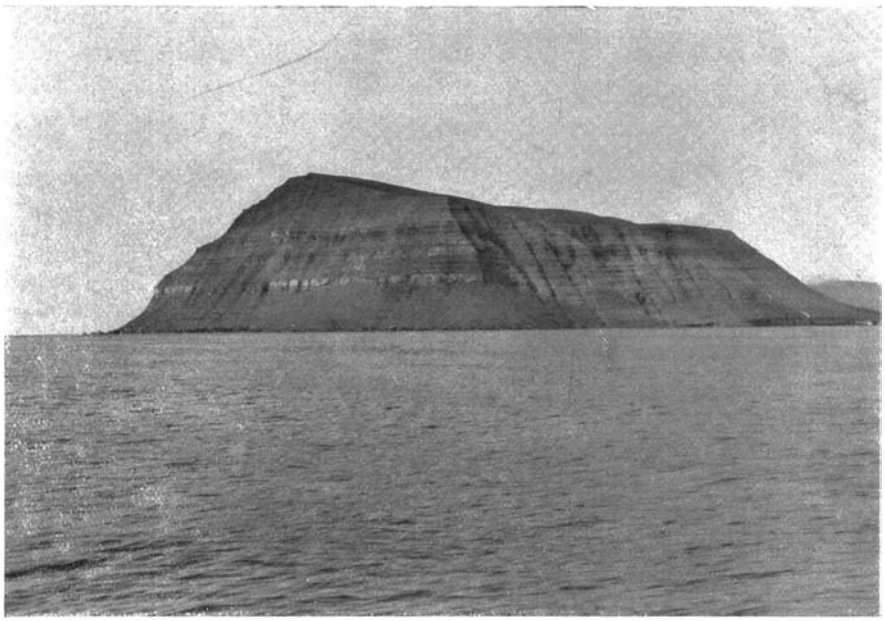
a. From the eastern edge of Werenskiold Hill, 242 m. above sea level, looking towards Iversen Hill. Bearing to the extremity of Koefoed Point, S 2° E, and to Iversen Hill, S 22° W.
Iversen phot. 13/8 1924.



b. The slope in the Bekkeskard (Brook Gully), looking south.
Iversen phot. 25/8 1924.

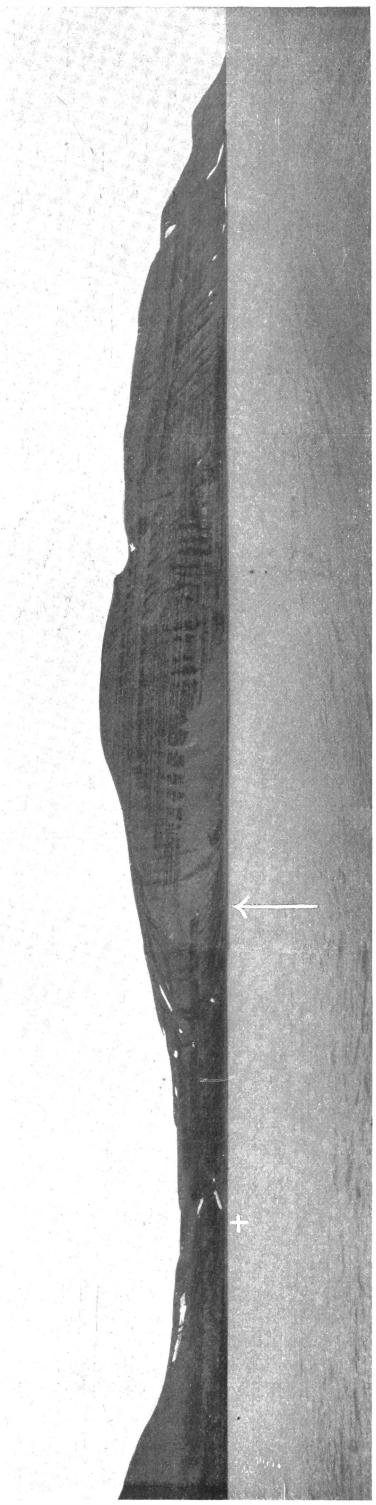
a. A little to the south of the hut in Husdalen (House Valley). Shows hut and landing place. Iversen phot. 13/8 1924.

b. From the lowest cairn on Iversen Hill, looking north.
Iversen phot. 25/8 1924.

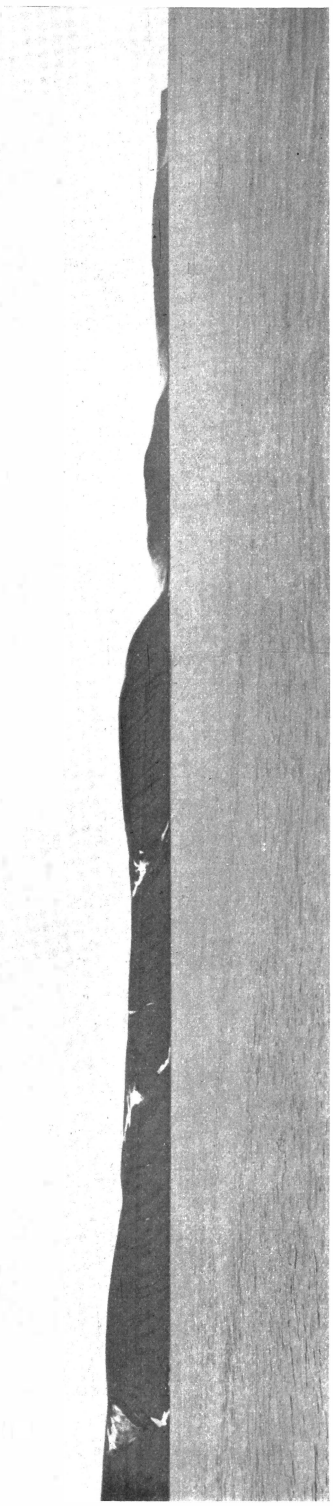


a. About one naut. mile SSE of Iversen Hill.
Iversen phot. 25/8 1924.

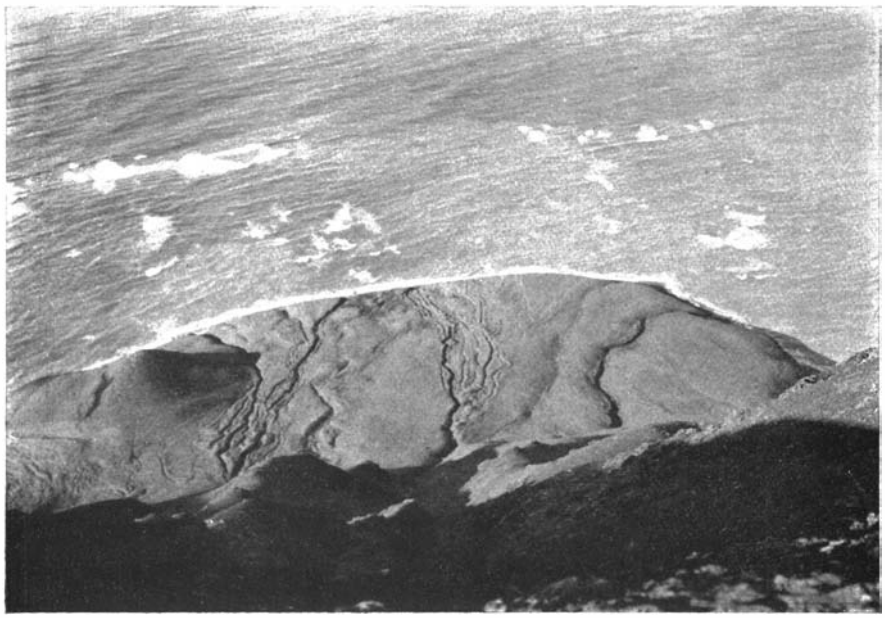
b. Hoel Point from SSE, about one naut. mile off nearest shore.
Iversen phot. 25/8 1924.



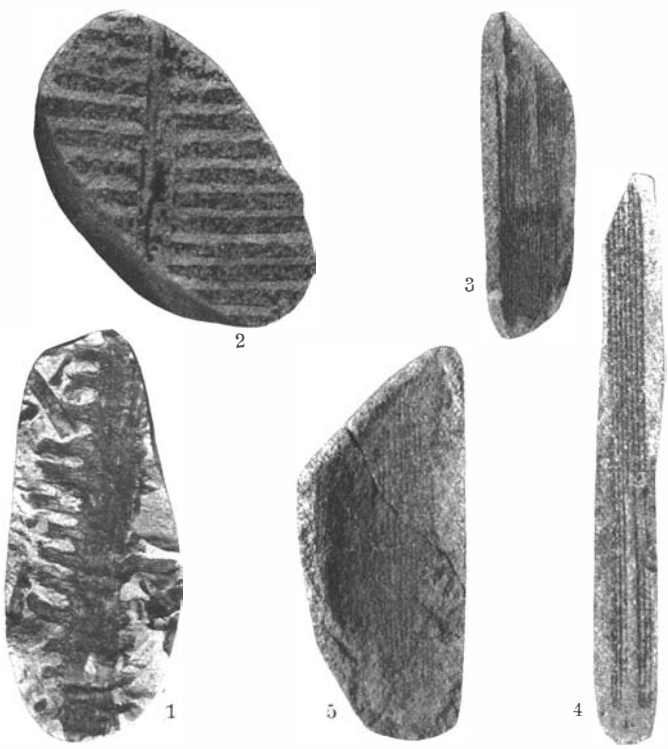
a. Panorama of Hope Island from the anchorage off Husdalen (House Valley). Iversen phot. 31/7 1924.
Location of the hut is indicated by an arrow, and the mouth of the House Brook by a cross.



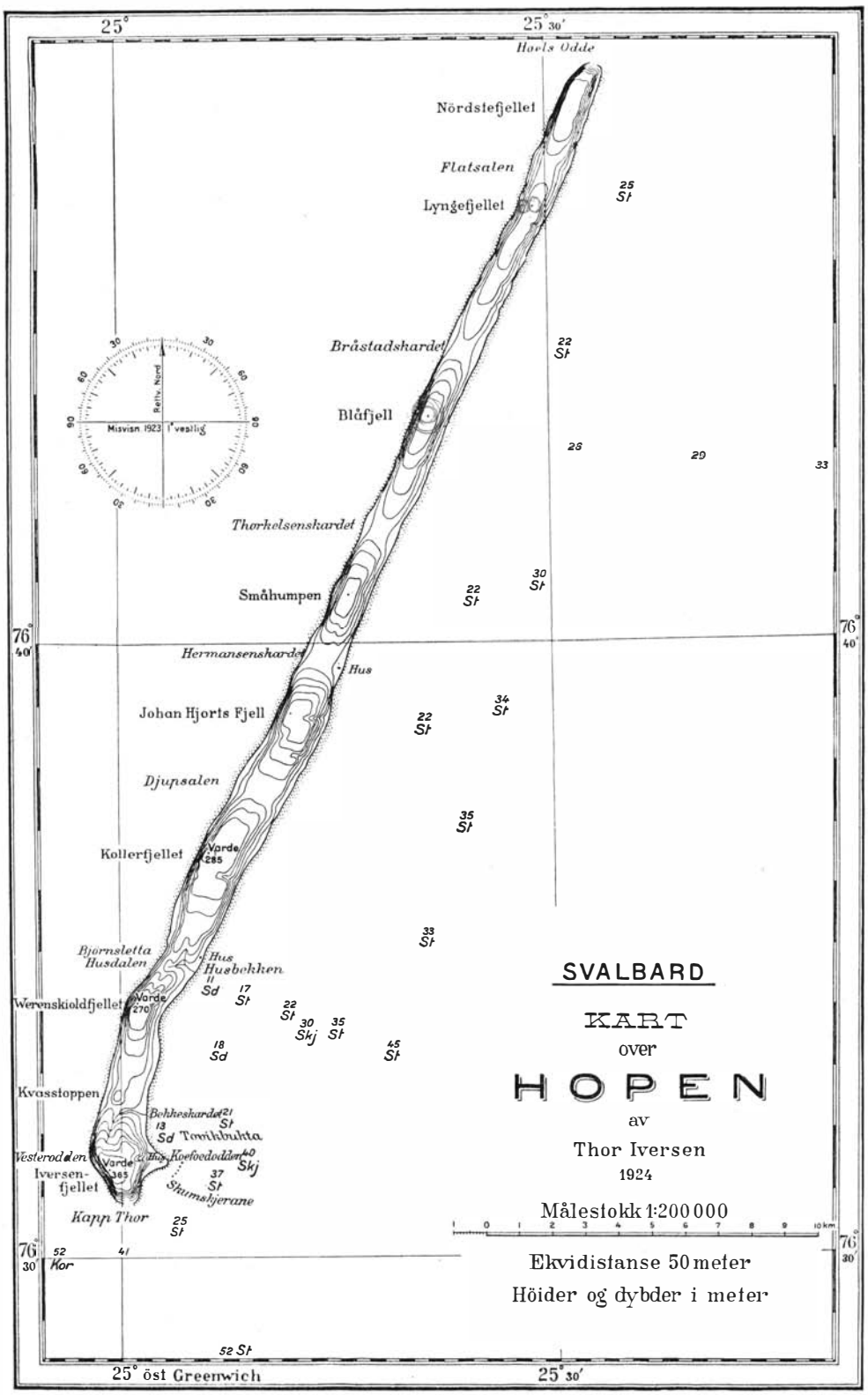
b. Panorama of Hope Island from about two naut. miles off House Valley. Iversen phot. 31/7 1924.



a. From the west edge, close by the cairn, on Werenskiold Hill, looking towards the beach below. Iversen phot. 13/8 1924.



b. Plant fossils from Hope Island. Nos. 1 and 2, Pterophyllum sp. Nos. 3, 4 and 5, stalks of Equisetales. Nos. 1, 3 and 4 belong to the Prince of Monaco, Nos. 2 and 5 to Mr. Iversen's collection. Nat. size. Phot. Høeg.



Map of Hope Island by Thor Iversen. Scale 1 : 200 000.

RESULTATER

AV

DE NORSKE STATSUNDERSTØTTEDE SPITSBERGENEKSPEDITIONER

(RESULTS OF THE NORWEGIAN STATE-SUPPORTED SPITSBERGEN EXPEDITIONS)

OSLO

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