

DET KONGELIGE DEPARTEMENT
FOR HANDEL, SJØFART, INDUSTRI, HÅNDVERK OG FISKERI

NORGES SVALBARD- OG ISHAVS-UNDERSØKELSER
LEDER: ADOLF HOEL

SKRIFTER OM SVALBARD OG ISHAVET

Nr. 73

REPORT ON THE ACTIVITIES OF NORGES SVALBARD- OG ISHAVS- UNDERSØKELSER 1927—1936

WITH 25 FIGURES IN THE TEXT,
2 PLATES, AND 1 MAP



OSLO
I KOMMISJON HOS JACOB DYBWAD
1937

RESULTS OF THE NORWEGIAN EXPEDITIONS TO SVALBARD 1906—1926 PUBLISHED IN OTHER SERIES

(See Nr. 1 of this series.)

The results of the Prince of Monaco's expeditions (Mission Isachsen) in 1906 and 1907 were published under the title of 'Exploration du Nord-Ouest du Spitsberg entreprise sous les auspices de S. A. S. le Prince de Monaco par la Mission Isachsen', in *Résultats des Campagnes scientifiques*, Albert Ier, Prince de Monaco, Fasc. XL—XLIV. Monaco.

ISACHSEN, GUNNAR, Première Partie. Récit de voyage. Fasc. XL. 1912. Fr. 120.00.

With map: Spitsberg (Côte Nord-Ouest). Scale 1:100 000. (2 sheets.) Charts: De la Partie Nord du Foreland à la Baie Magdalena, and Mouillages de la Côte Ouest du Spitsberg. ISACHSEN, GUNNAR et ADOLF HOEL, Deuxième Partie. Description du champ d'opération. Fasc. XLI. 1913. Fr. 80.00.

HOEL, ADOLF, Troisième Partie. Géologie. Fasc. XLII. 1914. Fr. 100.00.

SCHETELIG, JAKOB, Quatrième Partie. Les formations primitives. Fasc. XLIII. 1912. Fr. 16.00.

RESVOLL HOLMSEN, HANNA, Cinquième Partie. Observations botaniques. Fasc. XLIV, 1913. Fr. 40.00.

A considerable part of the results of the ISACHSEN expeditions in 1909 and 1910 has been published in *Videnskapselskapets Skrifter. I. Mat.-Naturv. Klasse. Kristiania (Oslo)*.

ISACHSEN, GUNNAR, Rapport sur l'Expédition Isachsen au Spitsberg. 1912, No. 15. Kr. 5,40.

ALEXANDER, ANTON, Observations astronomiques. 1911, No. 19. Kr. 0,40.

GRAARUD, AAGE, Observations météorologiques. 1913, No. 1. Kr. 2,40.

HELLAND-HANSEN, BJØRN and FRIDTJOF NANSEN, The sea west of Spitsbergen. 1912, No. 12. Kr. 3,60.

ISACHSEN, GUNNAR, The hydrographic observations. 1912, No. 14. Kr. 4,20.

With chart: Waters and anchorages on the west and north coast. Publ. by the Norw. Geogr. Survey, No. 198.

HOEL, A. et O. HOLTEDAHL, Les nappes de lave, les volcans et les sources thermales dans les environs de la Baie Wood au Spitsberg. 1911, No. 8. Kr. 4,00.

GOLDSCHMIDT, V. M., Petrographische Untersuchung einiger Eruptivgesteine von Nord-westspitzbergen. 1911, No. 9. Kr. 0,80.

BACKLUND, H., Über einige Olivinknollen aus der Lava von Wood-Bay, Spitzbergen. 1911, No. 16. Kr. 0,60.

HOLTEDAHL, OLAF, Zur Kenntnis der Karbonablagerungen des westlichen Spitzbergens. I. Eine Fauna der Moskauer Stufe. 1911, No. 10. Kr. 3,00. II. Allgemeine stratigraphische und tektonische Beobachtungen. 1912, No. 23. Kr. 5,00.

HOEL, ADOLF, Observations sur la vitesse d'écoulement et sur l'ablation du Glacier Lilliehöök au Spitsberg 1907—1912. 1916, No. 4. Kr. 2,20.

VEGARD, L., L'influence du sol sur la glaciation au Spitsberg. 1912, No. 3. Kr. 0,40.

ISACHSEN, GUNNAR, Travaux topographiques. 1915, No. 7. Kr. 10,00.

With map: Spitsberg (Partie Nord-Ouest). Scale 1:200 000 (2 sheets).

GUNNAR ISACHSEN has also published: Green Harbour, in *Norsk Geogr. Selsk. Aarb.*, Kristiania, 1912—13, Green Harbour, Spitsbergen, in *Scot. geogr. Mag.*, Edinburgh, 1915, and, Spitsbergen: Notes to accompany map, in *Geogr. Journ.*, London, 1915.

All the above publications have been collected into two volumes as *Expédition Isachsen au Spitsberg 1909—1910. Résultats scientifiques. I, II. Christiania 1916*.

As the result of the expeditions of ADOLF HOEL and ARVE STAXRUD 1911—1914 the following memoir has been published in *Videnskapselskapets Skrifter. I. Mat.-Naturv. Klasse*.

HOEL, ADOLF, Nouvelles observations sur le district volcanique du Spitsberg du Nord. 1914, No. 9. Kr. 2,50.

Expeditions of TH. VOGT 1925 and 1928:

STØRMER, LEIF, Downtonian Merostomata from Spitsbergen. — *Skr. Norske Vid.-Akad. I. Mat.-Nat. Kl.* 1934. No. 3. Kr. 3,00.

The following topographical maps and charts have been published separately:

Maps:

Bear Island. 1:25 000. 1925. Kr. 10,00.

Bear Island. 1:10 000. (In six sheets). 1925. Kr. 30,00.

East Greenland. Eirik Raudes Land from Sofiasund to Youngsund. 1:200 000. 1932. Kr. 5,00.

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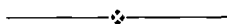
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A. W. BRØGGERS BOKTRYKKERI A/S

Contents.

	Page
Preface	7
Expeditions and Work of Norges Svalbard- og Ishavs-undersøkelser 1927—1936..	9
Work during the Winter of 1927—1928	9
Expeditions in the Summer of 1928	9
Hydrographic Survey of the Bear Island Banks	9
Topographical Work in North-West Spitsbergen	10
Topographical Work on the North Side of Isfjorden	11
Zoological Work in Spitsbergen and Bear Island	11
Geological Work and Deep Drilling in the Coal Area belonging to Kings Bay Kul Comp. A/S at Kongsfjorden	12
Hoel's Voyage in the "Krassin"	12
Work during the Winter of 1928—1929	13
Expeditions in the Summer of 1929	14
Expedition to North-East Greenland	14
Hydrographic Survey of the Bear Island Banks	17
Building of Cairns for the Trig. Work in Spitsbergen	18
Expedition to the Barents Sea (Frans Josef Land)	18
Work during the Winter of 1929—1930	19
Expeditions in the Summer of 1930	19
Expedition to Jan Mayen and North-East Greenland	19
Hydrographic Survey of the Bear Island Banks	21
Geological Expedition to Spitsbergen	22
Expedition to Frans Josef Land. The Discovery of the Andrée relics	22
Work during the Winter of 1930—1931	24
Expeditions in the Summer of 1931	25
The "Heimen" Expedition to South-East Greenland	25
The "Signalhorn" Expedition to South-East Greenland	27
Expedition to North-East Greenland	28
Hydrographic Survey of the Bear Island Banks	30
Work during the Winter of 1931—1932	32
Expeditions in the Summer of 1932	33
The "Polaris" Expedition to South-East Greenland	33
The "Veslemari" Expedition to South-East Greenland	35
Expedition to North-East Greenland	37
Survey of Glacier Fronts in Spitsbergen	43
Hydrographic Survey of the Bear Island Banks	44
Work during the Winter of 1932—1933	45
Expeditions in the Summer of 1933	46
Expedition to North-East Greenland	46
Erection of a Wireless Station and Lights in Spitsbergen	48

	Page
Work during the Winter of 1933—1934	49
Expeditions in the Summer of 1934	51
Expedition to Torgilsbu	51
Expedition to Myggbukta	52
Work during the Winter of 1934—1935	52
Expeditions in the Summer of 1935	53
Hydrographic Surveying in Davis Strait	53
Expedition to Torgilsbu	54
Expedition to Myggbukta	55
Hydrographic Work at Spitsbergen	58
Work during the Winter of 1935—1936	59
Expeditions in the Summer of 1936	60
Expedition to Torgilsbu	60
Expedition to Myggbukta	61
Expedition to Svalbard	62
Summary of Works	71
Davis Strait	71
North-East Greenland	71
South-East Greenland	75
Jan Mayen	76
Svalbard	77
Frans Josef Land	79
Financing of the Expeditions and the NSIU	79
Co-operation between the NSIU and Government Institutions	79
Offices and Store Rooms	82
Nature Protection	82
Glacier Studies in Norway	82
Assistance to Foreign Expeditions	82
Svalbard Place-names	87
The Library	88
Literature	89

Lists and Tables:

1. Members and Collaborators of the Expeditions	93
2. Vessels and Members	102
3. Particulars of Vessels	103
4. Office Personnel	104
5. Instruments	104
6. Astronomical Stations	106
7. Base Lines	106
8. Datum Points for the Computations of Altitudes	107
9. Methods Used by the Topographical Survey	107
10. Details of Topographical Field Work	109
11. Topographically Surveyed Areas	110
12. Hydrographically Surveyed Areas	112
13. Beacons, Lights, and Wireless Stations	113
14. Oceanographic Work	114
15. Number of Expeditions	114
16. Number of Photographs	115
17. Papers and Maps Published 1929—1936	115
18. Contributions	122

Illustrations.

Figure	Page
1. Drilling site at borehole 4 on Leirhaugen. Kings Bay coalfield	13
2. Members of the 1929 expedition to North-East Greenland	15
3. <i>S/S Veslekari</i> in the Greenland pack-ice	17
4. <i>M/V Heimen</i> in Umivik, South-East Greenland.....	27
5. Map of South-East Greenland showing main area with new coast lines	29
6. Topographers' camp on the south side of Claveringfjorden, near K. James, North-East Greenland	31
7. <i>S/S Polaris</i> off Kapp Løwenørn, South-East Greenland	34
8. <i>M/V Veslemari</i> unloading oil barrels and coal in Heimenhamna (Finnsbu), South-East Greenland	35
9. General map showing flying series in North-East Greenland.....	38
10. North-East Greenland. Nørlundtindane with Wordiebreen and Wordiebukta in the foreground. Gneiss is the dominating rock. Photograph taken towards south from the height 2500 Metres	39
11. North-East Greenland. Grantafjorden with Copelandfjorden and Claveringøya in the foreground.....	40
12. North-East Greenland. Moskusoksefjorden with Gausshalvøya in the foreground, and Hudsonlandet in the distance.....	41
13. Map of North-East Greenland showing trigonometrical net and charted areas	43
14. Isfjord Radio Station from the north. Spitsbergen.....	47
15. Spitsbergen. Isfjord Light, Isfjorden. Festningen Light, Grønfjorden	49
16. Map showing area with echo soundings in Davis Strait 1935	55
17. <i>S/S Buskø</i> in the ice off North-East Greenland 1935	56
18. General map showing charted areas in Svalbard.....	57
19. General map showing surveyed and photographed areas	63
20. General map showing trigonometrical net	65
21. Aeroplane used in Svalbard 1936	66
22. General map showing flying series	67
23. Spitsbergen. Duckwitzbreen on the west side of Barentsøya	69
24. Office of the NSIU 1926—34: Bygdø Allé 34, Oslo	80
25. Office of the NSIU from 1934: The former Astronomical Observatory, Observatoriegaten 1, Oslo	81

Plate

- I. Spitsbergen. Adventfjorden and Longyeardalen.
 - II. 1. Spitsbergen. East side of Edgeøya.
 2. Spitsbergen. Inner part of Van Mijenfjorden.
- Map of Svalbard.

Preface.

This report forms a continuation of the account of the Norwegian Svalbard expeditions given by Hoel: *The Norwegian Svalbard Expeditions 1906—1926. — Resultater av de Norske Statsunderst. Spitsbergeneksp. Vol. I, No. 1. Oslo 1929 (= Skrifter om Svalbard og Ishavet, No. 1).*

In 1927 no Norwegian expedition was sent out to the Arctic regions, but in the following years *Norges Svalbard- og Ishavs-undersøkelser* (see Hoel, l. c. pp. 59—60) had sent out expeditions to South-East Greenland, North-East Greenland and Jan Mayen, to Svalbard and Frans Josef Land and to different parts of the Arctic Ocean. The present report deals with these expeditions and their results, and also with the work carried out by the NSIU office during these years in connection with the expeditions.

Oslo, Dec. 1, 1937.

Adolf Hoel.

Expeditions and Work of Norges Svalbard- og Ishavs-undersøkelser¹ 1927—1936.

Work during the Winter of 1927—1928.

In the summer of 1927 no field work was done in Svalbard. The staff carried on with the working up of previously collected material, and until September 1927 they were also preparing, on the scale of 1:50 000, 33 maps of recognised claims in Svalbard. Along with a description of the boundaries of the properties, the maps were published by the Svalbard Commissioner (Hoel 1929, p. 52). The topographers Alfred Koller, Bernhard Luncke, Jakob Sartorius, and Wilhelm Solheim were carrying out computations and construction of the trigonometrical and photogrammetric material from the years 1920 and 1924 (Van Keulen- and Billefjorden), and the preparation of tables and maps to No. 1 of *Skrifter om Svalbard og Ishavet* (Adolf Hoel: The Norwegian Svalbard Expeditions 1906—1926. Oslo 1929).

Of the geologists, Anders K. Orvin and, part of the time, also Gunnar Horn were working up the results of the geological survey of Bear Island in 1924 and 1925.

Orvin also worked throughout the winter on a critical revision of the place-names of Svalbard (see p. 87).

Johan Braastad had leave from May 1927 to May 1928. Horn had leave from October 1927 to July 1928 to study coal petrography, especially as applied to the Svalbard coals, at the *Preussische Geologische Landesanstalt* in Berlin. For this purpose he had received a grant from *A/S Norsk Varekrigsforsikrings Fond*. The results are published in *Skrifter* No. 17, which paper also served him as a thesis for a doctor's degree at the *Technische Hochschule* in Berlin-Charlottenburg.

Expeditions in the Summer of 1928.

Hydrographic Survey of the Bear Island Banks.

In 1925 rich occurrences of cod and halibut were discovered around Bear Island, and in 1927 fishing was carried on by six steamers from Sunnmøre, and a score of motor cutters, chiefly from North Norway

¹ In the following called NSIU.

(Årsb. vedk. Norges Fiskerier 1928. No. X, p. 122). In these waters only a few soundings had been taken previously, and funds were therefore voted for the initiation of a thorough hydrographic survey of the Bear Island fishing banks in 1928. The hydrographic expedition left Harstad in North Norway on the inspection vessel of the Norwegian Navy "Michael Sars" on June 16. There were two hydrographic surveyors: the leader of the expedition, Commander A. Hermansen, Norwegian Navy; and a hydrographic surveyor from *Norges Sjøkartverk*, Lieutenant Rolf Kjær, Norwegian Navy. Skipper Peder Evensen acted as pilot for Bear Island. Commander O. G. Willoch was in charge of the "Michael Sars" and Lieutenants T. Sundt and G. Køste were deck officers. The vessel had 8 petty officers, and the crew numbered 15 men. The expedition thus totalled 29 men.

In Tromsø the Norwegian biologist Sven Sømme came on board, and also 10 persons (along with their outfit) who were to be taken to Bear Island for account of the mining company *Bjørnøen A.S.* The ship also carried 50 barrels of petroleum for the fishing fleet at Bear Island. Survey work was started on June 19 on the south coast of the island, the ship and also a motor-boat being used. However, "Michael Sars" had to take part in the search for the missing French seaplane "Latham" (with Roald Amundsen on board), which had gone to the rescue of the wrecked Italian airship "Italia" with the polar expedition of Nobile on board. "Michael Sars" was engaged in this search work until July 20. Kjær had been left at Bear Island, and he surveyed the coast with Evensen as pilot. The area (around the island) surveyed totalled 174 sq. km. Bear Island has a coast line 77 km long.

Topographical Work in North-West Spitsbergen.

The topographers Luncke and Solheim, each with two assistants, worked around Kongsfjorden during a period of 54 days. They left Bodø on July 5 in the collier "Skard", and reached Ny-Ålesund on the 9th. Two of the assistants came to Longyearbyen in a collier, whence they proceeded to Ny-Ålesund in a motor-boat belonging to NSIU. Arrival there July 16. The object of the survey was to connect, through triangulation, a base line measured in 1921 at Kongsfjorden, with the Isachsen base line in the Foreland Plain measured in 1909, and then carry the triangulation further to the inner end of Krossfjorden. Observations were carried out from 50 trigonometrical stations, and from 44 of these a total of 347 photograms were taken. They had further 15 tacheometer stations, and 7 photogrammetric sea stations with a total of 32 photograms. 22 cairns were erected. An area of 400 sq. km was mapped in detail, and 300 km of coast line were

measured. Tidal observations were carried out in Møllerhamna. Of this period of 54 days only 26 days afforded "survey weather"; on the remaining days there was fog, rain, or snow. The expedition sailed for Norway in the collier "Marita", leaving Ny-Ålesund on Sept. 5, arriving at Bodø on the 9th, and at Oslo on the 11th.

Topographical Work on the North Side of Isfjorden.

Koller with two assistants left Harstad on July 7 in the collier "Ingertre", and reached Longyearbyen on July 10, where he remained until the 18th. During these days he mapped (on the scale of 1:1000) parts of surface at the mouth of Mine No. 2 of the *Store Norske Spitsbergen Kulkompani Aktieselskap*. Koller had then at his disposal the vessel of the Mining Inspector of Svalbard, and sailed along the coast from Isfjorden to Sørkapp and into Storfjorden to take — ice conditions permitting — photogrammetric sea stations, and also to make a search for Roald Amundsen and his companions, who might possibly have reached land here. As leader of the search work, Commander Oscar Wisting took part in this voyage. From 23 sea stations 69 photograms were taken. They returned to Longyearbyen on July 28, and two days later Koller's party left for Kapp Thordsen to start the survey of the peninsula between Dickson- and Billefjorden, using the stereo-photogrammetric method. From Aug. 2 to the 31st they had only a fortnight of "survey weather". Work carried out: 43 photo stations (fixed trigonometrically) with a total of 163 photograms; 1 trigonometrical station without photograms, and 1 tacheometer station. 4 cairns were built. The area mapped totalled abt. 160 sq. km.

On Sept. 3 the party was fetched by the vessel of the Mining Inspector, and they left Longyearbyen on Sept. 5 in the S/S "Ingertre".

Zoological Work in Spitsbergen and Bear Island.

A biological party consisting of Dr. Sig Thor with one assistant sailed for Longyearbyen from Harstad on July 7 in the collier "Ingertre". They reached the mining town on July 10, and remained for a fortnight at Adventfjorden and surroundings to collect invertebrates. They were then brought to Bear Island in the "Michael Sars" of the hydrographic party, where the work was continued from July 26 to Aug. 3, and then back to Spitsbergen in the same ship to work at Barentsburg for three days, and the remaining 14 days at Adventfjorden. The party left Spitsbergen on Aug. 23 in the collier "Ingertre", reached Tromsø on the 26th and Oslo on the 31st.

The collected material has been described by Dr. Thor in *Skrifter* No. 27.

**Geological Work and Deep Drilling in the Coal Area belonging to
Kings Bay Kul Comp. A/S at Kongsfjorden.**

Deep drilling in the Kings Bay coal area was proposed by NSIU, and on June 14, 1928 the necessary money was voted by the Storting. The Ministry of Trade decided that the work should be carried out by NSIU, and Orvin was put in charge of it.

It was agreed that *Norsk Diamantborings A/S* of Oslo should lend two drilling machines (using chilled shots), and the same company provided a foreman and 5 drillers, whereas 3 assistant drillers and men for transport and other work were supplied by *Kings Bay Kul Comp. A/S*. Orvin, with the drilling crew and the machinery, left Bodø in the collier "Skard" on July 3, and reached Ny-Ålesund on the 9th. Drilling commenced on the 19th and was finished on Oct. 3. During this period five holes had been drilled, having a total length of 430.74 metres.

Orvin also continued the geological mapping of the property of the Kings Bay company, which he had commenced in 1922 and 1923, and whereby the number and extent of the coal-seams were fixed. Further knowledge of their thickness was also obtained. The expedition left Ny-Ålesund in a collier on Oct. 17 and reached Oslo on the 24th. Orvin's results are published in the monograph: *Geology of the Kings Bay Region, Spitsbergen, with special reference to the coal deposits. Skrifter No. 57. Oslo 1934.*

Hoel's Voyage in the "Krassin".

The leader of NSIU, Docent Adolf Hoel, was invited by the Russian authorities to go as an expert with the Russian relief expedition, in the ice-breaker "Krassin", to the rescue of the ill-fated expedition of Nobile in the airship "Italia". With Hoel on board the ice-breaker left Bergen in Norway on June 24, bound for Spitsbergen, where the ship sailed along the west and north coasts. The Italian naval officers Mariano and Zappi, who, together with the perished Malmgren, had left the main party in an attempt to reach land, were rescued in the morning of July 12, and the Viglieri group, consisting of five men, were saved the same evening. On July 19 the Italians were brought on board the "Citta di Milano" in Kongsfjorden. Here Hoel inspected the drilling operations, and also discussed various matters with the topographers Luncke and Solheim. Hoel left "Krassin" in Tromsø on Aug. 6. (An account of the "Krassin" expedition was published by Hoel in the book by Gunnar Hovdenak: *Roald Amundsens siste ferd. (The last journey of R. A.) Oslo 1934.*)

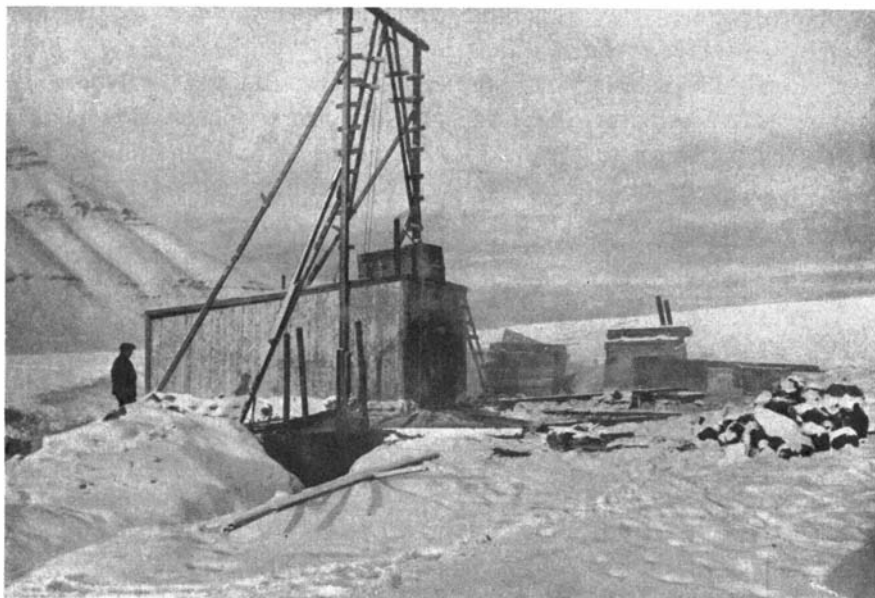


Fig. 1. Drilling site at borehole 4 on Leirhaugen. Kings Bay coalfield.

Orvin phot. Sept. 30, 1928.

Work during the Winter of 1928—1929.

The topographers Luncke and Solheim computed the trigonometrical net from Isfjorden to Krossfjorden, and also did photogrammetric construction work on Spitsbergen maps, and work on two preliminary charts on the scale of 1:100 000. The stereophotograms of Koller were plotted (in the spring of 1929) by Haaken Christensen and Luncke, who used a Zeiss stereoautograph belonging to *A/S Kartkontoret Stereografik*, Oslo. Further, much of the photogrammetric material from the expeditions fitted out by Prince Albert of Monaco and led by Captain G. Isachsen (to Spitsbergen in 1906 and 1907, see No. 1 of *Skrifter*, p. 13) were arranged and numbered. This collection of photographs was a gift from the *Musée Océanographique* in Monaco.

The hydrographic surveyor, Kjær, prepared a chart covering the coastal waters of Bear Island, a preliminary edition of which was issued in March (S. 1. Bjørnøya. Scale 1:40 000) together with sailing directions for the coast of Bear Island (*Meddelelse*, No. 6).

Orvin made reports for the Ministry of Trade and to the *Kings Bay Kul Comp. A/S* on the results of the summer's work, and also prepared a paper on the geology of Kings Bay coalfield, a paper on Jan Mayen (*Meddelelse*, No. 7), and various work in connection with the projected Greenland expedition 1929, etc.

Horn, who in July had returned from Germany, was also working on the Jan Mayen paper (*Meddelelse*, No. 7), on a report on Frans Josef Land, its discovery, exploration, and particularly the Norwegian hunting activities in that area, various office work, collection of material for Hoel's paper on the Svalbard expeditions (No. 1), and, in company with Braastad, he continued the work on the place-names in Svalbard. Braastad also did various work in connection with the relief expeditions for the Nobile expedition, office work, and preparations for the coming expeditions, etc.

Expeditions in the Summer of 1929.

Expedition to North-East Greenland.

From 1922 Norwegian wintering expeditions had in increasing numbers taken up hunting (foxes, etc.) in that part of East Greenland lying north of Scoresby Sound. The expedition of Skipper Johan Olsen had in 1922, in co-operation with *Geofysisk Institutt* in Tromsø, established a wireless station, Myggbukta, at Mackenzie Bay, in order to send weather reports to Norway. This activity was interrupted the following summer when Olsen's vessel was lost with all hands, and the relief expedition could not reach land owing to extremely difficult ice conditions. From 1926, however, hunting activity was again vigorously taken up, and in 1928 the NSIU succeeded in obtaining a State grant of 6000 kroner for the expedition of Finn Devold, to enable him to carry out certain scientific work.

The Norwegians regarded East Greenland as a *No man's land*, where they had carried out economic activity (hunting of seal, walrus, fox, and polar bear) long before others, and were alone in exploiting the country up to 1919 when a Danish company was formed with the object of carrying out hunting in East Greenland. When Denmark in the years 1916—1920 also wanted to extend Danish sovereignty so as to cover the whole of Greenland, the Norwegians felt this as a threat to their interests.

So far the only Danish colony in East Greenland had been Angmagssalik. Norway was opposed to an extension of Danish sovereignty, and negotiations followed. These resulted in the East Greenland Convention of July 9, 1924, whereby Norwegians and Danes should have the same rights to engage in hunting, sealing, and fishing, to take possession of land for use, to establish meteorological, telegraph and telephone stations, and to set up installations for scientific and humanitarian purposes. During the negotiations it was maintained by the Danes that it was necessary in consideration of the Eskimos to establish a colony in Scoresby Sound, and the convention gave Denmark the right to establish an Eskimo colony in Scoresby Sound, and already the following



Fig. 2. Members of the 1929 expedition to North-East Greenland.

Orvin phot. Aug. 27, 1929.

year some Eskimos were brought from Angmagssalik. The Danes now also initiated a systematic exploration of the country.

In view of these circumstances Norway found it necessary to act in order to maintain her rights. In the summer of 1929 the NSIU sent a scientific expedition to East Greenland. The cost was partly defrayed by the State in a sum of 20000 kroner, and partly by private contributions. The plans of the expedition were prepared by Hoel, who was also to lead it. As he was prevented from going, Orvin was appointed leader of the expedition, which had the following members: Luncke and Solheim, topographers; Dr. Bernt Lyng and Jakob Vaage, botanists; Nils Knaben, zoologist; Salve Solheim, physician and assistant; Rudi Einersen, wireless operator; Gunnleik Jensson, journalist. S/S "Veslekari" (owners: Elling Aarseth & Co.) of Ålesund, skipper Hans Rekdal, was chartered for the expedition, and as mate was secured Vebjørn Landmark, who had a thorough knowledge of East Greenland waters. The crew numbered 10 men, the expedition thus totalling 21 men.

Two other expeditions were also on board, one consisting of six men, and led by Johan Kjøllesdal, Civil Engineer, and sent out by *Statens Havnevesen*, to investigate the harbour conditions on Jan Mayen; and a second expedition of 10 men, led by Hallvard Devold, and despatched by the Norwegian hunting company *Arktisk Næringsdrift A/S*

which had just been formed. They were to be put ashore in various places in East Greenland to hunt fur animals in the winter. The "Veslekari" thus had 37 men on board.

The expedition left Ålesund on July 14 and reached Jan Mayen on the 19th, where the harbour survey party was put ashore at Nordlaguna on the north coast of the island. During the unloading the scientists of the expedition carried out various collection work on the island. The next morning the course was shaped for Greenland, and the ice-edge was reached on the morning of the 21st in Lat. 74° N and abt. 12° Long. W. On the 28th the ship had penetrated the ice and got into the shore lead ("landråken") off Bass Rock. The ice was very close this year; frequently the ship got stuck for hours until the ice slackened a little so that the ship could move forwards. It took "Veslekari" 7 days to get through the ice, and for comparison it may be stated that S/S "Heimland" of Tromsø with "The Second Cambridge Expedition to East Greenland" on board took 47 days, and the Danish expedition in the "Godthaab" 19 days. Work was carried on in Greenland between Kapp Wynn and the north side of Davysund until Aug. 23 when the expedition started on the return voyage. On the 31st the ship was clear of the ice, reached Jan Mayen on Sept. 2, where Kjøllesdal and his men were taken on board, and on the 6th the expedition was back at Ålesund.

Topographical work. A base line was measured in Myggbukta, and observations were taken in 37 trigonometric stations with 277 photograms, 10 trigonometric stations without photograms; and 48 photogrammetric sea stations with 173 exposures were taken. In order to obtain a starting point for the elevations, tidal measurements were carried out in Mackenziebukta. Thirty cairns were built.

The coast line (200 km) from Sabineøya to Geographical Societyøya, and the greater part of Hudsonland was mapped. The methods used were the photogrammetric and stereophotogrammetric. Total area mapped: 2000 sq. km, 500 km coast line. Scales: 1:50 000 and 1:100 000.

Geological work. The leader of the expedition, Orvin, was also the geologist. He accompanied the ship and went ashore whenever possible to collect rock specimens, fossils, etc.

Botanical work. Lichens were collected by Lynge and vascular plants by Vaage. Part of the lichen collection has been dealt with by Lynge and Scholander in *Skrifter*, No. 41. The other part has been mounted, and the working up is well advanced. The vascular plants are dealt with by Vaage in *Skrifter*, No. 48. Lichens were also collected by Lynge on Jan Mayen.

Zoological work. Knaben made dredgings and also collections on land. A considerable zoological material was thus brought home.



Fig. 3. *S/S Vestekari* in the Greenland pack-ice.

Orvin phot. Aug. 28, 1929.

The expedition caught 8 musk-ox calves alive, which with 10 calves (one and two years old) purchased, were taken to Spitsbergen (one died during the voyage) in the autumn and let loose there (Hiorthhamn, Adventfj.). This experiment has been highly successful and the animals have got a number of calves.

A detailed account of the expedition will be found in *Meddelelse*, No. 11.

Hydrographic Survey of the Bear Island Banks.

The inspection ship of the Norwegian Navy "Michael Sars" was placed at the disposal of a hydrographic expedition to the Svalbard waters from the beginning of June to the middle of July. The expedition was led by Captain Rolf von Krogh, Norwegian Navy, and Lieutenant Fredrik Vogt from *Norges Sjøkartverk* served as second hydrographic surveyor. The chief of "Michael Sars", Commander W. H. Landgraff, and the other officers: Lieutenants A. Sørensen and Gust. Heesch, also took part in the work.

The ice conditions were bad this summer, and even on June 10 Bear Island was still surrounded by drift ice. The survey therefore first took a hydrographic section from Torsvåg in Norway to the ice edge at Bear Island. Soundings were started south of Bear Island on June 12, and continued until July 8 when the ship returned to Tromsø, to proceed to Iceland on fishing inspection service.

The sealer "Blue Jacket" of Tromsø, skipper Victor Arnesen, was then chartered by NSIU. The crew numbered 11 men, all told. "Blue Jacket" left Tromsø on July 18 to continue the survey (July 23—Aug. 11). Von Krogh was in charge of the work, and Vogt was also on board. The vessel was now ordered to Spitsbergen where the ice conditions were particularly difficult this year, so that the coal steamers had difficulty in entering and leaving Isfjorden. "Blue Jacket" did patrol work and reported the state of the ice for the benefit of the steamers. On one of these trips the vessel ran on a shoal, but managed to get off the following day (Aug. 18). "Blue Jacket" stayed at Svalbard until Sept. 9 and was for the last few days hired by the *Store Norske Spitsbergen Kulkompani* to make some trips between Adventfjorden and Grønfjorden. The vessel left Longyearbyen on Sept. 9 and reached Tromsø on the 14th.

Building of Cairns for the Trigonometrical Work in Spitsbergen.

With support from NSIU, Arne Høygaard and Martin Mehren erected a number of cairns in the area between Smeerenburgfjorden and Kongsfjorden. Olav Staxrud also took part in the expedition, having an expert knowledge of Spitsbergen conditions. They left Bergen on July 12, and on Aug. 10 they returned to Ny-Ålesund, having erected a total of 16 cairns. From *Store Norske Spitsbergen Kulkompani* they had borrowed four sledge dogs.

Expedition to the Barents Sea (Frans Josef Land).

The planned expedition to Frans Josef Land was carried out in co-operation with Consul Lars Christensen of Sandefjord who had decided to send a wintering expedition to Frans Josef Land. A wireless station was also to be erected and weather reports sent to Norway. The wintering expedition was planned and fitted out by Commander Hj. Riiser-Larsen. The ships of the expedition were S/S "Hvalrossen" of Ålesund, Skipper O. Vinje, and M/C "Thorsnes I". The wireless operator was Lieutenant Joh. Breirem, Norwegian Navy, who was also to winter there, in charge of the meteorological and wireless station. Dr. Gunnar Horn from NSIU was to direct the scientific work planned to be carried out in Frans Josef Land. Skipper on "Thorsnes I" was Rudolf Svendsen, also leader of the hunting party, which, including Svendsen, numbered four men. The expedition left Tromsø on Aug. 5 and reached the ice edge ENE of Bear Island on the 8th. The edge was followed in a northeasterly direction. The ice conditions turned out to be particularly difficult, in fact Frans Josef Land was entirely closed by a 60—80 naut. miles wide belt of drift ice throughout the summer, and nowhere was it possible to approach the island nearer than about 20 miles. The attempts had to be given up and the ships returned to Tromsø, where they arrived on Sept. 22.

Work during the Winter of 1929—1930.

The topographers Luncke and Solheim did map-construction work from observations made in 1928, and prepared a number of maps of Svalbard glacier on the scale of 1 : 50000 to show the glacier variations. J. Dahl of *Ing. Dahls Opmåling og Kartografiske Anstalten* made a preliminary compensation with re-computation to conformous coordinates of the trigonometrical net between the astronomical points in Grønfjorden and Kongsfjorden, and the points of the Swedish-Russian Arc-of-Meridian Expedition at Storfjorden.

The hydrographic surveyor, Kjær, obtained leave from *Norges Sjøkartverk* and was engaged by the NSIU from Oct. 1, 1929. He prepared a plan for the publication of charts of the Svalbard waters, and also constructed the first to be issued, viz. *S. 2 Bjørnøyfarvatnet* (Bear Island Waters), scale 1 : 350000. The chart was published in May 1930. Kjær also commenced chart *S. 3. Frå Bellsund til Forlandsrevet med Isfjorden* on the scale of 1 : 200000.

Orvin was occupied with various work dealing with the Greenland expedition of 1929; published a paper on the Upper Devonian of East Greenland (*Skifter* No. 30); an account of the expedition in East Greenland in 1929 (*Meddelelse* No. 11); and worked on a paper on the Kings Bay Coal Field (*Skifter* No. 57).

Horn continued the investigations of the place-names in Svalbard, and prepared a paper on Frans Josef Land (*Skifter* No. 29). He also did various translation work, etc., published a paper on Norwegian hunting operations at Victoriaøya (in *Festskrift til Olaf Hanssen*. 1933), and read a paper on the Coal Deposits of Svalbard at the *Kolloquium über die Geologie der Arktis* in Greifswald on May 11, 1930.

Braastad worked on the place-names of Svalbard, and the fitting out of the expeditions to Greenland and Frans Josef Land. Thus he was present when the Greenland expeditions departed and arrived in Ålesund.

Expeditions in the Summer of 1930.

Expedition to Jan Mayen and North-East Greenland.

The object of the expedition was to continue the work started in 1929. The leader was Hoel, who also served as geologist. The other members were: von Krogh, hydrographer; Orvin, geologist; Vaage, Johannes Lid (worked on Jan Mayen) and P. F. Scholander, botanists, the latter also acting as physician; L. M. Rygg, botanical assistant on Jan Mayen; Paul Løyning, marine zoologist; Knaben, zoologist (insects); E. Siggeson, taxidermist (mammals and birds); Rudi Einersen, wireless operator; Dagfin Werenskiold, landscape painter; Victor Beonio-Broc-

chieri, Professor in political history at the University of Pavia. There were further two assistants and two carpenters. As passengers the ship carried: one hunter to *Arktisk Næringsdrift A/S*, and six men of the hunting expedition *Møre Grønlandsekspedisjon*. The hunters had with them 15 polar dogs from Svalbard.

S/S "Veslekari" of Ålesund, Skipper Paul Lillenes, and with a crew of 12 men, was chartered for the expedition, which numbered 36 men on leaving Ålesund on July 9. The ship called at Jan Mayen on July 14, where the botanist Lid with assistant went ashore to work when the rest of the expedition was in Greenland. The course was shaped for Claveringfjorden, and on July 16 at 4 a. m. the ice-edge was reached. To start with the ice was very open, but later became very close. By steering a northeasterly course more open ice was reached off Claveringfjorden, and Kapp Herschel was reached on the 17th at 4 a. m. Two men of the *Møre* expedition were put ashore on Kapp Herschel with provisions and outfit for two years. The remaining four members were later landed at Kapp Pettersens and in Antartichamna in Kong Oscars Fjord.

After having called at Kapp Wynn, where some stores belonging to *Arktisk Næringsdrift* were taken on board, "Veslekari" entered Claveringfjorden for Kapp Stosch and Revet on July 22. As the winter ice still covered the bay at Myggbukta, the next days were spent in carrying out various kinds of scientific work in the inner part of the fjord. On July 25 "Veslekari" left, and reached Myggbukta on the 29th. On Aug. 3 the ship called at Kapp Humboldt on Ymerøya, whence it sailed through Frans Josef Fjord to Moskusoksefjorden. Thence southwards to Kong Oscars Fjord and Davysundet, entering Segelsällskapets Fjord, and turning back a little south of Antartichamna. On Aug. 12 the "Veslekari" sailed northwards through Kong Oscars Fjord.

Some time was spent in Kempefjorden, and then in Vegasundet, Sofiasundet, and Dusénfjorden, whereupon the ship left for Myggbukta. On Aug. 22 the vessel left East Greenland. In addition to the members of the expedition the following passengers were on board: the hunting expedition of Finn Devold consisting of six members, and one man from *Arktisk Næringsdrift*. The course was set for Jan Mayen, and there was practically no ice. The island was reached on the 24th, Lid's party was taken on board, and on the 27th the expedition returned to Ålesund. Chief results of the expedition:

Hydrographic work. Sounding work was completed in Mackenziebukta, part of Fosterbukta, the inner part of Moskusoksefjorden, and the outer part of Dusénfjorden. Scale 1 : 100 000. Some preliminary soundings were also made: off the coast, in Grantafjorden, Claveringfjorden at Revet, outer part of Loch Fine to beyond Straumen. Further a series of soundings from Kapp Herschel to Jacksonøya, soundings in

the outer part of Moskusoksefjorden and Sofiasundet, at the entrance to Segelsällskapetets Fjord, and in Kong Oscars Fjord at Archerøyane.

Geological work. Various observations and collections from the Quaternary, 400 rock specimens, 65 specimens with Tertiary wood, 400 samples with Triassic fossils, 530 samples with Upper Carboniferous, and 270 with Devonian fossils. A number of soil sections were also taken.

Zoological work. Collections of the marine fauna; insects, birds, and mammals.

Botanical work. Lichens were collected by Scholander, vascular plants by Vaage. The collections of lichens (1929 and 1930) from North-East Greenland have to a large extent been worked up by Lynge and Scholander (*Skrifter* No. 41). Vaage's large collections of vascular plants are described in *Skrifter* No. 48. From Jan Mayen, Lid brought home lichens, to be described by Lynge. He also had a large collection of vascular plants from the island, now being worked up by himself.

Other work. Ethnographical and anthropological material were collected; plans were made of the huts; and a large number of photos taken. In Myggbukta a new house for the station was put up, and a new short-wave transmitter was installed. The transmitter had been presented to the NSIU by Consul Lars Christensen. The cost of erecting the house was also paid by him.

Professor Beonio-Brocchieri took a cinematographic film, and also a number of photographs of use to the topographic survey. Weren-skiold made a number of landscape paintings. One hunting expedition was taken to Greenland, and another was brought home. Huts were unloaded at 19 different points and a considerable quantity of stores was carried for *Arktisk Næringsdrift*. An account of the expedition will be found in *Meddelelse* No. 13.

Hydrographic Survey of the Bear Island Banks.

The expedition sailed in the fishery inspection ship of the Navy, the "Michael Sars", and was led by Rolf Kjær, who also had the assistance of the ship's officers: Commander P. L. Münster, Lieutenants L. Jansen and Erling Kjær, the other officers and the crew, a total of 26 men. E. Kjær had previous experience as hydrographic surveyor.

The expedition left Tromsø on June 2 and reached Bear Island on the morning of June 4. The ice conditions were very favourable and sounding work, oceanographical, and meteorological investigations were carried out in the waters between Bear Island and West-Spitsbergen. A tide-gauge (bought in 1929, type Julien Friez) was erected in Austervåg on the north-east coast of the island, and worked for 30 days. On one occasion "Michael Sars" towed a damaged fishing vessel from Bear Island to Tromsø, and on another she brought a

sick fisherman from the fishing grounds to Hammerfest. The expedition came to a close on July 10 in Harstad.

In addition to the meteorological and tidal observations, the expedition also took five oceanographical sections around Bear Island and a total of 252 soundings with bottom samples. The weather conditions were usually good with mostly western winds, but visibility was not so good. The results of the tidal observations are published in *Skifter* No. 14, and an account of the expedition will be found in *Meddelelse* No. 13.

Geological Expedition to Spitsbergen.

The programme included a thorough investigation of the Mesozoic sequence in the Isfjord area, it being desirable to supplement results obtained on previous expeditions. The expedition consisted of the German geologist Dr. Hans Frebald, Professor of the University in Greifswald; and the assistants Olav Staxrud, engineer, and Jens Erik Werenkiold, student. They left Harstad on July 2 in the collier "Inger Elisabeth" and reached Longyearbyen on July 5. In Spitsbergen they remained until Aug. 26.

Frebald worked on the east coast of Nordfjorden (Dicksonlandet), at Sassenfjorden, Grønfjorden, and in the area between Festningen and Russekjeila. The formations investigated were the Permian, Triassic, Jurassic, and the Cretaceous. From this sequence abundant material had already been collected on the Hoel expeditions (see No. 1 of *Skifter*), and worked up by Frebald. Much new information about the stratigraphy and the fauna had come to light, but a great deal remained to be solved, particularly the question of the relative position of the various horizons, and their position in relation to the stratigraphical systems of other areas. In the main these problems were solved. An account of the expedition will be found in *Meddelelse* No. 13, and the results are published in a number of papers in the series *Skifter*.

Expedition to Frans Josef Land. The Discovery of the Andrée Relics.

The object of the expedition was to carry out scientific investigations in the Frans Josef Land area, and at the same time the ship was to do some hunting. The expedition chartered the sealer M/V "Bratvaag" of Ålesund, Skipper Peder Eliassen. Leader and geologist was Horn, botanist Olaf Hanssen, and zoologist Adolf Sørensen. The crew numbered 13 men, and there were thus on board 17 men in all. The vessel had no wireless, only an ordinary broadcasting receiver.

The "Bratvaag" left Ålesund on July 26, reached Tromsø on the 30th, left the same night, and on Aug. 2 was at the island of Hopen, where the scientists went ashore for a few hours to make collections. The expedition then visited Abeløya, the easternmost island of Kong

Karls Land, and afterwards proceeded to Storøya on the east coast of Nordaustlandet. They landed at two points, and a hut was erected on the north-east shore next to the Italian depot, placed there in 1928 for the benefit of the Nobile expedition. The course was then set for Kvitøya (White Island) where the expedition remained until Aug. 7.

On the 6th the camp of the Andrée expedition (from 1897) was discovered on the ice-free land forming the southern promontory of the island. The first find was an aluminium lid on the beach, and then the canvas boat with a full cargo of expedition equipment was discovered some distance inland, partly buried in the snow, and fastened to a sledge. Then the body of Andrée himself was found, and of Strindberg who had been buried between two rocks. After the return of the expedition to Tromsø on Sept. 2 the relics were brought ashore and received by a committee appointed by the Swedish Government to examine and preserve the find. The committee consisted of the following Swedish members: Professor G. Hedrén, Professor N. Lithberg, assisted by Dr. E. Warfvinge, S. Köhler, engineer; and of the Norwegian members Docent A. Hoel, B. Dybwad-Holmboe, Physician to the County of Troms, and of Dr. Gunnar Horn. In the meantime an expedition sent out by a Swedish newspaper syndicate and led by Knut Stubendorff had reached Kvitøya in the sealer "Isbjørn", and succeeded in making further finds. Thus the body of Fränkel was found by this expedition, which returned to Tromsø on Sept. 16. On Sept. 19 the relics were brought on board the Swedish gunboat "Svensksund", which arrived in Stockholm on Oct. 5. The same day the funeral service was held in *Storkyrkan* in Stockholm. The relics, which had been presented to the Swedish Government, were later (1934) permanently housed in the rooms of the Geographical Institute of *Stockholms Högskola*. For particulars about the Andrée discovery see "Med Ørnen mot Polen" (1930).

On the night before Aug. 8 Victoriaøya was visited, and materials for a hut deposited ashore. The following day a report of the Andrée discovery was sent home in M/C "Terningen" of Tromsø.

The expedition reached Frans Josef Land on Aug. 11, passed up the Nightingalesundet and put up a hut with a small supply of provisions at Kapp Forbes. Zoological collections were made in the sound, and members of the expedition went ashore in Guntherbukta on Northbrookøya. To Algerøya they came on the 14th, landed at Kapp Flora on the 16th, and in Eirahamna the following day. Everywhere geological, botanical, and zoological material were collected. Various other points were also visited, and on the 25th the "Bratvaag" passed Kapp Harmsworth (the westernmost point of the group) homeward bound. On the 27th they went ashore on Kongsøya in Kong Karls Land, and reached Tromsø on Sept. 2, after having been escorted by the Norwegian

fishery inspection ship "Michael Sars" from Grøtnes, where the Andrée committee came on board.

On the results of the expedition the following papers have so far been published:

- Braarud, Trygve. Observations on net haul samples from the waters off North-East Spitsbergen and Franz Josef Land. (In: Braarud, T. The "Øst" Expedition to the Denmark Strait 1929. II). — Hvalrådets Skrifter. Nr. 10. Oslo 1935. Pp. 65—69.
- Florin, Rudolf. Die fossilen Ginkgophyten von Franz-Joseph-Land nebst Erörterungen über vermeintliche Cordaitales mesozoischen Alters. Mit 38 Taf. u. 28 Abb. im Text und auf 3 Beil. Stuttgart. 1936. Pp. 71—173, 1—72. 38 pl. 40. — Sonderabdr. aus Palaeontographica. B. 81. Abt. B. B. 82. Abt. B. Material from the expedition: B. 81. Abt. B. Pp. 146—56. Taf. 38—42.
- Goetghebuer, M. Chironomides du Groenland oriental, du Svalbard et de la Terre de François Joseph. Zool. Res. of the Norw. Exp. to East-Greenland. II. Oslo 1933. Pp. 19—31. — Skrifter om Svalbard og Ishavet. Nr. 53. Material from the Expedition: P. 24, 25.
- Grieg, James A. Some Echinoderms from Franz Josef Land, Victoriaøya and Hopen collected on the Norwegian sc. exp. 1930. Oslo 1935. 10 pp. Meddelelse. Norges Svalbard- og Ishavs-undersøkelser. Nr. 26.
- Hanssen, Olaf, and Johannes Lid. Flowering Plants of Franz Josef Land collected on the Norw. Sc. Exp. 1930. Oslo 1932. 42 pp. — Skrifter om Svalbard og Ishavet. Nr. 39.
- Horn, Gunnar. "Bratvaag"-expeditionen finner lægret. — Andrée, S. A. [etc.]. Med Ørnen mot Polen. Sth. 1930. Pp. 278—302. Transl. into many languages. English ed.: The Andrée Diaries.
- Ekspedisjonen til Franz Josefs Land. — Norsk geogr. tidsskrift. B. 3. Oslo 1931. Pp. 396—405. Meddelelse. Norges Svalbard- og Ishavsundersøkelser. Nr. 13.
- Some geological results of the Norwegian Expedition to Franz Josef Land 1930. — Norsk geol. tidsskrift. B. 11. Oslo 1932. Pp. 482—89.
- Høeg, Ove Arbo. Notes on some Arctic Fossil Wood. — Meddelelse. Norges Svalbard- og Ishavs-undersøkelser. Nr. 17. Oslo 1932. Material from the expedition: Pp. 3—4. Pl. III.
- Lyng, B. Lichens collected on the Norw. Sc. Exp. to Franz Josef Land 1930. Oslo 1931. 31 pp. 2 pl. — Skrifter om Svalbard og Ishavet. Nr. 38.

Work during the Winter of 1930—31.

The topographers Luncke and Solheim worked up the topographical material from the expedition to North-East Greenland in 1929. The stereo-photogrammetrically surveyed part of the material was constructed (Haaken Christensen and Luncke) with the help of the Zeiss stereo-autograph of *Norges Geografiske Opmåling*. They further carried out the construction of the map covering the area around Van Keulenfjorden in Spitsbergen (surveyed in 1920) and prepared a description of the survey of Bear Island 1922—24.

The hydrographic surveyor, Kjær, finished the preparation of the chart S. 3, *Frå Bellsund til Forlandsrevet med Isfjorden*.

Orvin was occupied with work in connection with the Greenland expedition of 1930, published an account of the expedition (*Meddelelse*

No. 13), and a description of the huts (with plans) in North-East Greenland. He also worked on the paper on the Kings Bay coalfield (*Skifter* No. 57).

Throughout the autumn Horn was engaged on the *Andrée* find, and had for some time leave for this purpose. He also did various work in connection with the Frans Josef Land expedition, translated into English a botanical Greenland paper (*Skifter* No. 48), did various office work, etc. He gave lectures on the *Andrée* discovery before the Geographical Societies in Stockholm, Göteborg, Oslo, and Uppsala, and in March 1931 in Antwerp.

Braastad was occupied with the expeditions, the *Andrée* find, the estimates for NSIU, the place-names of Svalbard, correspondence, etc.

Expeditions in the Summer of 1931.

One expedition was sent out to North-East Greenland, a hydrographic expedition to the Bear Island waters, and scientists were also sent with an expedition to South-East Greenland. The immediate occasion for sending Norwegian expeditions to this part of Greenland has been dealt with on page 14. When the Danes founded the Scoresby Sound colony, they had two colonies in East Greenland, viz. the Scoresby Sound area just mentioned, and the area of the Angmagssalik colony. The land outside these areas was regarded as a No-man's-land by the Norwegians, and according to the East Greenland Convention of 1924 Norwegians and Danes were to have equal rights in these parts.

South-East Greenland was then but little known. It was believed that the coast was difficult of access even in the summer months, and nothing whatever was known of the hunting possibilities ashore. It was natural, then, that those Norwegians who had taken part in, or knew the good results of the hunting in North-East Greenland, should desire to try the southern areas as well; for they might give even better results. In 1931 two Norwegian vessels sailed for South-East Greenland, one with a hunting expedition led by Finn Devold and consisting of six men, who put up their huts in the Skjoldungen and Umanak districts; and the other (sent out by Peter S. Brandal in Brandal near Ålesund) of three men led by Ole Mortensen, went to the third fjord north of Lindenow-fjorden, the Kangerdluarak. We shall here deal mainly with the activities of expeditions with which the NSIU are concerned.

The "Heimen" Expedition to South-East Greenland.

M/V "Heimen" of Tromsø had been chartered by Finn Devold to carry his expedition of six men to South-East Greenland. They had supplies for two years, and material to erect about 30 huts. With this expedition went also a party sent out by NSIU, whose members were:

Thorolf Vogt, Professor of geology at the *Norges Tekniske Høiskole* in Trondheim, geologist and leader of the scientific party; Lieutenant Eystein Lundbom, Norwegian Navy, surveyor; and Bjørn Bjørlykke, botanist. The landscape painter Gunnar Wefring was also on board as the guest of Devold. The crew of the "Heimen" numbered eight men, with Lars Jakobsen as skipper.

The vessel left Svolvær in North Norway on July 23, and encountered the ice north-west of Iceland on the 29th, sailed southwards through the Greenland Strait, and anchored in the Tingmiarmiut district on Aug. 1. They worked here for a few days and investigated the fjords from a motor-boat. On Aug. 4 they left for the fjord on the south side of the island of Skjoldungen. In this district (Akorninarmiut) they remained until Aug. 14. The members of the hunting expedition landed their material for two main stations, huts, outfit and provisions, and the main station with wireless was erected at a small harbour on the peninsula north of Skjoldungen in Lat. $63^{\circ} 24' N$ and $41^{\circ} 18' Long. W. Gr.$ The station was called *Finnsbu*. A regular meteorological service was to be maintained. The station was to be a link in the series maintained by Norway on the occasion of the International Polar Year 1932—33.

The scientists investigated the country adjoining the fjords and were able to correct the map considerably. They then sailed to Umanak south of Skjoldungen where the third hunting party was put ashore. On Aug. 18 they sailed northwards with the object of finding the point in Umivik where the expedition of Fridtjof Nansen in Aug. 1888 left the east coast to cross the ice cap. "Heimen" reached the point the very same night, the camp of Nansen was found the next day, and here a cairn was built. The surrounding country was investigated, and our people came upon a summer camp comprising 16 Eskimos from Angmagssalik. On Aug. 22 the vessel proceeded southwards again, to the district of Skjoldungen, where the scientific work was continued. The expedition left Greenland on Aug. 30, and came to Trondheim on Sept. 7. An account of the expedition will be found in *Meddelelse* No. 20.

The results of the expedition were:

Topographical work. A sketch map was prepared of the Skjoldungen district, showing many new features: Several large fjords north of Finnsbu, and corrections of old coast lines. Survey work was also undertaken in Umivik, Umanak, and Tingmiarmiut. Extent of new coast lines sketched: 980 km.

Hydrographic work. Soundings were carried out in a number of places.

Geological work. Vogt worked on the coast Umivik—Tingmiarmiut and found in the Skjoldungen district the so-called Lofot-rocks, being a particularly interesting find in view of the occurrence of similar rocks

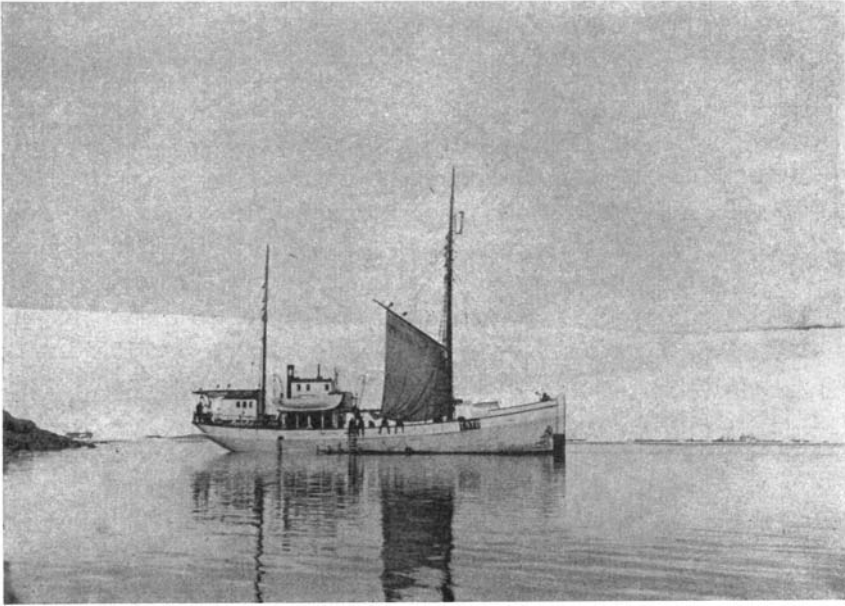


Fig. 4. *M/V Heimen* in Umivik, South-East Greenland.

Vogt phot. Aug. 19, 1931.

in Norway. The Quaternary geology was also studied, and the results of this work have been published in *Skifter* No. 60.

Botanical work. Much material was collected, most of which has been described (*Skifter* No. 43, 45 and 46). A new species of *Hieracium* was found, and of lichens were collected 70 kinds, of which several species are new to these regions.

Anthropological collections. From old Eskimo graves Vogt collected skeleton remains which have been presented to the Anatomical Institute of the Oslo University for examination.

The "Signalhorn" Expedition to South-East Greenland.

The sealer S/S "Signalhorn" with the Mortensen wintering expedition called at a number of points between Storfjorden (Kangerdlugssuak) in Lat. 68° N and Lindenowfjorden in the south to find a suitable place for a hunting station. J. Kr. Tornøe, secretary to *Norges Svalbard- og Ishavsraad* also took part in this expedition as leader, collected botanical and geological material, and obtained much useful knowledge of the coast. Thus from experience gained on the expedition Tornøe concludes that he has identified the Hvitserk and Blåserk of the old Norse travel accounts to Greenland, as being mountains on the Liverpool Coast. The lichens collected by Tornøe have been described by Lyngé (*Skifter* No. 45), the vascular plants by Lid (*Skifter* No. 44). The hieracium by Omang (*Skifter* No. 46).

Expedition to North-East Greenland.

The expenses were defrayed by the Norwegian Government, the Nansen Fund, and private subscribers. The members were: Hoel, geologist and leader; Hans S. Jelstrup, astronomer of *Norges Geografiske Opmåling*; Luncke, Solheim and Askheim, topographers; von Krogh, hydrographic surveyor; Anton Jakhelln, oceanographer; Løyning, zoologist; Erling Hansen, zoological assistant; Joakim Devold, physician; K. W. Tønnesen, wireless operator; A. H. Øverbye, assistant and wireless operator to the astronomer. Further: eight assistants and three journalists, viz., Halvdan Hydle of the "Aftenposten", Oslo; Axel Kielland of the "Dagbladet", Oslo; B. Høye of the "Tidens Tegn", Oslo, and of the "Dagen", Bergen. The vessel of the expedition was M/V "Polarbjørn" of Ålesund. The crew, including the skipper, Kristoffer Marø, numbered nine men. The expedition thus totalled 32 members.

The vessel left Ålesund on July 9, called at Jan Mayen on the 15th, and reached the pack ice on the 17th. The ice conditions were very difficult this year, and it took the ship a fortnight to get through the ice belt. The expedition reached Kapp Herschel on the last day of July. The work was confined to about the same areas as in 1929 and 1930. As before, fresh provisions were carried to the hunting stations, and they also obtained transport assistance, etc. On Aug. 10 the "Polarbjørn" received a message from Captain Robert Bartlett of the American schooner "Effie M. Morrissey", calling for assistance, as his ship had run ashore at Kapp Stosch. She was not got off till the following day.

Passengers on the homeward voyage were Arne Høygaard and Martin Mehren, who had made a crossing of the Greenland ice-cap with dogs and sledges from the west to the east coast. Two men of the crew had gone ashore to winter, and the ship had thus 41 men on board. She left Myggbukta on Aug. 22. The ice belt was now only 21 nautical miles wide, and the ice being very open the expedition made a very quick crossing, reaching Ålesund on Aug. 31. (The passengers and some of the expedition members arrived in the inspection ship H. M. S. "Fridtjof Nansen", which, according to previous arrangement, had met "Polarbjørn" north of Iceland.)

The results of the expedition were:

An *astronomical* determination (latitude, longitude, and azimuth) was made of a point at Myggbukta. The results are published in *Skrifter* No. 50. *Triangulation* and *topographic survey* was carried out in the area between Fosterbukta and Kapp Herschel and towards Loch Fine. The trigonometrical net was extended along the south side of Claveringfjorden, on Claveringøya and Wollaston Foreland. In the same region an area of 2500 sq. km was stereo-photogrammetrically mapped on the

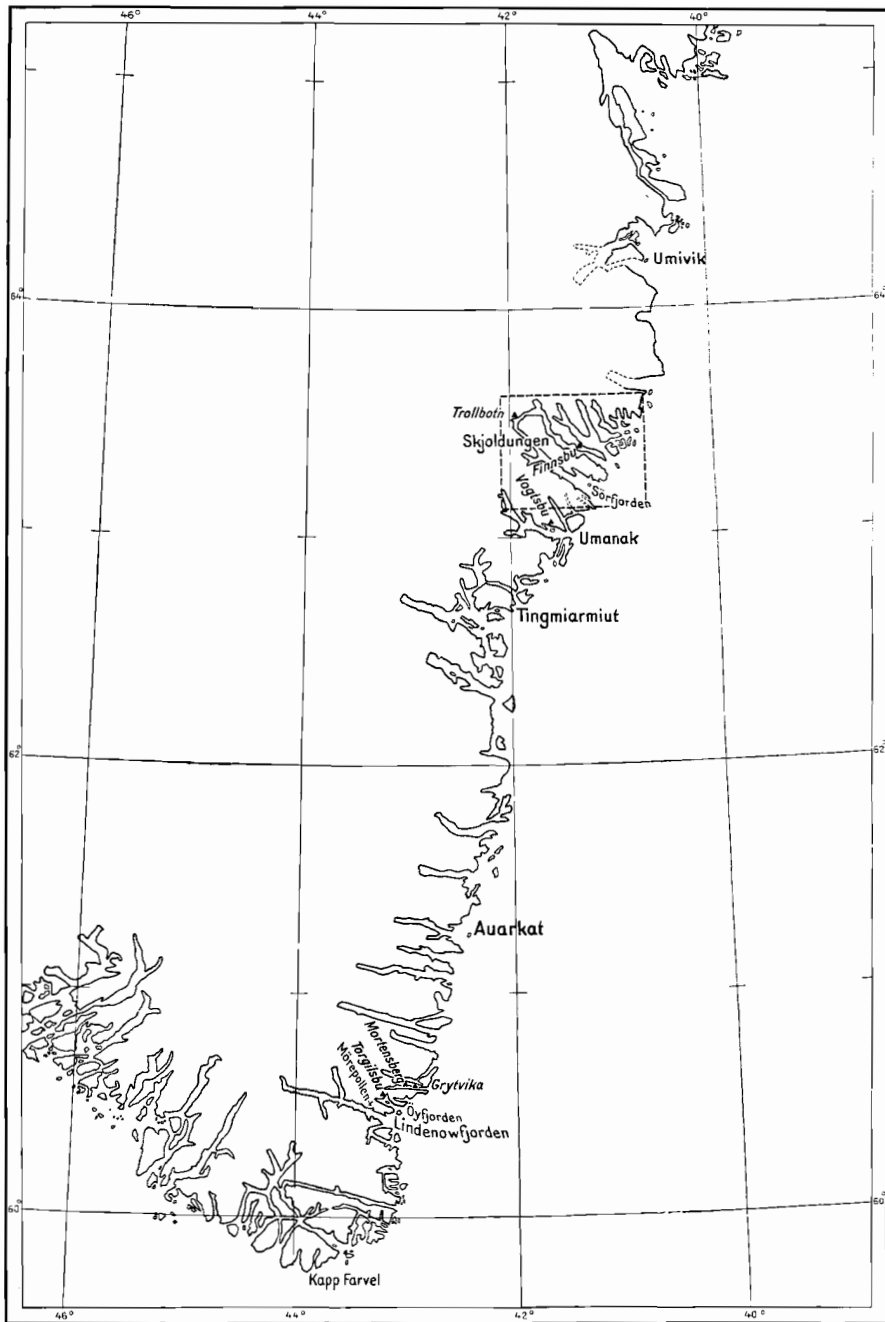


Fig. 5. Map of South-East Greenland showing main area with new coast lines.

scale of 1:50000, and a coast-line of 330 km from Hold with Hope to Homes Foreland, and around Gael Hamkebukta and Clavingfjorden was surveyed with direct "depression" measurements. A stereo-photogrammetric outfit, just acquired, was employed for the first time. It consists of a Baalsrud photo-theodolite No. 1133, size of photograms 10×15 cm; and a Wild Universal theodolite No. 3105. Observations were taken from 60 trigonometrical stations, with a total of 390 photograms, 10 stations without photograms, 17 photogrammetric sea stations with 42 photograms and 38 tacheometer stations. In the trigonometrical main points 31 cylindrical stone cairns were built of the height of 0.8—1.8 m. Tidal observations were carried out on the north coast of Homes Foreland.

Hydrographic surveying was carried out, continuing the work of 1930. Soundings were taken over an area of 970 sq. km in the mouth of Frans Josef Fjord, in the eastern part of Sofiasundet as far as a line from Kapp Franklin to Kapp Laplace, and the coast from Kapp Franklin to Kapp Bennet. A total of 155 km of 10 and 6 m danger lines was traced.

Further 21 *oceanographic* stations were taken, most of them in the inner part of the fjords. The greatest depth found was 780 m (in Frans Josef Fjord).

Zoological collections were made of the marine fauna, and mammals and birds were to a certain extent also collected.

As an experiment 16 young hares were captured to be taken to Svalbard, but unfortunately most of them were drowned accidentally on the voyage. The remainder (3) were released in Hiorthhamn at Adventfjorden.

Geological work was done, in particular measurements of strand lines and terraces.

An account of the expedition will be found in *Meddelelse* No. 25.

Hydrographic Survey of the Bear Island Banks.

The "Michael Sars" served as vessel for the expedition to the Bear Island banks, and Rolf Kjær was the leader and surveyor. The ship's officers were Commander Th. Thommesen, Lieutenants H. Henriksen and Jon Seip, who all took part in the survey. The ship left Tromsø on May 1, and soundings were carried out south-west of Bear Island until May 8, when she returned to Tromsø for boiler scaling. At the same time Thommesen was replaced by Commander H. S. Briseid, who also took part in the hydrographic work. On May 16 the "Michael Sars" again went north, but no hydrographic work could be done until the 19th on account of bad weather. Many fishing vessels now appeared on the fishing grounds, both Norwegian, French, and Spanish.

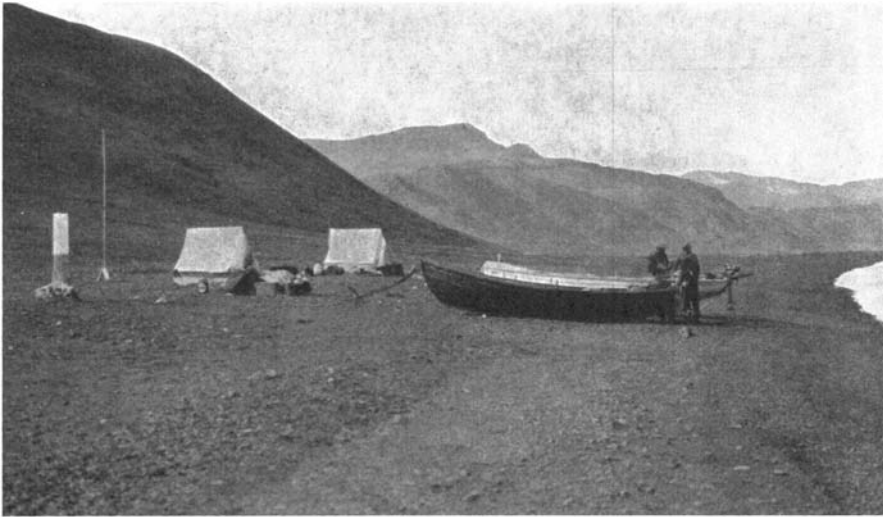


Fig. 6. Topographers' camp on the south side of Claveringfjorden, near K. James, North-East Greenland.

Solheim phot. 1931

The surveyors worked south-east of Bear Island, and also on the coast at Sør- and Russehamna, until the 24th. The ship then went back to Norway and coaled in Honningsvåg, where it remained until May 31 owing to epidemics on board. They again worked at Bear Island until June 4, and stayed in Tromsø until the 12th (boiler scaling and military practice). A series of soundings from Norway to Bear Island was then taken, but the ship had to remain a whole week to the leeward side of the island, as the weather was very bad with strong winds, fog, and snow. In this period several signals were put up at various points on the island for future use. Observations of the declination were made, whereupon the ship on the 16th left the island for Norway. In Grytvika on the west coast of Bear Island there were then at anchor abt. 40 fishing vessels.

Kjær left the "Michael Sars" in Harstad on the 22nd, and then sailed for Longyearbyen in the collier "Kaprinno". From June 27 to July 1 he made a number of observations of the declination. Kjær returned to Harstad in the same boat, and reached Oslo in the middle of July.

Summary of the work done: One oceanographical section, 453 soundings with bottom samples, revision of part of the south-east coast of Bear Island, five series (17 observations) of the magnetic declination on Bear Island and at Adventfjorden (Longyearbyen) in Spitsbergen. In 1930 there were abt. 200 vessels at Bear Island, the number in 1931 was only 50, and an increasing number of foreign trawlers was observed.

Work during the Winter of 1931—32.

Besides Luncke and Solheim, Askheim also worked in the office of NSIU from June 1931 as topographer and draughtsman. In the course of the winter the office carried out trigonometrical computations and construction of the material from the expedition to North-East Greenland in 1931. Luncke was two months and a half in Germany where, in collaboration with Dr. Kurt Schwidewsky, he did the stereo-photogrammetric construction of an area of 1830 sq. km on the scale of 1 : 50 000 and 1 : 100 000. A Zeiss stereo-planigraph was used (belonging to the *Luftbildabteilung der Deutschen Versuchsanstalt für Luftfahrt*, Berlin-Adlershof, Leiter: Professor Dr. Otto Lacmann), and also the Hugerhoff auto-cartograph of the *Technische Hochschule*, Berlin-Charlottenburg. The topographers also made preparations for the coming aerial survey of North-East Greenland, made seven sheets (on aluminium) of the constructed area on the scale of 1 : 100 000. The map was reproduced and printed in *Norges Geografiske Opmåling* with the following title: *Austgrønland. Eirik Raudes Land fra Sofiasund til Youngsund*. Scale 1 : 200 000.

The hydrographic surveyor Kjær prepared the final edition of the chart S. 1. *Bjørnøya*, on the scale of 1 : 40 000, which was issued in March 1932 along with the chart made in 1930—31: S. 3. *Frå Bellsund til Forlandsrevet med Isfjorden*. He then commenced work on the charts S. 6. *Norge—Svalbard, søre blad: Frå Andfjorden og Varanger til Bjørnøya* on the 1 : 750 000 scale; and S. 4, *Frå Bellsund til Sørkapp* on the scale of 1 : 200 000.

The staff of the NSIU had this winter to spend much time on work connected with the East Greenland Case. The history of the Case is briefly as follows: *Norges Svalbard- og Ishavs-råd*¹ had under the dates of Feb. 7 and May 5 1931 submitted proposals to the Government to the effect that Norway should occupy those areas used by Norwegian hunters in East Greenland. On June 27 the same year Hallvard Devold hoisted the Norwegian flag in Myggbukta and took possession of the country between Carlsbergfjorden in the south and Besselfjorden in the north, for Norway. The occupation was recognized by a Royal Decree of July 10. On the 11th, Denmark placed the matter before the Permanent Court of International Justice in the Hague, and on Aug. 6 the Court fixed the dates for the filing of Case, Counter-Case, Reply,

¹ In 1928 Hoel had proposed the appointment of a *Norges Svalbard- og Ishavs-råd* (Svalbard and Arctic Sea Council of Norway) to act in an advisory capacity in all Arctic matters. The Council was appointed in January 1931 with 10 members, Hoel being one of them. Chairman of the Council was Gustav Smedal, LL. D. and secretary J. Kr. Tornøe. The Council had its office in the rooms of the NSIU. In 1933 the Council was abolished.

and Rejoinder. The last of the written proceedings, the Norwegian Rejoinder, was filed on Oct. 14, 1932. On Sept. 4, 1931 an expert committee was appointed by the Norwegian Government and consisting of six members. One of them was Hoel, leader of NSIU. The committee now charged the NSIU with the task of supplying material to be used for the preparation of the Norwegian written and oral proceedings. This work occupied most of the time of the staff of the NSIU for nearly two years and was also carried out by other persons employed by the office.

For instance, Orvin prepared a survey of the wintering expeditions to East Greenland, a description of the hunting stations and huts, went through a large number of maps in various libraries, etc. He published a paper on a fossil river bed in East Greenland (*Meddelelse* No. 14, II), and worked on the preparations for the coming expedition to North-East Greenland.

Horn was also engaged on various work in connection with the Greenland affair, and in October he sailed (with leave from NSIU) for the U. S. A. to lecture on the Andrée discovery, also before the American Geographical Society in New York. After his return in March 1932 he continued to work with Greenland matters.

Braastad also spent much time on Greenland matters, worked on the estimates for NSIU, printing of publications, the accounts, various correspondence, preparations for the Greenland expeditions (which were to erect three new wireless stations).

By a Royal Decree of July 12, 1932 Norway had also declared that part of South-East Greenland lying between $60^{\circ} 30'$ and $63^{\circ} 40'$ Lat. N as being under Norwegian sovereignty.

Expeditions in the Summer of 1932.

The following expeditions were sent out: One to North-East Greenland, two to South-East Greenland, one to Spitsbergen to measure glaciers, and a hydrographic expedition to the Bear Island waters.

The "Polaris" Expedition to South-East Greenland.

1932—33 was the International Polar Year, with a number of nations participating. Norway had already the wireless stations in Myggbukta and Finnsbu, and in the summer of 1932 expeditions were also sent out to erect the radio and meteorological stations Jonsbu in lat. $75^{\circ} 20' N$, in Storfjorden in lat. abt. 68° , and north of Lindenowfjorden in lat. abt. $60^{\circ} 30'$. The expedition which received a grant to erect the last two stations was sent out by Peter S. Brandal, who combined it with an attempt at hunting in these areas.

In order that the expedition should also be able to carry out scientific work, two botanists were on board, sent out by NSIU. They

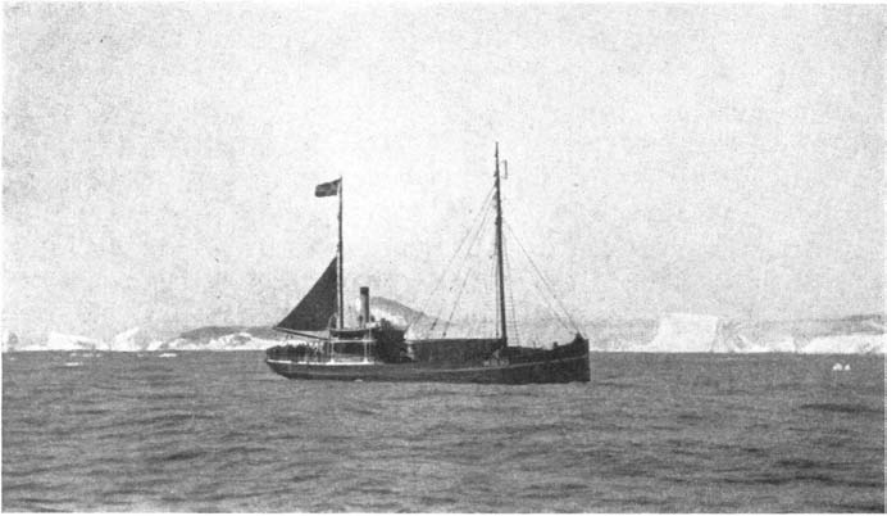


Fig. 7. *S/S Polaris* off Kapp Løwenørn, South-East Greenland.

Horn phot. Aug. 16, 1932.

were Dr. P. F. Scholander, and the medical student Joakim Devold. Thor Iversen, fishery consultant to the Fisheries Directorate in Bergen, also participated in the expedition to make preliminary investigations for a coming fishery expedition.

The sealer *S/S "Polaris"* left Brandal near Ålesund on July 11, 1932 with Peter S. Brandal jr. as skipper. The vessel had also six winterers on board, amongst whom were the wireless operators Sverre Aaseth and Henry Haug. The expedition reached Finnsbu on July 24, called at Trollbotn to unload provisions, and arrived at the hunting station Mortensberg in Kangerdluarakfjorden on the 26th, where they received the sad news that the leader of the wintering party, Ole Mortensen, had been drowned on Feb. 2 (1932). The two remaining hunters left the station with the expedition. The "*Polaris*" now sailed to Lindenowfjorden where the wireless station was erected in a small bay on the north side, named Mørepollen. A number of hunting stations were unloaded in the fjords to the north, and the pelts from Mortensberg were collected, whereupon the vessel sailed northwards and entered the Tingmiarmiutfjord on Aug. 8. They met here the expedition of the American, Mr. D. Talcott, with the *M/V "Nordkap II"* of Tromsø. The "*Polaris*" then called at the three hunting stations of Finn Devold, and received eight barrels of Salmon (*Arctic Char, Salmo alpinus*). On Aug. 16 they met the "*Veslemari*" expedition off Kapp Løwenørn. J. Devold here joined that expedition, whereupon "*Polaris*" continued her voyage northwards and entered Storfjorden on the 20th, where a hut was built on the east side of the fjord, and the main station with the wireless on the west side. The station was finished on the 26th. Henry Haug with



Fig. 8. *M/V Veslemari* unloading oil barrels and coal in Heimenhamna (Finnsbu), South-East Greenland.

Horn phot. Aug. 17, 1932.

two men were the winterers. Another hut was erected in Amdrupfjorden, and the hut from 1931 was repaired. On the 29th the "Polaris" left for Norway and reached Brandal on Sept. 12.

Scholander and Devold collected a large botanical material, which is dealt with in the *Skrifter* No. 56 and 70. Anthropological material was also collected for the Anatomical Institute of the University in Oslo.

The "Veslemari" Expedition to South-East Greenland.

The task of the expedition was to continue the work of the "Heimen" and "Signalhorn" expeditions in 1931, and, as far as possible, visit the entire coast from Lat. $63^{\circ} 40'$ to $60^{\circ} 30'$, which stretch, as mentioned above, had been claimed for Norway by the Norwegian Government on July 12, 1932. The expedition chartered *M/V "Veslemari"* of Ålesund, commanded by Skipper Monrad Pilskog, with a crew of ten. The vessel had been fitted with a new 100-watt wireless equipment. The party consisted of the following: Horn, geologist and leader; Commander Erling Kjær, Norwegian Navy, hydrographic surveyor; J. Devold, botanist and anthropologist; Bjarne Lande, wireless operator.

The ship left Ålesund on Aug. 6, and called at Åndalsnes to take on board 300 bags of Spitsbergen coal. On board were also 50 bls. of Solar oil. The coal and oil were to be stored in South-East Greenland for the use of fishing vessels and hunters. The ship also had on board nine huts, 1000 feet of boards, 120 feet laths, cement, and various other

goods, including a new motor for the wireless station in Finnsbu. The "Veslemari" left Åndalsnes on Aug. 7 in the morning, and was off Cape Nord on the north coast of Iceland on the 13th. The expedition reached the Greenland coast at Kapp Løwenørn (Lat. $64^{\circ} 30' N$) on Aug. 16, where another Norwegian expedition ship was met, S/S "Polaris", and Devold who had been with the "Polaris" was transferred to the "Veslemari". The following day the expedition reached Finnsbu, where some coal and oil were unloaded, and the scientific work was commenced. From Finnsbu they proceeded to the Trollbotn hunting station (west of Finnsbu), and thence along the coast southwards as far as Lindenowfjorden where the ship entered the little bay of Mørepollen.

There was here a wireless station erected some weeks before by the "Polaris" expedition (see above). Unfortunately the station had to be moved to another site, and this work was carried out by the "Veslemari" expedition. Another site was found in the fjord to the north, called Øyfjorden by the Norwegian hunters. The new station was built here in Lat. $60^{\circ} 32' N$ and abt. $43^{\circ} 11' W$, and called *Torgilsbu* in commemoration of the Norwegian Torgils Orrabeinsfostre, who, after having emigrated to Iceland, may have visited this part of the East Greenland coast shortly after the year 1000. The moving of the station occupied the expedition until Sept. 2. From Torgilsbu the expedition returned northwards, and after having called at various points on the coast, Kangerdluarak (Lat. $60^{\circ} 34' N$), Auarkat ($61^{\circ} 16'$), Inugsuit ($61^{\circ} 41'$), Tingmiarmiut and Umanak, reached Finnsbu on Sept. 13. On Sept. 16 the expedition left Greenland and reached Ålesund on the 27th.

The work of the expedition included plans of the Norwegian hunting stations and surroundings, and a survey of parts of Øyfjorden (where Torgilsbu is situated). At Torgilsbu and other points determinations of the latitude were done, and at Torgilsbu and Finnsbu a determination of the magnetic variation was carried out.

The *hydrographic* work included a survey of Heimenhamna at Finnsbu on the scale of 1:5000, of Grytvika in Kangerdluarak on the same scale, and of Mørepollen on the north side of Lindenowfjorden on the 1:10000 scale. Soundings were made at various points, sketches and views of the coast prepared. At Finnsbu the manager of the station, Finn Devold, carried out (for the expedition) tidal observations during a period of 28 days. The results are published in *Skrifter* No. 14.

The *geological* work consisted in the collecting of specimens wherever the expedition landed, particularly from the coast between the district of Skjoldungen and Umanak, to supplement the work of Vogt in 1931, and the collections have also been handed over to Vogt to be worked up by him. Soil sections were also taken.

The *botanical* collections were quite considerable, and the vascular plants have been described by Devold and Scholander in *Skrifter* No. 56 (1933).

Anthropological material was also collected from the old Eskimo graves and handed over to the Anatomical Institute of the University of Oslo for examination.

A detailed account of the expedition will be found in *Meddelelse* No. 24.

Expedition to North-East Greenland.

Originally, the expedition was planned to be similar in scope to the previous three, but after the grant had been given by the Government, Consul Lars Christensen in Sandefjord offered the NSIU the use of his aeroplane Qarrtsiluni (Lockheed Vega) for survey purposes. The aerial survey was assured when *J. L. Tiedemanns Tobaksfabrik* of Oslo gave 20 000 kroner for this purpose. As an auxiliary a Spartan aeroplane belonging to Wilhelm Omsted of Oslo was hired.

The Qarrtsiluni was flown to Berlin by Lieutenant Storm. Here the camera was mounted in the machine (Serial camera, picture size 18 × 18 cm, focal length 21 cm, type Zeiss R. M. K.). The mounting was carried out by The *Luftbildabteilung der Deutschen Versuchsanstalt für Luftfahrt*, Berlin-Adlershof under the leadership of Professor O. Lacmann. Trial flights were also made in order to ascertain the suitability of the plane for the purpose. The aerial survey was planned by Lacmann and Luncke of the NSIU.

The members of the expedition were: Orvin, geologist and leader; von Krogh, hydrographic surveyor and maritime leader; Jelstrup, astronomer; Solheim and Askheim, topographers; Max Bundermann of Berlin, air-survey photographer; Lieutenant Erik Storm, Norwegian Navy, air pilot; Flight-Lieutenant Sigurd Aagenæs, reserve air pilot; Bjarne Larsen, Norwegian Navy, mechanics; Jakhelln, oceanographer; Sigurd Aandstad, botanist; Løyning, marine zoologist; Søren Richter, archaeologist; Hansen, assistant to Løyning; Erling Siggeson, taxidermist; Øverbye, assistant and wireless operator to the astronomer; Captain Lars Kjærland, Norwegian Army, surveyor and assistant to the astronomer. There were six assistants to the land and sea parties. The landscape painter Gunnar Wefring accompanied the expedition and also the following journalists; Odd Arnesen of the "Aftenposten", Oslo; Erling Nordahl representing "Morgenbladet" of Oslo and "Bergens Aftenblad" of Bergen; Sigurd Skaun of the "Dagsposten", Trondheim. The last mentioned along with Harald Welde, mining-engineering student from Trondheim, was also to undertake an inland tour on the west side of Waltershausenbreen.

This year, too, the "Polarbjørn" served as the expedition vessel. Her owners (A/S Polarbjørn) had made a contract with the *Handels-*

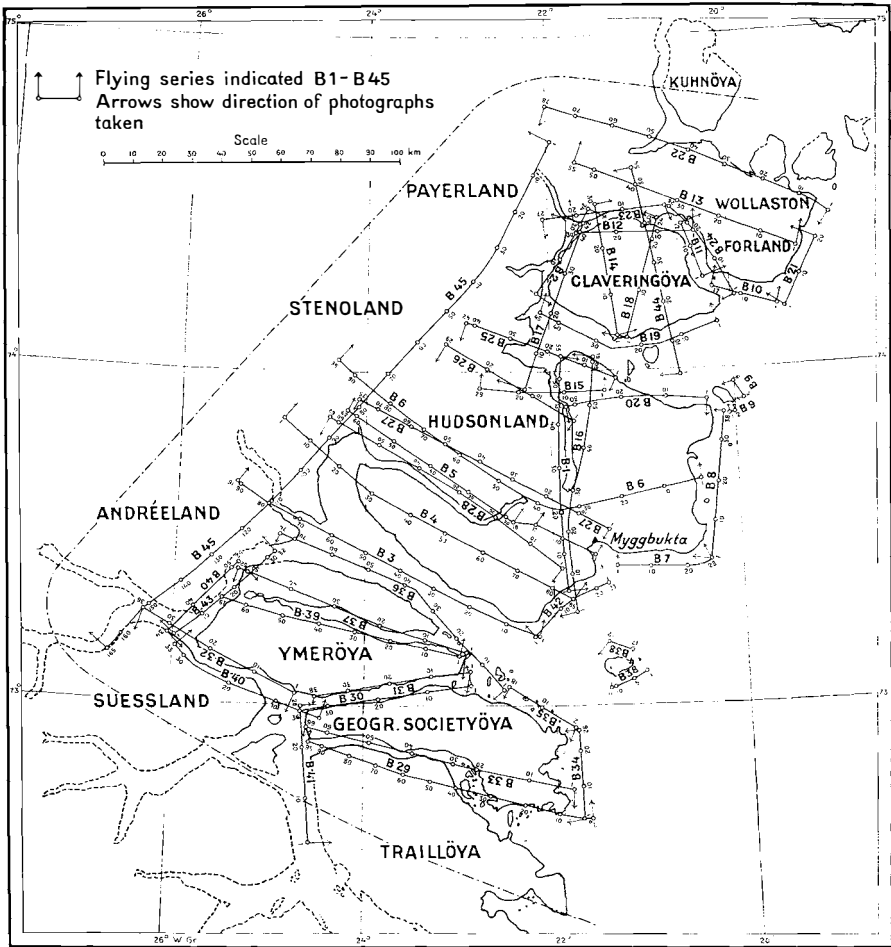


Fig. 9. General map showing flying series in North-East Greenland.

departementet (Department of Trade) in Oslo according to which the owners had installed a new Polar Diesel engine of 300 H. P. in the "Polarbjørn", fitted the vessel with two deck huts, gangway; against which the Government undertook the obligation to charter the vessel for at least two consecutive months a year, and at the price of 700 kroner per day, and 400 kroner for each additional day. The Government should also have the option of chartering her for five years, and, if desired, the right to renew the option for another five years. In the years 1934—36 the rate was fixed at 500 kroner per day for the first 60 days, and 400 kroner for the following 30 days. The contract also contained other clauses, which, however, are of minor importance.

The crew, including the skipper, Kristoffer Marø, totalled 13 men. When a part of North-East Greenland was declared Norwegian territory

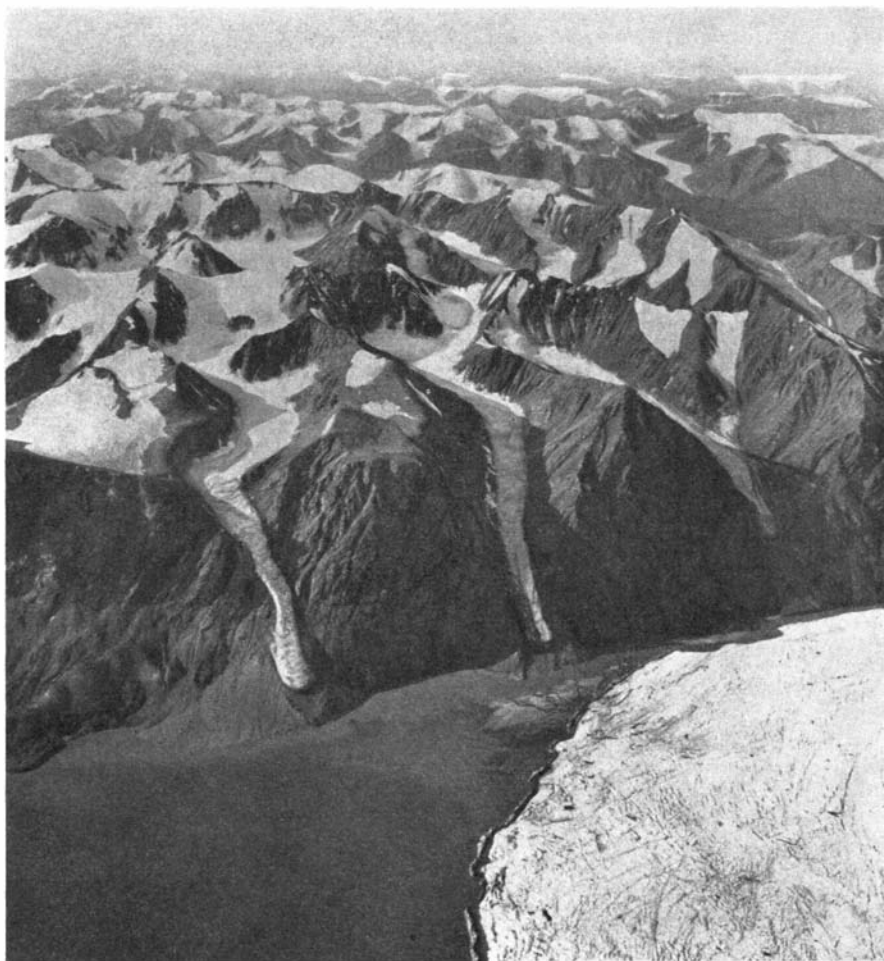


Fig. 10. North-East Greenland. Nørlundtindane with Wordiebreen and Wordiebukta in the foreground. Gneiss is the dominating rock. Photograph taken towards south from the height of 2500 Metres.

Max Bundermann phot. Aug. 14, 1932.

(and called Eirik Raudes Land), Helge Ingstad was appointed *sysselmann* (administrator), and some of the wintering hunters were granted police authority. On board were also the wintering expedition of Ingstad consisting of five men (fitted out for two years), and eight men from *Arktisk Næringsdrift A/S*. There were thus 54 men on board.

The expedition left Ålesund on July 13. Various goods and the aeroplanes had been taken on board in Oslo, Horten, and Fredrikstad. In addition to the outfit of the hunting expeditions, there were also on board 16 dogs, 7 silver foxes and 12 carrier pigeons. Until the arrival in Myggbukta John Thorstensen served as wireless operator, to be relieved by Hallvard Devold. The vessel was fitted with a new 300-watt wireless



Fig. 11. North-East Greenland. Grantafjorden with Copelandfjorden and Clavingøya in the foreground. An old moraine nearly blocks the Grantafjord. The mountains in the central part of the photograph consist of gneiss and granite. Taken towards west from the height of 2500 Metres.

Max Bundermann phot. Aug. 8, 1932.

equipment. The "Polarbjørn" called at Jan Mayen on the 17th to deliver mails and various goods, reached the ice edge on the 19th, and was off the Greenland coast (Kapp Borlase Warren) on the 21st. Then it continued northwards through the shore lead to Sabineøya, where the Jelstrup party went ashore. The scientists worked the same areas as in the preceding years: from Sabineøya in the north, to Davysundet in the south. The base of the aerial survey was Myggbukta, where good starting ground (2000 m \times 2500 m) was found on the sandy plain on the south-west side of the bay. Skaun and Welde were put ashore at Kapp Bull in Nordfjorden on July 29, and were called for on Aug. 18.

Before the departure the ice conditions were examined from the aeroplane, and in the early morning of the 21st the expedition left for home. On the homeward voyage the vessel had 48 men on board.



Fig. 12. North-East Greenland. Moskusoksefjorden with Gausshalvøya in the foreground, and Hudsonlandet in the distance. Sandy beds of Devonian and Lower Carboniferous age are the most common. Photograph taken towards north-east from the height of 3500 Metres.

Max Bundermann phot July 31, 1932.

The "Polarbjørn" reached Ålesund on the 26th, and then proceeded to Oslo with the aeroplanes and the expedition outfit (arrived Aug. 31).

The scientific results of the expedition were considerable: An *astronomical determination* of latitude, longitude, and azimuth was made on Sabineøya near the astronomical stations of Sabine (1823), and the Second German Polar Expedition (1869—70). The instrument was mounted on a concrete pillar in a house with a partly removable roof. The results may support the view that Greenland has a westerly drift. They are published in the *Skifter* No. 58.

Topographical work. The trigonometrical net was extended along the Frans Josef fjord, Nordfjorden, and Moskusoksefjorden, around the

inner part of Claveringfjorden and along Copelandfjorden. In the same region an area of 2200 sq. km was stereo-photogrammetrically surveyed on the scale of 1:50 000. Further, a coast line of 410 km in the mentioned fjords was measured through "direct depressions". Observations were made in 52 trigonometrical stations with a total of 361 photograms, and six stations without such. Further: 18 photogrammetric sea stations with 36 photograms, and 5 tacheometer stations. 24 cairns were built.

Aerial Survey. The survey was carried out according to a plan previously drawn up, and covered the area from Trailløya and Suessland in the southwest, to Sabine- and Kuhnøya in the north-east. Towards the inland ice the limit crossed Payer-, Steno-, and Andréeland. The flying height was from 2500 to 3500 m and the average base length abt. 1500 m. The photographs were taken obliquely at an angle of 20° to the horizon. The survey was carried out along lines, the distance between which was 20 km, and covered an area of 30 000 sq. km, of which 15 000 sq. km were previously unknown country. Ten survey flights were carried out with a total of 37½ flying hours and photographs numbering 2109, in 45 series, were taken. A detailed account of the air survey will be found in *Meddelelse* No. 23.

Sounding work. The total area sounded amounted to 912 sq. km, covering the whole of Loch Fine, Claveringfjorden from L. F. to the mouth, and the sound between Jacksonøya and the mainland. A few soundings were also made from the vessel in fjords not as yet hydrographically surveyed.

The *oceanographic* stations numbered 26, most of them in the fjords, some on the coast and in the drift ice.

Geological mapping on the scale of 1:200 000 was done in selected areas, and rock specimens and fossils were collected.

The *botanical* collections consisted of a vast material of mosses, which are being worked up by Mrs. Karen Hygen of Bergen. The botanist (Aandstad) also collected some flowering plants, which will be dealt with by Lid.

The *zoological* collections were for the most part marine, and at various points 20 net hauls were made. Our knowledge, based on the summer's and previous work, of the marine animal life south of Sabineøya is now quite extensive. Mammals and birds were collected for the Zoological Museum in Oslo and the Whaling Museum in Sandefjord.

Archæological investigations and collections were made in old Eskimo house sites in Claveringfjorden, Moskusoksefjorden, on Strindberghalvøya and in Myggbukta.

A *cinema film*, 1400 m in length was also taken.

In addition to the scientific work, the expedition also transported two hunting expeditions with outfit and provisions for two years to

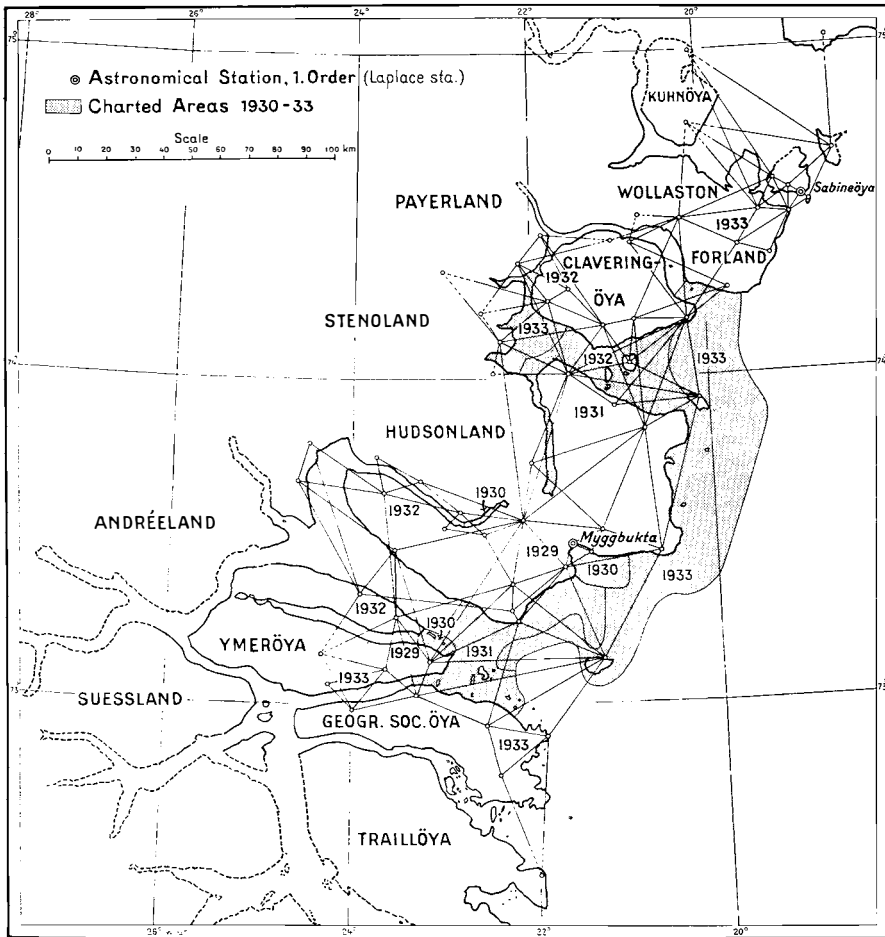


Fig. 13. Map of North-East Greenland showing trigonometrical net and charted areas.

Greenland, and put the parties of the expeditions ashore at various points. Whilst in Greenland waters the "Polarbjørn" covered a distance of 3400 km. On the return voyage the vessel also had on board four men from *Arktisk Næringsdrift A/S*, and three from *Møre Greenland expedition*.

Survey of Glacier Fronts in Spitsbergen.

Koller was to undertake the measurement of the position of the glacier fronts in Spitsbergen. He left Trondheim in S/S "Ingertre" on July 8 and reached Longyearbyen on July 13. Thence he left on the 17th in the boat of the Mining Inspector for Tempelfjorden, where Von Postbreen was measured. After a visit to Hornsund (in company

with the Mining Inspector, Merckoll) he sailed to Kongsfjorden (Aug. 4), where a number of glaciers were measured. During the days Aug. 11—13 they were in Møllerfjorden, and Koller took the opportunity to ascend Kong Håkons Fjell, from where he took a photographic panorama and some "depression" measurements, whereby the fronts of Lilliehöökbrean and some glaciers debouching into Møllerfjorden were fixed. Thence he proceeded back to Kongsfjorden, where some supplementary measurements were carried out. After having worked for some time in Billefjorden, Koller left Spitsbergen in S/S "Ingerfem" and reached Oslo on Aug. 30. The summer's work was much hampered by bad weather.

Hydrographic Survey of the Bear Island Banks.

The chief task of this expedition was to continue the soundings of the fishing banks, and it started from Vardø on May 23 with Rolf Kjær in charge. The new inspection vessel of the Navy "Fridtjof Nansen" (1700 tons displacement, and a complement of 70 men) had been placed at the disposal of the expedition, and the captain of the ship J. L. Høst, the other officers Commander A. Gunvaldsen, and Lieutenants F. T. Ulstrup, H. Bjørnstad, and Rolf Haga assisted in the survey. The expedition, which also brought fresh personnel for the wireless station on Bear Island, encountered the drift-ice already in Lat. 73° N, and had to go through the ice for several hours before the shore lead on the east side of the island was reached (May 25), where the wireless personnel were landed.

Much drift ice forced the expedition to commence the sounding work far to the west of the island. In the last week of May sounding work was attempted west and south-west of the island, but the work was much hampered by drift ice and bad weather with snow, and low temperatures. The first fishing steamers of the year, Norwegian and French, were seen as early as May 28, and also a Norwegian whaling factory, "Pioner". As the amount of drift-ice was increasing, the sounding work was discontinued and the expedition left on June 1 for Norway to await better conditions.

They remained in Tromsø until June 10, and then returned to Bear Island, where ice conditions were now much better, but the weather was still bad: strong winds, fog, and snow. Much sounding work was carried out in the period June 10—23 in the quadrant SW to NW of the island almost as far as Sørkapp in Spitsbergen, and in the south between Bear Island and Norway. Determinations of the magnetic variation were also made, as well as meteorological observations (the latter always being part of the programme). The ship called at the island to take on board the wireless personnel returning home, and reached Harstad in Norway on June 25, whereupon Kjær returned to Oslo. *En route* he made some determinations of the variation in Troms and Finnmark.

The 1932 hydrographic work was much hampered by bad weather and also drift-ice. Nevertheless, the results were fairly satisfactory, chiefly because the expedition had, for the first time, the benefit of using an echo sounder (German Atlas sounder). The vessel was also fitted out with a gyroscopic compass, and other modern appliances of much use in navigation. In May—June there were only 25—30 Norwegian fishing vessels at Bear Island, but quite a number of foreign trawlers: Spanish, French, Russian (5 large ones), German and British. A Faroe cutter was also observed.

Work during the Winter of 1932—33.

As mentioned on p. 33 the last of the written proceedings, the Norwegian Rejoinder, was filed on Oct. 14, 1932. The oral proceedings commenced on Nov. 21 and continued until Dec. 14, and again from Jan. 16 to Febr. 7, 1933. The Norwegian expert committee, including Hoel, were present in the Hague during the entire oral proceedings. On April 5, 1933 the Court delivered its judgement, in favour of Denmark. The judgement has, however, been strongly criticised by neutral experts on international law. The Case about South-East Greenland was then withdrawn.

The work of the NSIU in this period consisted in:

The topographers: Luncke, Solheim, and Askheim carried out trigonometrical computations and construction of East Greenland maps, plotting of control points on abt. 2000 air photograms, preparation of an account of the air survey (printed as *Meddelelse* No. 23), and topographical construction of the area between Dunderbukta and Torellbreen in Spitsbergen (from surveys in 1918, 1919, and 1923).

The hydrographer, Kjær, completed the Chart S. 6: Norway-Svalbard, southern sheet, and also prepared the northern sheet, on the scale 1 : 750 000 (in Lat. 74° 30'). Both charts were available to the public in March 1933.

Orvin was working up the results of the Greenland expedition 1932, collected various information and prepared reports for the use of the Norwegian delegation to the Hague Greenland Case; and made arrangements for the building of a wireless station and lights in Isfjorden on Spitsbergen. The estimates, house plans, and purchases were all made by him.

Horn was also occupied with matters relating to Greenland, the expedition to South-East Greenland in 1932, translation into English of *Skifter* No. 60, No. 14, and No. 56 (partly), general correspondence, and various other work.

Braastad was until the end of January engaged on Greenland matters; later with the estimates, work relating to the printing of the publications, accounts, correspondence, and preparations for the Greenland expeditions.

Expeditions in the Summer of 1933.

This summer two expeditions were at work: one in North-East Greenland, and one in Svalbard to erect a wireless station and lights.¹

Expedition to North-East Greenland.

The expedition sailed in M/V "Polarbjørn" and had the following members: Hoel, geologist and leader; von Krogh and Rolf Kjær, hydrographers; Solheim, Luncke and Askheim, topographers; Asbjørn Hagen, botanist; Richter, archæologist; Rolf Mørk, physician and botanist. There were nine assistants. The crew of the vessel, including the skipper, Kristoffer Marø, numbered 12 men. On board were also five hunters of the *Arktisk Næringsdrift A/S*

As the vessel had to take all the goods and materials for the erection of the wireless station and the lights in Svalbard, from Oslo to Svalbard, the expedition left earlier than usual, from Oslo on June 24 and from Tromsø on July 5. On July 8 the unloading at Kapp Linné on the south side of Isfjorden was commenced. While the "Polarbjørn" was lying in Spitsbergen the topographers mapped the area around the projected wireless station on the 1 : 4000 scale, and the hydrographic surveyor, Kjær, charted the harbour (with danger line).

On the 13th the unloading at Kapp Linné was completed and "Polarbjørn" followed the ice edge towards Greenland (in a southwesterly direction). On the 16th she entered the ice, which was quite open, and dropped anchor off Dronning Augustas Dal on Wollaston Foreland in the morning of July 18. The scientists worked the same areas as in the previous years, and "Polarbjørn" was all through the summer somewhere between Antartichamna in the south and Peterbukta in the north. Fresh supplies, mail, etc. were brought to the hunting stations, which also received transport assistance from the vessel.

The homeward voyage was started on the 22nd of August. Passengers were: Helge Ingstad, four men from *Arktisk Næringsdrift A/S*, and three men from *Møre* Greenland expedition. The vessel left the ice-edge abt. 45 naut. miles east of Bontekoe. In the evening of the 23rd they called at Jan Mayen and reached Ålesund on the 27th.

The scientific results were in the main as follows:

The *hydrographic* survey was carried out by two parties: The party of von Krogh had a motor-boat at its disposal and sounded the inner part of Claveringfjorden from the entrance to Loch Fine, around Jordan Hill to Revet, Youngsundet, and towards Kapp Herschel, parts of Gael Hamkefjorden, the waters at Jacksonøya, and southwards along the coast

¹ Expedition to Torgilsbu 1933, see p. 51.

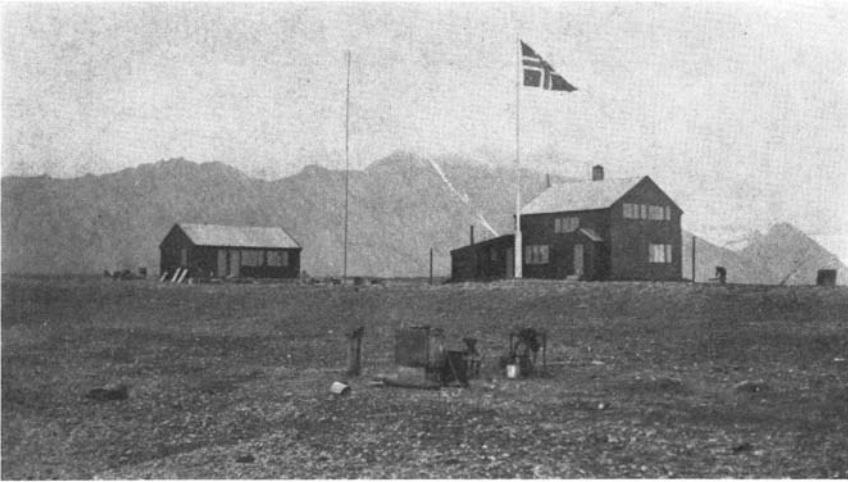


Fig. 14. Isfjord Radio Station from the north. Spitsbergen.

Orvin phot. Sept. 13, 1933.

to Hold with Hope. Kjær was on board the "Polarbjørn" and carried out soundings from the north side of Gael Hamkefjorden and Bontekoe, and as far as the drift-ice. He further undertook soundings in the innermost part of Alpfjorden, where the "Polarbjørn" had ran ashore. Kjær also made some *astronomical* determinations between Antartichamna and Peterbukta.

Topographical work. Two of the topographical parties worked in the northern area and one in the south. At Germaniahamna on Sabineøya a base-line was measured 1025 m in length, whence a triangle net was carried southwards to connect up with the net from the base at Myggbukta measured in 1929. The two astronomical stations at Myggbukta and on Sabineøya were thus connected. On Sabineøya, Wollaston Foreland and Clavingøya, an area of 1500 sq. km, was stereo-photogrammetrically surveyed, and 290 km of coast-line measured by "direct depressions". On Ymerøya and Geographical Societyøya triangulation and surveys of 1000 sq. km were carried out, and 350 km of coast-line measured. Observations were made in 61 trigonometrical stations with 456 photograms; there were 22 stations with no photograms, and 27 tacheometer stations. 24 cairns were built. This year, too, conspicuous points were fixed by theodolite measurements to be used as control points when the detailed maps are worked out.

Including this year's surveys a total of 9200 sq. km was now mapped in North-East Greenland; 1880 km of continuous coast-line from Vega-sund to Kuhnøya had been measured. Practically the entire terrestrial survey had been carried out within the area of 30 000 sq. km covered by the air survey in 1932, and forms the base for the working out of the air photographs.

Tidal measurements. At Vesle Finschøya tidal observations were carried out with an automatic tide-gauge throughout a period of 30 days. Tidal observations were also made in Germaniahamna and on the north coast of Geographical Societyøya. The results are published in *Skrifter* No. 14.

Geological work (Hoel) consisted chiefly of the measurements of the heights of marine Quaternary shore lines and terraces at various points between Antarctichamna and Peterbukta.

Botanical collections were made by Hagen: Some lichens during the short stay of the expedition in Spitsbergen (being incorporated in a paper in preparation by Lyngé). His main work was in Greenland, where he made important collections of fungi, especially parasitic fungi.

Archæological work: Richter continued his investigations of the old Eskimo settlements.

A more detailed account of the expeditions to North-East Greenland in the years 1931—33 will be found in *Meddelelse* No. 25.

Erection of a Wireless Station and Lights in Spitsbergen.

With the increasing exportation of coal from the Isfjord collieries in Spitsbergen, and the extension of the shipping season in the autumn (to October and November), the question of lights in this fjord became urgent. At the request of the Department of Trade, the NSIU, in collaboration with *Telegrafstyret* and *Fyrvesenet*, prepared a plan for the erection of a wireless station and a light at Kapp Linné as well as lights at the entrance to Grønfyorden and Adventfyorden, from where the coals are shipped.

On May 16 (1933) the necessary funds (kr. 100 000 from the Svalbard Account ("Svalbardbudgett")) were voted by the Storting. It was found possible to carry out the work for that limited sum because the expedition to Spitsbergen could be combined with that year's Greenland expedition, making it unnecessary to charter a special vessel for the former. The NSIU was entrusted with this work. For the purchase of the lights, C. F. Rode, of the *Fyrvesenet*, was consulted, and Rode had also made the plans for the lights. The wireless equipment had been ordered through the *Telegrafstyret*. Otherwise all the work was done by Orvin.

The equipment was taken on board the "Polarbjørn" in Oslo on June 20—24, the accumulators in Horten and sundry goods in Tromsø, whence the vessel sailed on July 5th. From the 8th to the 13th the goods and equipment were unloaded at Kapp Linné. The "Polarbjørn" then sailed for Greenland with the scientific expedition. Some wooden material was also dispatched in the collier "Ingertre".

Orvin directed the operations, with Sverre Aasebø in special charge of the erection of the lights. Hallvard Devold, manager of the station



Isfjord Light,
Isfjorden.



Fig. 15.
Spitsbergen.

Festningen Light,
Grønfjorden.

and Otto Bruness, wireless operator, erected the wireless. The workmen numbered 11, and one cook.

The Kapp Linné light was placed on the west side of the entrance to the little bay here, and the station abt. 300 m south-east of it. On July 15 the house for the workmen was ready. The men worked 11 hours a day, and on Sept. 13 and 14 the work was so far completed that they could leave after having built: 1. Isfjord wireless station on Kapp Linné. 2. Isfjord Light on Kapp Linné. 3. Festningen Light on the rock Festningen at the entrance to Grønfjorden. 4. Vestpynten Light on the westside of the entrance to Adventfjorden.

The Norwegian coast-defence ship, "Tordenskjold", took radio bearings, and found only small deviations from the compass bearings. A radio direction finder might thus well be installed.

From 1934 the meteorological service for Svalbard was transferred from Longyearbyen to Isfjord radio.

A detailed account of the expedition will be found in *Meddelelse* No. 25.

Work during the Winter of 1933—34.

The topographers Luncke, Solheim and Askheim continued to work up the topographical material from Greenland, and prepared a detailed terrestrial base for the air-photogrammetric construction of the Greenland areas Wollaston Foreland, Claveringøya and Jordan Hill. As Norway possessed no apparatus for the automatic elaboration of air survey photographs, an agreement (June 1934) was concluded between the NSIU

(Hoel) and the *Deutsche Versuchsanstalt für Luftfahrt* (Lacmann), according to which the work should be carried out in Germany as a joint Norwegian-German undertaking with monetary contributions from both countries. The Norwegian contributions came from the *Roald Amundsens Minnefond* in Oslo. The measurement of the air photographs was carried out on (1) the Zeiss Stereoplanigraph Model 1928 of the *Hansa Luftbild G. m. b. H.* (Director: Wilhelm Gessner) and (2) the Zeiss Stereoplanigraph Model 1930 of the *Luftbild-Abteilung der Deutschen Versuchsanstalt für Luftfahrt* (Leader: Professor Dr. Otto Lacmann of the *Technische Hochschule*, Berlin—Charlottenburg). On (1) was constructed the map Jordan Hill (1162 sq. km), and on (2) the maps Claveringøya (island 1501, and parts of the main land 717 sq. km) and Geographical Societyøya 1770 sq. km. The maps Jordan Hill and Claveringøya were finished this winter. They were made on the scale of 1 : 50 000, with a contour interval of 100 m, and cover an area of 3380 sq. km.

Major P. A. Grinaker of the Geographical Survey of Norway compensated the trigonometrical net between the astronomical point in Myggbukta and the point on Sabineøya.

The area surveyed with tacheometer at Kapp Linné in Spitsbergen was constructed on the 1 : 4000 scale.

Kjær prepared the chart S. 7. *Nordsvalbard*, scale 1 : 600 000, and also a preliminary edition of S. 8. *Kongsfjorden og Krossfjorden*, scale 1 : 100 000. Both charts were available to the public in June 1934. The chart S. 11. *Austgrønland, frå Liverpoolkysten til Store Koldeweyøya*, scale 1 : 600 000 was commenced. Together with J. E. Fjeldstad he published: *Tidal Observations in the Arctic. (Skrifter No. 14).*

Orvin prepared a report on the building of the radio station and lights in Spitsbergen, and was also occupied with the closing of the accounts, etc. He finished the paper "Geology of the Kings Bay Region, Spitsbergen" (*Skrifter* No. 57), which was printed this year. The paper served as a thesis for his degree of doctor of philosophy at the University in Oslo in the spring of 1934. He further prepared a report on the expeditions to North-East Greenland 1931—33, and a paper on the sequence: Permian — Cretaceous of the Festning section in Spitsbergen. (*Skrifter*, No. 18.)

Horn did various work on material collected on the expeditions (coals, etc.), assisted in preparing for the press various *Skrifter*, wrote a paper on the Norwegians in the Kara Sea, had to do with planned expeditions, and did various other work.

Braastad did various office work, dealt with the publications, accounts, estimates, correspondence, the expeditions to Greenland, etc.

On June 12, 1934 NSIU removed from Bygdø Allé 34 to the old University Astronomical Observatory, Observatoriegaten 1, and for some time the entire staff were engaged in moving.

Expeditions in the Summer of 1934.

No scientific expeditions were sent out this summer, only two expeditions to relieve the staff of the meteorological stations Myggbukta and Torgilsbu, and convey wintering hunters to and from North-East Greenland. The station Torgilsbu in Lat. $60^{\circ} 32' N$ is operated on behalf of the Norwegian Government by the NSIU. Myggbukta is run by the hunting company *Arktisk Næringsdrift A/S*. The company receives a contribution from the Government, and is also administered by the NSIU. Both stations send daily reports to the Norwegian Meteorological Institute, and these reports are necessary and of great value to Norwegian weather forecasting.

Expedition to Torgilsbu.

The relief of the personnel of the meteorological station Torgilsbu in 1933 was carried out by Martin Karlsen, of Brandal near Ålesund, who had received a grant from the Government to pay a wireless operator at the station. For this reason this expedition has not been dealt with before, but for the sake of completeness a short account of it will be given here.

S/S "Signalhorn", skipper Joh. Aksnes, left Brandal on July 10, 1933, reached the Storfjord on the 18th, where the wireless station was taken down and brought on board. This station had been in operation during the International Polar Year 1932—33, and was now to be closed down. The personnel were: Henry Haug, wireless operator, Severin S. Brandal, and Ole Torvik. Thence the vessel sailed southwards, called at Finnsbu and Trollbotn in the Skjoldungen district, and reached Torgilsbu on July 31, where the wireless operator, Anders Feyling, and Severin S. Brandal went ashore with their supplies. On the return voyage the expedition of Finn Devold was taken on board, and also the supplies of oil and coal which had been deposited in Grytvika and Heimenhamna by the "Veslemari" expedition the year before. On the 19th of August the "Signalhorn" sailed from Finnsbu with 19 men on board: Two from the Storfjord station, three from Torgilsbu, and six from Finnsbu and the other stations of Finn Devold, and the crew of the vessel making up the rest. On the 23rd the vessel called at Adelvik in Iceland, and reached Brandal on Sept. 2.

In 1934 the fitting and sending out of the relief expedition to South-East Greenland was taken over by NSIU.

The expedition in 1934 sailed in M/V "Brandal", skipper S. Engeset, and owned by Martin Karlsen of Brandal, leaving Brandal on Aug. 9. The vessel called at Akureyri and Reykjavik in Iceland, and reached the Greenland coast at Skjoldungen on Aug. 24, arrived in Torgilsbu two days later, where the new wireless operator, John Thorstensen, with two men went ashore, and the previous wireless operator, Anders Feyling, and one man came on board to go home. At Torgilsbu and Mortens-

berg they did some fishing and got six barrels of "salmon" (Arctic char, *Salmo alpinus*).

On Sept. 2 they started for Norway, called at Tingmiarmiut and the Norwegian station Vogtsbu in Umanak (now unoccupied), and reached Ålesund on Sept. 20. A detailed account of the voyage will be found in *Meddelelse* No. 32.

Expedition to Myggbukta.

The expedition had the use of M/V "Sælbarden" of Ålesund, commanded by skipper P. Andresen, and she left Norway on July 29. On board were the wireless operator Henry Haug, to relieve Johan Holm in Myggbukta, one hunter from *Arktisk Næringsdrift A/S*, and four hunters from *Suløya* Greenland expedition. The ship reached the edge of the drift-ice in Lat. 74° 3' N, Long. 16° 10' W on Aug. 4, and arrived at Kapp Herschel the next day. The vessel sailed along the entire coast and in several of the fjords from Davysund to Haystack. Two men of the *Suløya* expedition were landed at Kapp Herschel, and two on the south side of Kong Oscars Fjord; the wireless operator in Myggbukta was relieved, four men of the Helge Ingstad hunting expedition were picked up in Sunnmørsheimen and Karlsbak; four men of the Sigurd Tolløfsen expedition at Kapp Herschel and Kuhnøya, and five from the John Giæver expedition in Peterbukta and Roseneathbukta. All the pelts were taken home, and at the various points much coal, provisions, and other goods were brought ashore.

On Aug. 23 the course was set southwards from Haystack, and during the night of the 24th—25th the ice-edge was passed. On the 27th three members of the Cambridge expedition of the Bird brothers were picked up at Walrus Gat in Jan Mayen, and on Sept. 2 the expedition reached Tromsø, where several of the winterers went ashore. On the 9th the "Sælbarden" arrived at Ålesund. A detailed account of the expedition will be found in *Meddelelse* No. 32.

Work during the Winter of 1934—1935.

The topographers Luncke, Solheim, and Askheim prepared a detailed plan for an air survey of the entire archipelago of Svalbard. They also brought together various material to be used in the Svalbard publications, finished the computation of the trigonometrical observations from East Greenland, and transferred all the points to the final coordinate system.

Deutsche Versuchsanstalt für Luftfahrt constructed (see p. 50), under the leadership of Professor Otto Lacmann, a map of Geographical Societyøya on the scale of 1:50 000 with 50 m contour interval; area

1770 sq. km. The construction was carried out as a scientific experiment, without using terrestrially fixed points, the flying height being the only known factor.

Kjær continued the work on the chart S. 11 (East Greenland), and commenced a sailing directions for the area covered by the chart. On Jan. 1, 1935 he left the NSIU with leave to go to Turkey and organise the Turkish hydrographic service.

Orvin worked on a geological general map of Svalbard, and a paper dealing with the geology of that country; with the "Festning" section, compilations from diaries of wintering hunters, and various office work. He also prepared a geological map on the scale of 1:50 000 from the topographic photographs of the inner part of the Isfjord peninsula, and studied other portions of the topographic material from the geological point of view. He made plans of hunting stations, maps of hunting areas in Svalbard, a card register of the Svalbard hunting districts, arranged on cards photographs covering many years and also made a rearrangement of the lantern slides, etc.

Horn was working on the place-names of Svalbard, the exchange service of the NSIU, Svalbard coals, arrangement of photographs on cards, correspondence, translations, etc. From May 22 to June 6 he had leave from the NSIU and was in Germany for a course of study.

Braastad was working on the place-names of Svalbard practically throughout the entire period, and did also various office and secretarial work.

This winter John Giæver was also employed by the office, and from October to January he prepared a survey of the Norwegian and foreign expeditions to Arctic and Antarctic regions. In June he returned after having taken part in one of the hunting expeditions to the White Sea and the West Ice.

Expeditions in the Summer of 1935.

In the summer of 1935 the following expeditions were sent out: Two hydrographic expeditions (to Svalbard and Davis Strait), two vessels to East Greenland to relieve the personnel of the meteorological stations of Torgilsbu and Myggbukta, and hunters in North-East Greenland.

Hydrographic Surveying in Davis Strait.

A grant was received from the Government for the sending out of a hydrographic expedition in connection with the fishery expedition to the Davis Strait of the firm of Bogen & Johnsen, Oslo, as the fishing banks in these waters were still little known.

The agreement between this firm and the NSIU stipulated that an echo sounder of the type "British Admiralty Magneto Striction Recorder M. S. III" should be installed in the ship of the company, S/S "Korsvik", and that Captain Rolf von Krogh should serve as the hydrographic surveyor of the expedition. Meteorological observations were also to be carried out, and sent to The Meteorological Institute in Oslo. As much information as possible about the fisheries in the Strait should also be collected. In addition to the mother ship "Korsvik", there were the following fishing vessels: "Koralen", "Polartind", "Brandal", "Holmen", and "Vårliv".

"Korsvik" left Ålesund on May 7 and reached the fishing grounds on the 23rd. Fishing was carried out on the banks off West Greenland and off the coasts of Baffin Land and Labrador until Sept. 20, when the expedition left for home, arriving in Ålesund on Sept. 30. The catch consisted of 280 tons of frozen halibut of excellent quality.

Von Krogh sounded a distance of 2760 nautical miles with the echo sounder; and 225 miles with a Lucas sounding machine from a motor-dorry. The 31 anchorages of the "Korsvik" were fixed from sun observations. 300 fathom contour lines were plotted throughout a distance of 250 nautical miles. A detailed account of the expedition will be found in *Meddelelse* No. 32.

Expedition to Torgilsbu.

The sealer S/S "Signalhorn" of Brandal, skipper Johs. Aksnes, left Brandal and Ålesund on July 11 to relieve the Norwegian meteorological station at Torgilsbu, and carry stores for a fresh wintering party. The ice-edge was reached on July 20 in Lat. 66° N, Long. 30° 25' W. Off Griffenfeldt Island (Lat. 63° N) the vessel met with a narrow tongue of ice stretching far out to sea. From that point there was open water as far as Kapp Adelaer, where close pack-ice was again encountered, and the course shaped SSE to avoid it. Further south, however, the ice-belt narrowed to a width of 10 miles. Torgilsbu was reached on July 23 and here the wireless operator, John Thorstensen, and the cook Arne Dobloug came on board; and the new wireless operator Sverre Åseth and the cook Leif Hals landed with their stores. Sigvald S. Brandal was to spend another winter at Torgilsbu. The "Signalhorn" left the station on July 26, called at Mortensberg and Vogtsbu in Umanak, and reached the fishing banks off Storfjorden (Kangerdlugsuak) on Aug. 1. Here Thorstensen transhipped to the S/S "Isflora", and reached Brandal on Aug. 29. "Signalhorn" carried out fishing for Greenland shark and halibut until Sept. 2. The vessel returned to Norway on Sept. 8. A detailed account of the expedition will be found in *Meddelelse* No. 32.

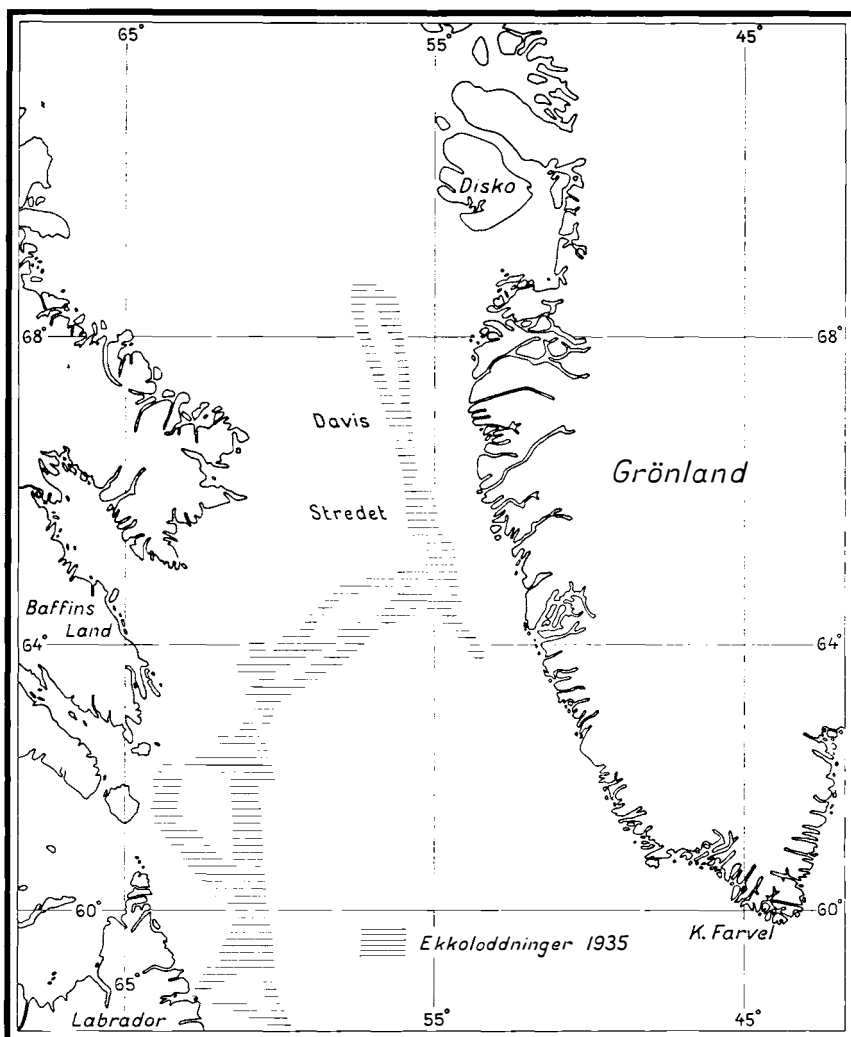


Fig. 16. Map showing area with echo soundings in Davis Strait 1935.

Expedition to Myggbukta.

S/S "Buskø" of Ålesund, skipper Johannes Myklebust, was chartered for a trip to North-East Greenland to relieve the wireless operator Henry Haug, and bring, in addition to the new operator Johan Holm, six hunters (including their leader Finn Framnes Hansen) of the *Arktisk Næringsdrift A/S* to the hunting areas.

"Buskø" left Ålesund on July 27, and reached the ice-edge in Lat. 72° N on Aug. 3. The vessel entered the ice in Lat. $74^{\circ} 30'$ N. Ice conditions were, however, very difficult, and as late as the 17th of August the ship had not been able to penetrate the ice. It was therefore



Fig. 17. *S/S Buskø* in the ice off North-East Greenland 1935.

decided to take the sealer *S/S "Veslekari"* (a strong ship with a powerful engine), which was doing hydrographic work off Svalbard, to Greenland to replace the "*Buskø*". The latter, however, succeeded in reaching Kapp Herschel on Aug. 22. The "*Veslekari*" had on board stores of coal and provisions from Svalbard to be placed in a depot at Myggbukta in case the ice conditions should become so difficult that vessels could not reach the coast, and, accordingly, she received orders to sail for that point. Off Hold with Hope, however, the "*Veslekari*" encountered a gale and ice pressures, so that she sprang a leak and the fires were extinguished by the water; the crew brought their gear on to the ice, as the vessel appeared to be sinking. They managed, however, to pump out the ship and get up steam, and on Aug. 31 she got clear of the ice.

While landing men and stores in Claveringfjorden the "*Buskø*" received a wireless message from Captain Vedel of the Danish Government ship "*Godthaab*" asking the skipper to go to the rescue of four Danes, who were on their way by boat from Hochstetter Foreland to Eskimones, but had to abandon their boat in the ice off Kapp Berlin, where they were now, and in a bad state. NSIU also received a request from the Naval Ministry in Copenhagen to assist the men. Skipper Myklebust then received from the NSIU orders to do everything he thought necessary to save the Danes. The "*Buskø*" reached Kapp Herschel on Aug. 26, and had planned to go farther to the north, but was prevented from doing so by the ice. On the 27th Framnes Hansen, Sverre Moldskred, Johan Johansen, and Herman Andresen went northwards in a motor-dorry (between the ice and the shore), and

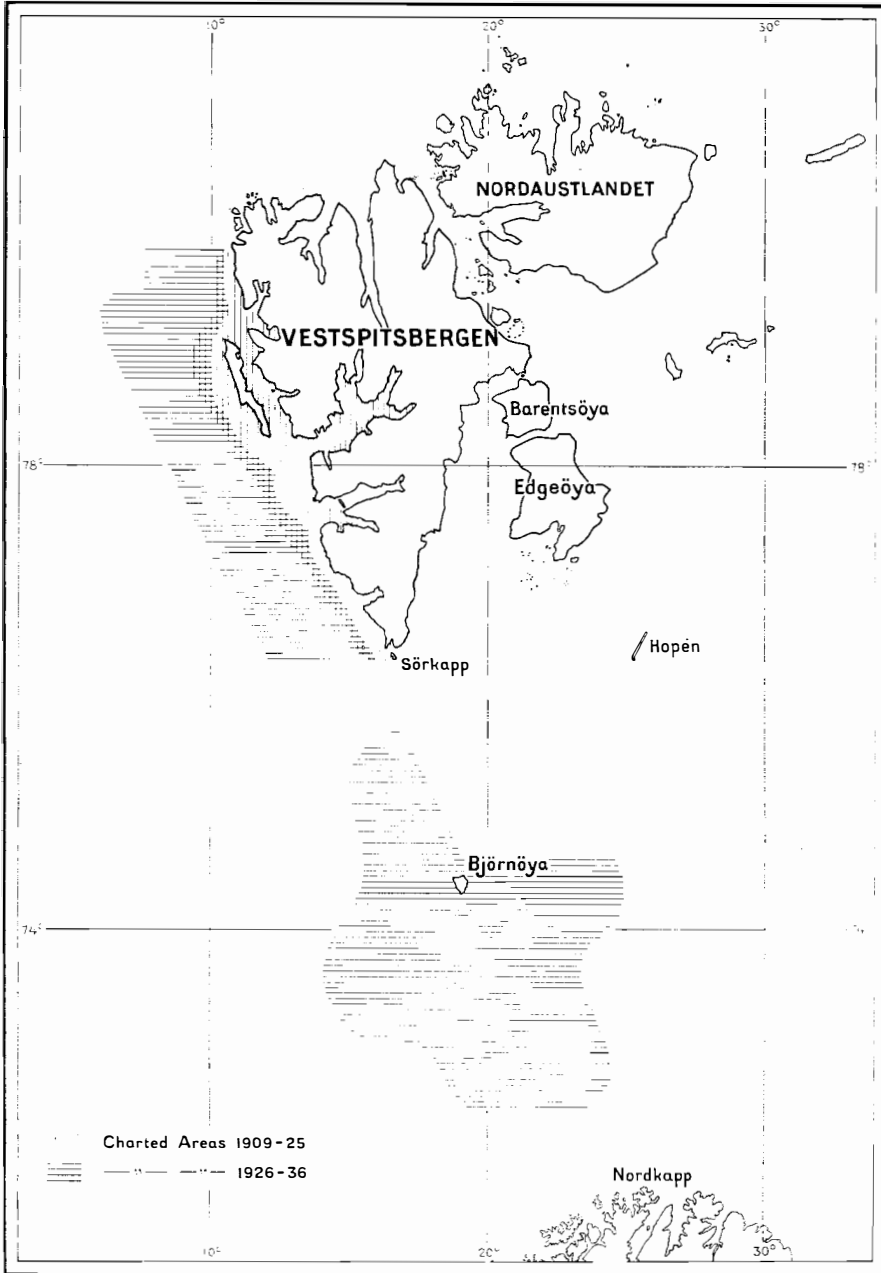


Fig. 18. General map showing charted areas in Svalbard.

met the four Danes, marching southwards, about 10 km south of Kapp Berlin. The combined parties returned to the ship, after an absence of 17¹/₂ hours. The ice was now close to the shore, and the "Buskø" made fruitless attempts to go south. Instead, she sailed into the Clavingfjord and landed the stores for Myggbukta at the inner end of Moskusoksefjorden. Holm Johnsen, engineering student from Trondheim, who was on the "Buskø" as a passenger, was charged by the *Arktisk Næringsdrift* to take the stores to Myggbukta in the course of the winter.

The "Veslekari" was found to be reasonably seaworthy after the encounter with the ice, and received orders to proceed to Clavingfjorden to assist the "Buskø" on the outward voyage. The "Veslekari" got through the ice without difficulty and met the "Buskø" in Loch Fine on Sept. 1. On the 6th both vessels left East Greenland at Kapp Herschel. On board were two of the Danes, Leo Hansen and Chr. Jensen, the wireless operator from Myggbukta, Henry Haug, and five hunters (amongst whom the leader, Eiliv Herdal) of the *Arktisk Næringsdrift*. The vessels got safely through the ice, the "Veslekari" cutting through the newly frozen ice, which was then several inches thick. They called at Jan Mayen to take home mail, and Ålesund was reached on Sept. 13. A more detailed account of the trip will be found in *Meddelelse* No. 32.

Hydrographic Work at Spitsbergen.

In the spring of 1935 a grant was received from the Government for a hydrographic survey of the waters west of Spitsbergen, which now had become of importance on account of the cod and halibut fisheries started here in the preceding year. The previous soundings at Spitsbergen had chiefly been carried out in the fjords and near the coast for the benefit of shipping. In the last few years, large areas around Bear Island had also been surveyed.

The vessel chartered for this purpose was the S/S "Veslekari" of Ålesund, skipper Johan Olsen. She was fitted out with an echo sounder of the type "British Admiralty, Magneto Striction Recorder M. S. III". The plans for the survey were made in co-operation with the Fishery Board in Bergen. Commander Erling Kjær, Norwegian Navy, assisted by the hydrographer Odd Bostrøm, were to carry out the work in the first half of the summer. The "Veslekari" left Ålesund on June 3, sailed to Longyearbyen for coaling, and commenced the survey on June 13 off Prins Karls Forland. Kjær was in charge until July 3.

The work was continued on the 9th by Captain A. Hermansen, who worked from Forlandet southwards to Sørkapp, and also ran some

sections farther to the north. On Aug. 10 his leave expired, and the work was continued by Bostrøm (who did the subsidiary sections) until the 17th, when the vessel received orders to proceed to Longyearbyen and prepare for a voyage to North-East Greenland to replace the "Buskø" (see above).

Off the coast from Sørkapp to Hamburgbukta — abt. 190 nautical miles in length — were ran 51 sections E—W, and up to abt. 55 miles off the coast. The total length of sections sounded with the echo apparatus amounted to 1860 nautical miles. At some points bottom samples were taken with an ordinary sounder. A more detailed account of the expedition will be found in *Meddelelse* No. 32.

Work during the Winter of 1935—1936.

The topographers Luncke, Solheim, and Askheim worked on geodetic computations concerning the area between Sørkapp and Isfjorden, the construction of a topographic map on the 1:50 000 scale of the area from Hornsund to Bellsund, the preparation of base sheets on aluminium on the scale of 1:100 000, plane table sheets from the hydrographic survey, plotting of the results of the echo soundings in 1935, preparations for the expedition and air survey in 1936.

Kjær returned from Turkey in October 1935. He then worked on the chart S. 9, *Frå Sørkapp til Hamburgbukta*, scale: 1:350 000. The chart covers the fishing banks west of Spitsbergen. He also worked on the chart of the North-East Greenland coast. From May 2, 1936 he had leave to work for *Norges Sjøkartverk* (Hydrographic Survey of Norway) and from Oct. 1, 1936 he was appointed director of that survey.

Braastad left the NSIU on Nov. 23, 1935 to become one of the directors of the firm of Arthur Gurholt & Co., Oslo.

Orvin worked on the preparation of this paper, geological maps, card register of huts, habitations, hunting and vessels, place-names of Svalbard, published *Meddelelse* No. 32, prepared a proposal for the arrangement of claim patents ("utmål") on the treaty properties of the State in Svalbard, made plans of hunting huts to be erected by the State, etc. Horn was most of the time occupied with the place-names of Svalbard, library work, correspondence, translations, etc. John Giæver, who had succeeded Braastad, worked on the annexation history of Svalbard, and did also various office work.

Mrs. Svanhild Lund left the service of the NSIU on Apr. 16, 1936, and her position as cashier was taken over by Miss Signy Bang (who had been employed by the NSIU since Feb. 18, 1936).

Expeditions in the Summer of 1936.

As usual, two expeditions were sent to East Greenland, one to relieve the men at the meteorological station in Torgilsbu, and the other to relieve the men at the Myggbukta meteorological station, and also the men at several of the hunting stations in North-East Greenland.

To Svalbard, where since 1925 we had only carried on exploration with smaller expeditions for special purposes, was sent a big expedition whose main object was the air survey of the islands. This expedition co-operated to a certain extent with the expedition of the Mining Inspector for Svalbard, H. Merckoll, who was inspecting various properties and points of interest to the administration.

Expedition to Torgilsbu.

It was arranged with the owners of the sealer S/S "Selis", I. Austad in Tromsø, that the relief of the personnel of the Torgilsbu station should be undertaken in conjunction with seal hunting and Greenland shark fishing. Through the NSIU the British East Greenland Expedition, 1935—36 (leader of the winter party: L. R. Wager) also contributed to the expedition in return for services rendered in fetching them from their wintering base in the Storfjord (Kangerdlugsuak) according to an agreement concluded the preceding year.

S/S "Selis" commanded by Ingvar Johannesen, left Tromsø on June 17, and reached the Greenland coast in Lat. abt. 68° N towards the end of the month. There was then scattered drift-ice off the coast. On July 10 the vessel steered southwards, and reached Torgilsbu on July 15. South of Lat. 64° there was only a narrow belt of icebergs, and calf-ice along the coast. In Torgilsbu provisions and other stores were landed. Three men, viz., the wireless operator Ragnar Eggesvik, the cook Arne Dobloug, and Severin S. Brandal were left to spend the winter of 1936—1937. The old winterers Aaseth, Brandal, and Hals went on board, and on the 17th "Selis" left. The ship remained at Trollbotn in the Skjoldungen district from the 19th to the 21st, and then continued northward.

On the 25th S/S "Hvalrossen" of Ålesund was met in Lat. 67° 30' N, Long. 32° 30' W. The vessel was homeward bound, and Brandal and Hals went with her.

The "Selis" entered Storfjorden (Kangerdlugsuak) on the 29th, and the skipper arranged with Mr. Wager that the ship should call again on Aug. 17 to pick up the expedition. Fishing for Greenland shark off

the Storfjord occupied the time until the vessel returned to Storfjorden on the above date and took the British expedition on board. On the 19th the "Selis" left, put the Eskimo members of the expedition ashore at Angmagssalik on Aug. 21, and after a call at Isafjord in Iceland, where the British expedition left the ship, the "Selis" reached Tromsø on Sept. 4.

Expedition to Myggbukta.

The vessel chartered for this trip was M/S "Isbjørn" skipper Albert Bergesen (owners: Holmboes ishavsrederi, Tromsø). The vessel left Tromsø on Aug. 5. On board were the wireless operator Henry Haug, the hunters Sverre Røstad and Magne Råum, and two ornithologists from Cambridge University E. G. and C. G. Bird who intended to spend a year in Myggbukta doing scientific work. There were also five passengers making the voyage, out and home, viz. the Finnish ornithologist Ludvig Munsterhjelm; Bredo Diesen, dentist; Maurits Diesen, solicitor; Sigurd Huseby, landed proprietor; and Harald Natvig, senior physician.

The "Isbjørn" reached Kapp Herschel on Aug. 11 after having gone through the ice — very scattered — in only 10 hours. The vessel then visited the stations Revet and Krogness in Claveringfjorden, Myggbukta, and Kapp Humboldt on Ymerøya, whence she sailed northward to Kapp Herschel to call for the hunters Herman Andresen and Nils Hanken. Then southward again to Myggbukta, Kapp Humboldt, Hoelsbu in Moskusoksefjorden, and to Geologfjorden, where materials for one station and three huts were landed. The materials for one hut were put ashore in Eleonorebukta and one at Bjørnheimen in Antarcitcsundet. The "Isbjørn" then sailed southward down the Kong Oscars Fjord and visited Sunnmørsheimen in Antarcichamna. At all stations provisions and stores were landed, and the men relieved. The vessel left Greenland on the 27th and called at Jan Mayen on the 30th.

There was so little ice off the coast this summer that the swell made it impossible to unload at some of the stations facing the open sea. On the homeward voyage no ice at all was seen. On board were then: the wireless operator in Myggbukta Johan Holm; Søren Richter and Johan Johansen of *Arktisk Næringsdrift*; and Herman Andresen of *Suløya* Greenland expedition. Peder Sulabak of the same expedition had left in the sealer "Sælbarden", which also visited North-East Greenland this summer. In the winter of 1936—1937 the following Norwegians wintered in North-East Greenland: Henry Haug, wireless operator, six hunters of *Arktisk Næringsdrift*, and two hunters of *Suløya* Greenland Expedition.

Expedition to Svalbard.

As the air survey of parts of North-East Greenland in 1932 had been very successful, it was proposed to carry out such a survey of Svalbard, too, and the necessary funds for an expedition, with the air survey as its main object, were voted by the Storting — one half in 1935 and the rest in 1936. The preparations were most carefully made so as to ensure the best possible result. "Polarbjørn" is very well suited as a base ship for flying in the polar regions, and was used as such in 1932. The ship had now also installed an echo sounder of the type British Admiralty Magneto Striction Recorder M. S. III. The Air Service of the Navy (*Marinens Flyvevåben*) placed at the disposal of the expedition a scouting plane of the type MF 11, and also the necessary personnel. Jointly with the Geographical Survey of Norway the NSIU purchased a modern aerial camera of Zeiss make, film size 18×18 cm, focal length 21 cm, aperture 1 : 4.5. The films were in rolls of 55 m or 270 pictures. The plans for the air survey were prepared by Luncke, who also supervised the installation of the camera in the plane, and made test photographs before leaving.

Most of the members of the expedition sailed in the "Polarbjørn" from Ålesund on June 26 and Tromsø on the 29th, whereas the air survey party, along with the plane, were carried in the collier S/S "Ingerto" on June 27 from Bergen direct to Longyearbyen. 15 tons of aviation petrol had been sent previously by another collier. The members leaving in the "Polarbjørn" were: Hoel, leader and geologist; von Krogh and Bostrøm, hydrographers; Solheim and Askheim, topographers; Orvin, geologist; Eilif Dahl, botanist; Wefring, landscape painter; six assistants. Captain of the vessel was Kristoffer Marø, and the crew consisted of 13 men. In addition were 16 passengers to Kongsfjorden, viz. the Danish minister in Oslo, Henrik Kauffmann; Mrs. Laura Borgen with two assistants who were going to Ny-Ålesund to study the conditions with a view to the possible establishment of a hotel service there; Arne Brøgger with nine workmen and two cooks were going to the Norwegian State's fishing station in Ny-Ålesund. Large quantities of stores for this station were also on board. The air survey party sailed in the S/S "Ingerto" and consisted of Luncke, air photographer and leader of the air survey; Commander Gøsta Wendelbo, Norwegian Navy, pilot and flight leader, Lieutenant Sigurd Sivertsen, pilot; Thor Smaaland, Andreas Ekedal, Olav Schibbye, air mechanics; Sigurd Thomle, cook.

"Polarbjørn" reached Calypsobyen on the south side of Bellsund the night before July 3, where Orvin with the assistants Kristen Lorentsen and Wilhelm Matheson were landed with a motor-boat and provisions for two months. His work was to take samples on the State coal fields in Bellsund for claim-patent purposes; to map geologically

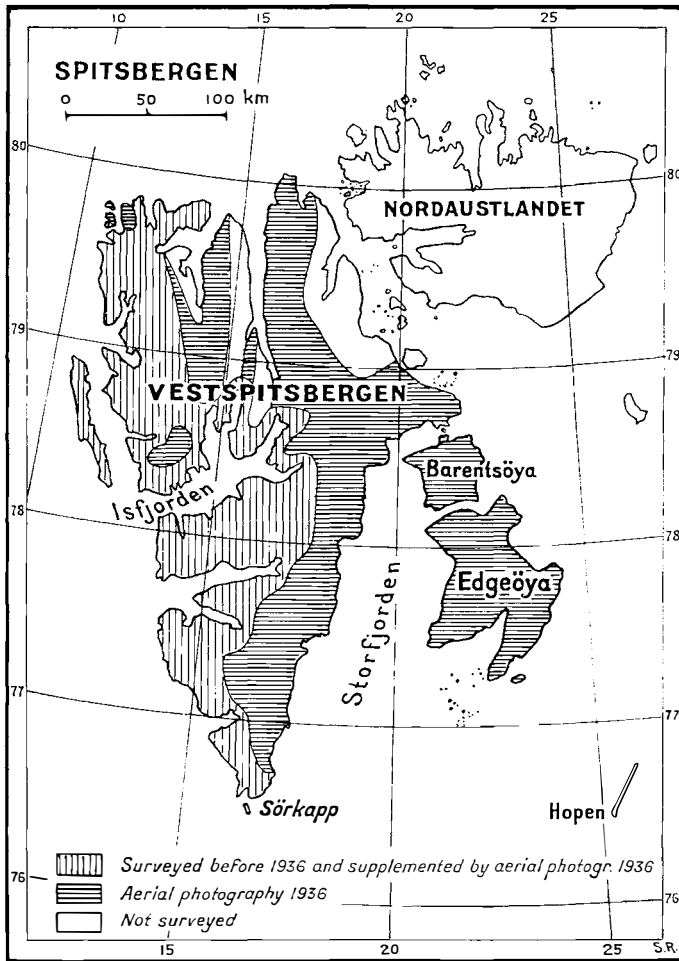


Fig. 19. General map showing surveyed and photographed areas.

and investigate the region southward to Hornsund; and to photograph and make plans of all the huts he might come across.

From the mouth of the Isfjorden some of the stores and outfit of the air party were sent to Longyearbyen in a motor-dorry, while the vessel sailed for Kongsfjorden, where all the passengers and the painter, Wefring, went ashore. Goods were also unloaded for the fishery station. Thence the vessel continued northward to Kvedfjordbukta, where Solheim with the assistants Joh. Rikardsen and Kristoffer Marø, Jun. were landed to do topographical work from Krossfjorden northward to Raudfjorden. The "Polarbjørn" then sailed to Longyearbyen, where the outfit for the airmen and petrol were taken on board and conveyed to Kapp Smith in Dicksonfjorden, where also a buoy was put in position for the plane which arrived from Longyearbyen the same day.

The camp of the air survey was ready on July 7. It consisted of five tents, one kitchen and one radio hut. The air party remained here and commenced the survey, while the "Polarbjørn" in the following weeks visited different localities between Isfjorden and Norskøyane, where new beacons were erected, and echo soundings made.

Askheim with two of the ship's crew as assistants: John Egset and Olaf Brandal, left the vessel in Virgohamna on July 15 to do topographical work in the northwestern part of Spitsbergen.

On Aug. 10 nearly the whole of West-Spitsbergen with adjacent islands had been photographed from the air. It would now be more convenient to continue the work from a base on the east coast. The "Polarbjørn" accordingly brought all the outfit and stores of the air camp to the east of Tjuvfjorden on Edgeøya, where the vessel served as a base for the air party until Aug. 18, when the survey was terminated and the plane flown to Longyearbyen. In this period the entire Barents- and Edgeøya had been photographed from the air. The vessel now sailed northward along the east coast, through Heleysundet and Hinlopenstredet to Murchisonfjorden, where they looked for a suitable base for the air survey of Nordaustlandet which would be carried out on the next expedition. They then sailed to Brennevinsfjorden in Nordaustlandet, where they met the British wintering expedition led by A. R. Glen, and also the expedition of Merckoll in "Heimland I".

The "Polarbjørn" conveyed a party of the British expedition to Waldenøya to carry out trigonometric measurements. After the return to the station in Brennevinsfjorden, three of the airmen changed over to the "Heimland I" to go to Longyearbyen, but Koller and Dahl, who had been with "Heimland I" on its trip around Svalbard, came on board the "Polarbjørn" which sailed to Murchisonfjorden for the second time to continue the reconnaissance for a base for the air survey, and a suitable base was also discovered in the SE part of the fjord. Then the ship sailed to Wijdefjorden for soundings. A hunting hut was also taken on board here for the *Sjøfartsmuseet* in Oslo. Thence to Moffen, where theodolite sights to trig. points on the mainland were taken to fix the position of a wooden beacon placed there earlier in the summer.

Solheim's party came on board in Svenskegattet on Aug. 26, and that of Askheim in Virgohamna on the same day. The ship then called at Ny-Ålesund, where Mrs. Borgen with assistants came on board. The course was then shaped for Longyearbyen, whence an extra trip was made to the so-called Minister Shoal (Ministerbåen) in Sassenfjorden, and to Skansbukta. After the return to Longyearbyen Luncke and Thomle came on board, whereupon Barentsburg and Kapp Linné were visited.

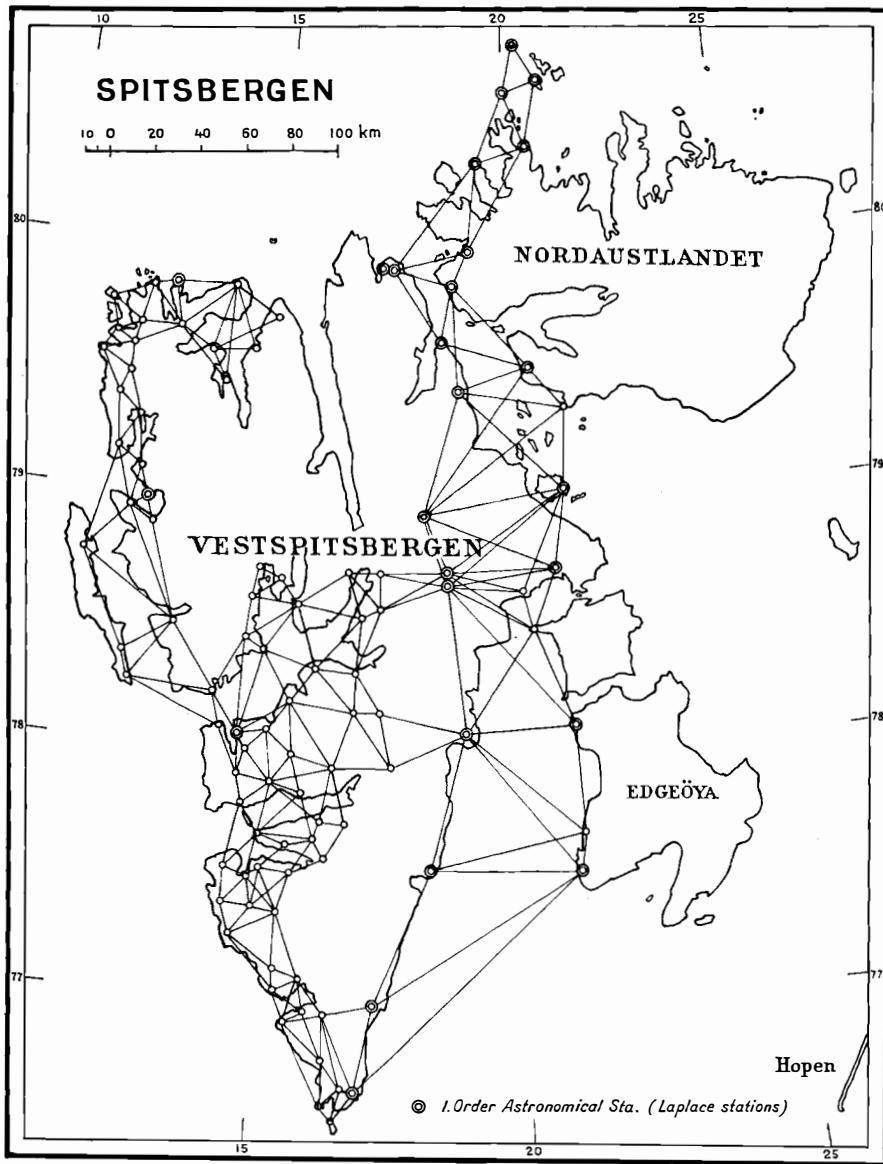


Fig. 20. General map showing trigonometrical net including the Swedish-Russian Arc Measurement stations on the east coast and Nordaustlandet.

Orvin's party embarked in Hornsund on Aug. 30, and the same day the "Polarbjørn" left Spitsbergen. The expedition passed Tromsø on Sept. 2, called at Harstad, where some hunters and stores from the "Isbjørn" (just arrived from North-East Greenland) were taken on board. In Kristiansund most of the expedition members left the ship, and on Sept. 6 Ålesund was reached. Sivertsen and Ekedal of the air

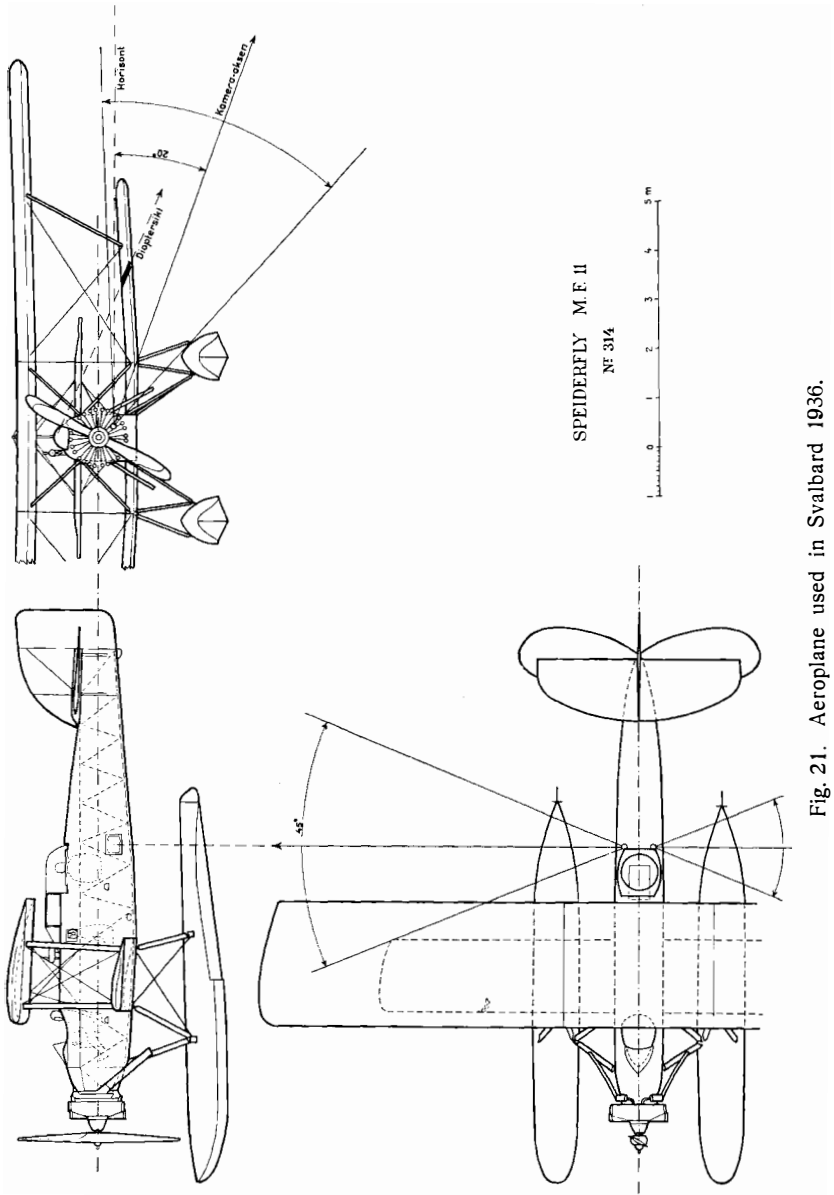


Fig. 21. Aeroplane used in Svalbard 1936.

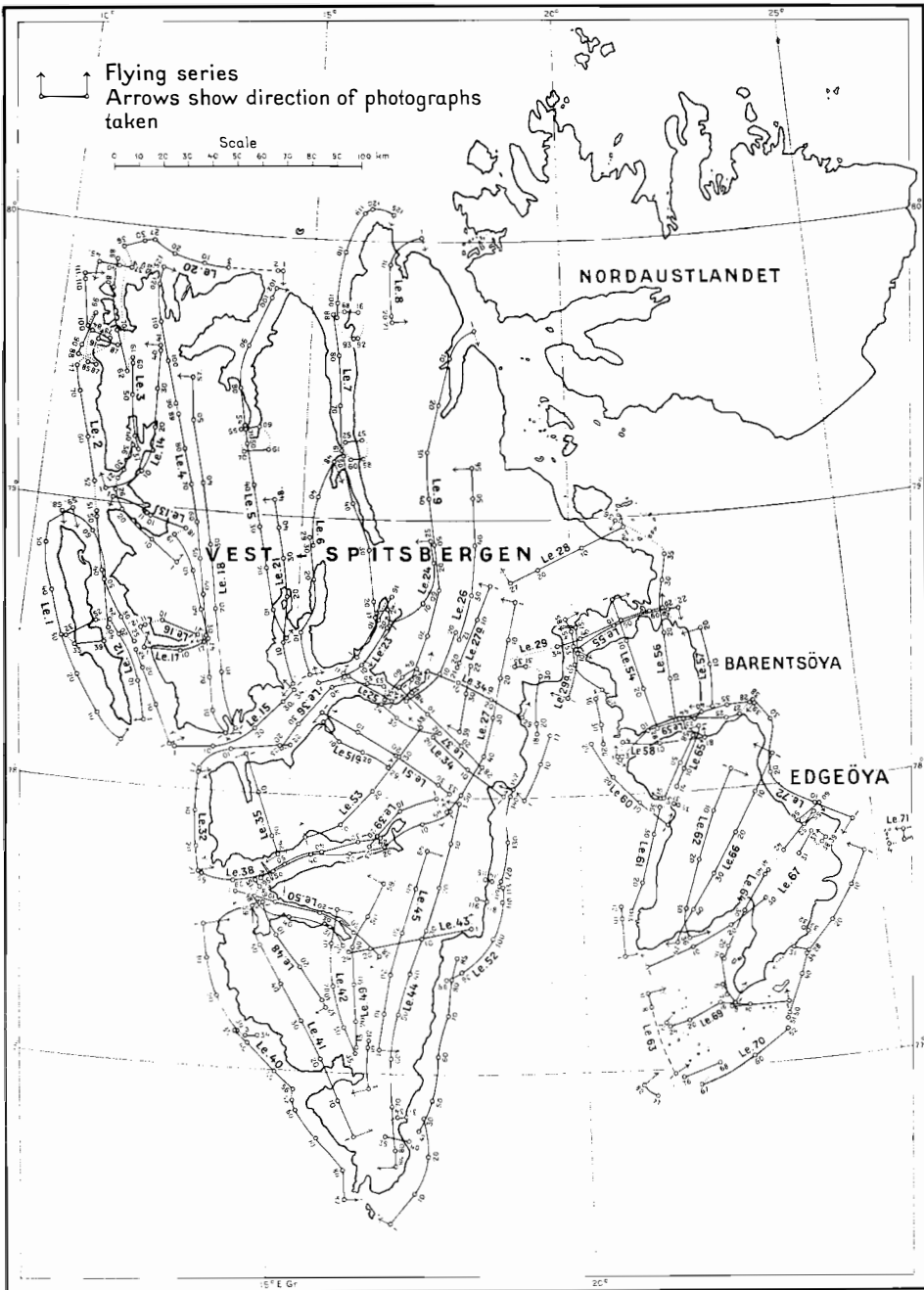


Fig. 22. General map showing flying series.

party left Longyearbyen on Aug. 22 in the collier "Ingerseks". The plane was also on board. Wendelbo, Smaaland, and Schibbye left on the 28th in "Ingerto".

The results of the expedition were in the main as follows:

Terrestrial topographical surveying was carried out in the north-western part of West-Spitsbergen by two parties. In the period July 3—Aug. 30 the average temperature was 7° C, the number of clear days was 20, those with misty weather numbered 39, of which 11 had rain. The triangulation was carried out from Krossfjorden to the astronomical point at Biskayerhuken. Solheim observed in 29 stations, and from 23 of these 171 photograms were taken. He built 10 cairns, and 60 km of coast line was measured by "direct depressions".

Askheim carried out topographical work from July 15 to Aug. 5 when he sprained his foot. He made observations in 8 trigonometrical stations from 5 of which were taken 35 photograms. 13 cairns were built and throughout a period of 88 hours a tide gauge was read in Virgobukta.

The *air survey* was very successful. The flying routes (series) are shown on the map fig. 22. A total of 19 survey flights were made, with 86 flying hours and 3300 photographs, covering an area of 40000 sq. km or nearly $\frac{2}{3}$ of the entire Svalbard archipelago. The photographed areas include West-Spitsbergen, Prins Karls Forland, Edgeøya, Barentsøya and a number of smaller islands. The photographs were taken obliquely at an angle of 20° with the horizon. They are all excellent. The construction of the map on the scale of 1:50000 will be made with the Zeiss stereoplanigraph, which was purchased in the autumn of 1936 by NSIU and *Norges Geografiske Opmåling* jointly.

The hydrographic work was to some extent hampered by the air survey work. The vessel of the expedition had to do meteorological and safety service, and during the latter part of the work also to serve as a mother ship for the air party. With the echo sounder a number of lines were sounded on the west coast, chiefly to supplement the echo soundings made in 1935. In several fjords on the east and north coast, where no soundings had previously been carried out, echo soundings were also made. Smaller areas were sounded from a motor-boat.

Four floating spar buoys were placed in Forlandssundet, on Ministerbåen, and one on each side of the mouth of Grønfjorden. On account of the ice they have to be removed every autumn. Beacons were erected on Moffen and Amsterdamøya and cairns on Norskøyane. The beacon on Fuglehuken was reinforced, that on Poolepynten rebuilt, and those at Brandalpynten and Daudmannsodden were repaired. The ironwork for the light on Kapp Linné was chipped, and painted with red lead.

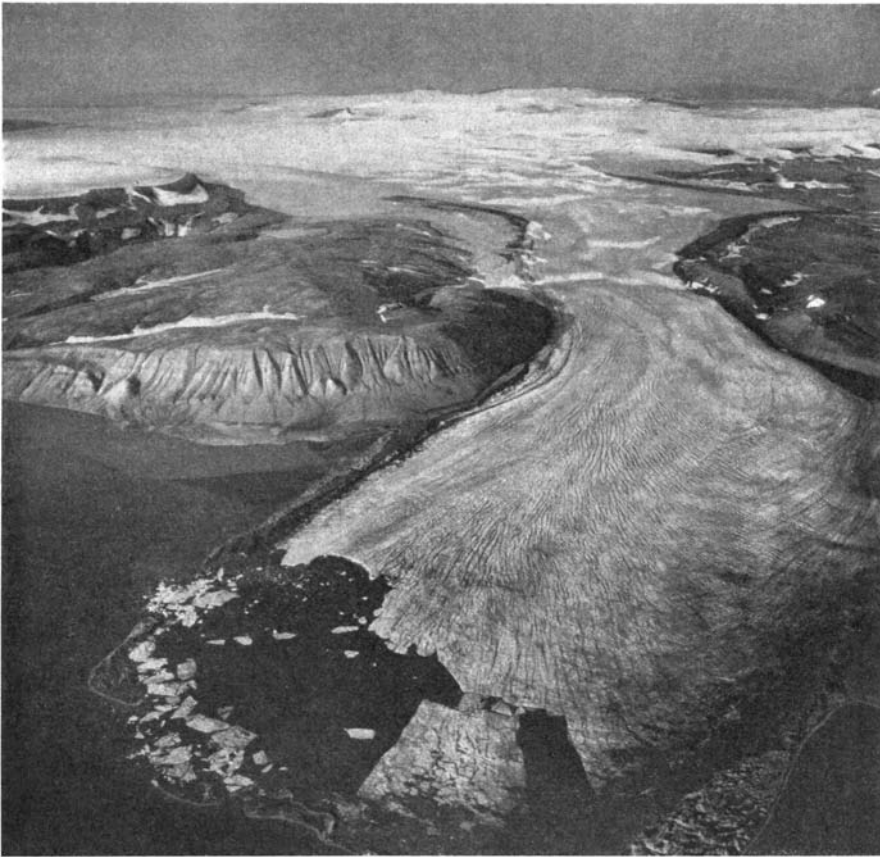


Fig. 23. Spitsbergen. Duckwitzbreen on the west side of Barentsøya. The glacier is retreating with remains of the dead glacier and swimming Ice-bergs within a morainic semi-circular ridge consisting of clay. The hills are built up of flat-lying Triassic shales. Taken towards east from the height of 3000 metres.

B. Luncke phot. Aug. 5, 1936.

Geological work was done by Hoel especially on Edgeøya, but his work was much hampered, as he had to accompany the vessel throughout the expedition. Representing the State he was present at a claim-patent function in Mimerdalen.

When in 1920 Norway obtained the sovereignty over Svalbard there were many claims to land made by companies and individuals based on occupations carried out when Svalbard was still no-man's-land. According to the Svalbard Treaty these claims were decided by a Commissioner (Danish) appointed for this special purpose. Those claimants whose rights were recognised received their title-deed (*hjemmelsbrev*) in 1927. The Mining Ordinance for Spitsbergen and Bear Island (Svalbard) provides in § 35 that "The persons and Companies who, pursuant to the provisions of the Annex to the Spitsbergen Treaty,

are recognised as proprietors of a certain territory, shall be granted as many claims as they desire within the boundaries of their property subject to the following conditions: . . . (b). That an application for a claim patent containing information of the nature of the deposit under reference to a sample, contemporarily handed over, of the minerals and rocks found and accompanied by the stipulated fee, be filed with the Commissioner of Mines within 10 years after the claimant's title-deed for the property has been issued . . .". With the Claim Patent the owner has the sole right to mining in the area covered by the Patent. The 10-year period expired in 1937. The Norwegian State has also several of these so-called Treaty-Properties. The NSIU had previously made proposals as to Claim Patents on the State properties, and the geologists of the expedition were to deal with these matters.

Orvin now collected coal samples for claim-patent requisitions for five of the State's properties in the Bellsund region, where he also carried out geological investigations and mapping. He further mapped geologically and investigated the coastal area from Bellsund to south of Hornsund, where there are chiefly rocks of the Heclahoek formation. He collected about 300 rock samples, covered (on foot) a distance of about 1000 km, and in a motor-boat about 700 km.

Botanical work was in the hands of Eilif Dahl, who collected a vast amount of botanical material. The vascular plants have already been worked up by himself. His collection of lichens is also very considerable.

Other work. NSIU co-operated in Svalbard with the expedition of the mining inspector Hans Merckoll, who circumnavigated Svalbard in "Heimland I". This vessel belonging to Jakobsen Brothers, Tromsø, left that port on July 22 with Karl Jakobsen as skipper. On board were also John Giæver as representative of the NSIU and the topographer Alfred Koller. In Adventfjorden Merckoll (with two assistants), Dahl, and Wefring, who had sailed in the "Polarbjørn" to Svalbard, came on board, and on the 27th the vessel left in the direction of Sørkapp. The original plan was to inspect the east coast of Spitsbergen. Later it was decided that the expedition should also carry with it a number of huts, viz. three main stations and three smaller huts. They were taken on board in Tromsø. The expedition had also made an agreement with Glen to fetch the Oxford University Arctic Expedition, which had wintered in Brennevinsfjorden on Nordaustlandet.

"Heimland I" rounded Sørkapp, visited Hedgehog, Edgeøya, Barentsøya, Kong Karls Land, Storøya, Dovebukta, Rijpfjorden, Brennevinsfjorden (where the British expedition came on board) Phippsøya and Lågøya. The vessel returned via the N.W. corner of Spitsbergen.

One main station called *Heimland* was built below Måkefjellet on the northwest side of Barentsøya; and the other at Kapp Koburg on

Kongsøya. The huts (so-called secondary stations "bistasjoner") were built on the north side of Svenskøya and on Phippsøya. The third main station and a hut were not erected, but stored in Ny Ålesund along with the stoves, etc.

Otherwise the work of the expedition had to be somewhat scattered. Some of the old huts were inspected, and other work included topography, tide measurements, botanical collections, etc. Wefring made a number of landscape paintings.

Merckoll along with his two assistants left the expedition on Aug. 24 in Longyearbyen. The members of the British expedition and Giæver accompanied the vessel to Tromsø, where they arrived on Aug. 29.

Summary of Works.

On the preceding pages we have given an account of the work of the expeditions, but as they have operated in different regions, it will be useful to state briefly what has been done in these areas. For the details the preceding pages and the tables at the end of this paper should be consulted. In the tables will be found detailed information about the members, vessels, instruments; summaries of the topographical and hydrographic work.

Davis Strait.

Hydrographic work. In the summer of 1935 von Krogh took part in the fishery expedition of Bogen and Johnsen A/S to Davis Strait in S/S "Korsvik" and carried out a series of echo soundings, and soundings — using an ordinary sounding machine — from a motor-dorry.

North-East Greenland.

In the years 1929—1933 expeditions were sent out every year to that part of North-East Greenland lying between Carlsbergfjorden in the south and Roseneathbukta in the north. In 1934 and the following years the task of the expeditions was only to relieve the wireless operator at the meteorological station in Myggbukta, and the hunters of various companies and expeditions. All the expeditions have proceeded according to plan, and without serious accidents. The work carried out within the mentioned area is briefly the following:

Determination of Latitude and Longitude.

Hans S. Jelstrup, astronomer to the *Norges Geografiske Opmåling* was a member of our expeditions, and determined the latitude and longitude of a point at Myggbukta in 1931, and at Germaniahavn in 1932. Both determinations were carried out with a large Prin transit

(built in Paris 1923). At both points were placed concrete pillars (1.12×1.12 m) to the depth of abt. 2 m. Above the pillars huts have been built (3.20×3.15 m). The point in Germaniahavn coincides with the point fixed by Sabine in 1823 and the Second German Polar Expedition 1869—1870. This point was of particular interest, apart from being the northernmost in the triangulation net, as the results of Jelstrup in this point may show that Greenland has a westerly drift, in agreement with the hypothesis of Wegener. The two astronomical points are tied up by the trig. net, and are the fixed points for the Norwegian survey in these tracts.

Triangulation and terrestrial detail survey. Aerial survey. The survey was started in 1929 when Luncke and Solheim, using ordinary photogrammetry and stereophotogrammetry, mapped a large part of the coast from Sabineøya in the north to Geographical Societyøya in the south. Base-lines were measured at Myggbukta, and a number of cairns were built. This summer and the following (1930) sea stations were taken by Orvin, using an aerial camera (old type). No survey work was undertaken in 1930, but in 1931 three survey parties (Luncke, Solheim, and Askheim) were in the field. They extended the triangle net from Fosterbukta to Kapp Herschel, and along the south coast of Claveringfjorden as far as Loch Fine. Cairns were also built, coast-lines surveyed, and stereo-photogrammetric mapping carried out.

In 1932 Solheim and Askheim were the topographers, and they extended the triangle net along the coasts of the outer part of Frans Josef Fjord, Nordfjorden and Moskusoksefjorden, and also around the inner part of Claveringfjorden and Copelandfjorden. Within the same area mapping and surveying of coast lines were carried out as usual. This summer a very successful air survey of an area of 30 000 sq. km was effected in these regions. In 1933 all the topographers of the NSIU worked in North-East Greenland (that part which had been called Eirik Raudes Land). Another base-line was measured at Germaniahavn, which was connected (by triangulation) with the southern net, and with the astronomical point of Jelstrup at Myggbukta, as well as the German triangulation net of 1869—1870. The air photographs of 1932 also covered areas with no triangulation net, and in 1933 it was therefore of great importance to get as many points fixed as possible, to serve the future construction of the air map. The triangulation was continued southwards to Geographical Societyøya. Mapping and survey of coast-lines were carried out as before. In 1934 (and the following summers) no survey work was carried out by us in North-East Greenland.

Tidal observations. To fix the datum level of the altitudes several series of tidal measurements were carried out. The first was made by Luncke and Solheim at Myggbukta in 1929 using staff readings. In

1931 tidal observations were carried out on the north coast of Homes Forland, and in 1933 the tide was registered on an automatic gauge on Vesle Finschøya in Claveringfjorden for 30 days; staff tide readings were also made in Germaniahavn and on the north coast of Geographical Societyøya.

Hydrographic work. Sounding work in North-East Greenland commenced in 1930 when von Krogh (using a motor-boat) carried out soundings in Mackenziebukta, a part of Fosterbukta, inner part of Moskusoksefjorden, outer part of Grantafjorden, in the outer part of Loch Fine, between Kapp Herschel and Jacksonøya, in the outer part of Moskusoksefjorden, Sofiasundet, at the mouth of Segelsällskapets Fjord, and at Archerøyane. Von Krogh continued the hydrographic work in 1931: mouth of Frans Josef Fjord, eastern part of Sofiasundet as far east as a line from Kapp Franklin to Kapp Laplace, and off the coast between Kapp Bennet and Kapp Franklin. The six- and ten-metres danger lines were traced. In 1932 von Krogh sounded the entire Loch Fine and Claveringfjorden. In 1933 there were two hydrographers, von Krogh in a motor boat sounded the inner part of Claveringfjorden between Loch Fine and Revet, Youngsundet towards Kapp Herschel, a part of Gael Hamkefjorden and the region at Jacksonøya, the coast southwards to Hold with Hope; the other hydrographic surveyor, Kjær, was on board the "Polarbjørn" and carried out soundings at the outer coast and adjoining part of the ocean from Bontekoe to Gael Hamkefjorden. For the soundings an ordinary lead and sounding machines were used.

Oceanographic work was carried out in North-East Greenland by Jakhelln on the expeditions in 1931 and 1932, with 21 and 26 stations respectively; in the fjords, at the coast, and a few stations in the drift-ice.

Geological work. This has been carried out in scattered areas throughout the entire region visited by the Norwegian expeditions. As the geologist has usually also acted as leader of the expedition, it has been difficult for him to do extensive work anywhere. In the years 1930, 1931, and 1933 Hoel measured terraces and shore-lines and collected various material, chiefly relating to the Quaternary geology. In 1929, 1930, and 1932 Orvin collected rocks and fossils from various formations, and also did some geological mapping.

Botanical work. Botanists have taken part in all the expeditions to North-East Greenland 1929—1933. In 1929 Lynge collected lichens and Vaage vascular plants; in 1930 Scholander collected lichens and mosses, and Vaage vascular plants. In 1932 Aandstad collected mosses exclusively, and in 1933 Hagen chiefly fungi.

Zoological collections and observations were carried out during the expeditions to North-East Greenland 1929—1933. In 1929 Knaben

made hauls for marine life and also collected insects. In 1930, 1931, and 1932 hauls for marine life were carried out by Løyning along the entire coast and in the fjords, so that we now possess a fairly good knowledge of the marine fauna near land. Mammals and birds were collected for the Zoological Museum in Oslo by Siggeson in 1930, and Hansen in 1931; the latter for the Oslo museum and the whaling museum in Sandefjord in 1932.

Transfer of musk-oxen and hares from Greenland to Svalbard. The expedition of 1929 captured 8 musk-ox calves in North-East Greenland, which, along with 10 calves acquired in Norway, were taken to Svalbard the same autumn in the sealer S/S "Veslekari". One died on the voyage, but the remaining 17 stood the transport well, and were landed at Hiorthhamn in Adventfjorden. They have had calves and the number is now probably doubled. In 1931 16 hares were taken on board by the expedition in North-East Greenland. On the return voyage most of them unfortunately were accidentally drowned, so that only three could be taken to Svalbard and released in Hiorthhamn (the same year).

Archaeological and anthropological work. Richter wintered in 1929—1931 as a member of the expedition of *Arktisk Næringsdrift*, and was a member of the NSIU expeditions of 1932 and 1933. He has made a number of excavations and investigations of Eskimo hut sites in the region from Claveringfjorden to Frans Josef Fjord, and collected a large material. Some material was also collected by other members on the expeditions in 1929, 1930 and 1931. Richter and the physicians of the expeditions have collected skeletons from the Eskimo graves.

Building of a wireless station. In 1930 the NSIU expedition put up a new building for the wireless station in Myggbukta. A short wave equipment was also installed.

Cinematographic film. In 1930 a film was made by the Italian Beonio-Brocchieri, and in 1932 1400 metres of film was made by Askheim and Orvin on behalf of the *Tiedemanns Tobaksfabrik* in Oslo.

Landscape paintings and drawings. 1930: by Dagfin Werenskiold. 1932: by Gunnar Wefring.

Journalists. 1929: one, 1930: one, 1931: three, and in 1932: three.

Transport of hunting expeditions. In 1929 transports to North-East Greenland included: materials for 30 huts, a large amount of coal, provisions, etc. 10 men of the *Arktisk Næringsdrift* went in the vessel of the expedition to North-East Greenland, and five men of the *Hird*-expedition returned with her.

In 1930 we had one man of the *A. N.* and five men of the *Møre*-expedition with a big outfit to Greenland; and back to Norway we carried one man of the *A. N.*, and six men of the Finn Devold expedition.

In 1931: two men of the *A. N.* serving as members of the crew on the outward voyage; eight hunters of the *A. N.*, one of the *Møre*, and the Norwegians Høygaard and Mehren (who had crossed the ice-cap) were taken back to Norway.

In 1932 the 5-man expedition of the *sysselemand*, Helge Ingstad, and eight men of the *A. N.* were brought over, and the following returned with the vessel: four men of the *A. N.*, and three of the *Møre*.

In 1933 five men of the *A. N.* were brought over, and on the return voyage the following were given a passage: Ingstad, and 7 men of the *A. N.*

In 1934 (“Sælbarden”) one wireless operator, one hunter of the *A. N.*, and four men of the *Suløya* expedition were brought over; and the following were brought back: four men of the Ingstad expedition, four of the Tolløfsen, the Giæver expedition of five men, a wireless operator from Myggbukta, and from Jan Mayen the Bird brothers.

In 1935 “Buskø” brought over one wireless operator to Myggbukta and six men of the *A. N.*; and the homeward voyage: two Danish hunters, one wireless operator from Myggbukta, and five hunters of the *A. N.*

In 1936 (“Isbjørn”): one wireless operator, two hunters and the Bird brothers to North-East Greenland. Back: one wireless operator and three hunters.

It should also be mentioned that the expedition in 1929 conveyed to Jan Mayen and back an expedition of seven men sent out by the *Statens Havnevesen* in Oslo to investigate the harbour possibilities.

In 1931 the expedition pulled the American expedition vessel “Effie M. Morrissey” off a shoal in Claveringfjorden. In 1935 the expedition in the “Buskø” took on board four Danes in distress south of Kapp Berlin in North-East Greenland.

South-East Greenland.

Our expeditions to South-East Greenland commenced in 1931. They have in some instances been made in chartered vessels, and on other occasions members of our staff have accompanied the expeditions sent out to relieve the wireless stations and hunting establishments there. These expeditions have been much smaller than those to North-East Greenland, and the scientific work has also been on a much smaller scale and scattered over a vast area.

Topographic work. In 1931 Vogt and Lundbom prepared a sketch map of the Skjoldungen districts with many new features and also some fjords not hitherto known. In this district coast-lines of an aggregate length of 680 km were sketched in. Sketch maps of the districts of Tingmiarmiut, Umanak, and Umivik were also prepared (length of new coast-lines 300 km). In 1932 Horn made plans of the

hunting stations, and coast-lines in Øyfjorden. Kjær arranged for tidal measurements to be made at Finnsbu, and made determinations of latitude at Finnsbu and Torgilsbu.

Hydrographic work was carried out at scattered points by the Vogt expedition in 1931, and in 1932 Kjær prepared hydrographic plans of Heimenhamna at Finnsbu, Grytvika in Kangerdluarak, and Mørepollen on the north side of Lindenowfjorden. Scattered soundings were also taken, and views of the coast prepared.

Geological work. In 1931 Vogt did geological work in the region Umivik—Tingmiarmiut. At Skjoldungen he found the so-called Lofot-rocks. The same year Tornøe also made some geological collections, and in 1932 Horn made geological investigations and collections.

Botanical work. In 1931 the botanist of the Vogt expedition, Bjørlykke, and also Vogt himself, collected much material, and in the same year Tornøe of the "Signalhorn" expedition also made some collections. In 1932 Scholander and Devold accompanied the "Polaris" expedition and collected much botanical material at various points. Devold was later transferred to the "Veslemari" to continue his work.

Anthropological collections were made by Vogt in 1931 and Devold in 1932.

Historical studies. In 1931 Tornøe devoted much attention to the appearance of the coast of South-East Greenland in connection with studies of the old Norse navigation along this coast.

Landscape paintings were executed by Wefring in 1931.

Wireless and Meteorological Station Torgilsbu. This station had been built by the "Polaris" expedition in 1932 on the north side of Lindenowfjorden, but was moved by the "Veslemari" expedition to the next fjord (north) the same summer. The latter expedition also left a store of coal, oil, and building materials in South-East Greenland.

Relief of wireless operators and hunters. The NSIU has since 1934 been entrusted with the relief of the personnel at the Torgilsbu station, and keeping it supplied with stores and provisions. In that year M/C "Brandal" brought one wireless operator and two men to Torgilsbu, and one wireless operator and one man home. In 1935 (S/S "Signalhorn") two men each way, in 1936 (S/S "Selis") three men each way, and from Kangerdlugsuak the British Wager expedition was brought to Iceland (and their Eskimos to Angmagssalik).

Jan Mayen.

The Norwegian expeditions have several times called at Jan Mayen on their way to and from Greenland, and during these short stays a little work has been attempted ashore (topographical, botanical, zoological, and geological). In 1930 the botanist Lid with one assistant remained at the island while the vessel was in Greenland.

Svalbard.

In the period 1927—1936 NSIU has had only one big expedition to Svalbard, but several small ones for some special purpose. The following is a summary of their work:

Triangulation and mapping. In 1928 Luncke and Solheim worked in the area Kongsfjorden—Krossfjorden and connected up the base in Kongsfjorden of 1921, with the Isachsen base from 1909 on Prins Karls Forland. A number of photogrammetric stations were taken, many cairns built, and coast-lines measured. In the same summer Koller took a number of photogrammetric sea-stations between Isfjorden and Sørkapp, and made a detailed survey of an area between Dickson- and Billefjorden.

In 1929 Høygaard, Mehren, and O. Staxrud built cairns for the trigonometrical work between Smeerenburg- and Kongsfjorden. In 1932 Koller carried out a survey of glacier fronts in Kongsfjorden, Krossfjorden and Tempelfjorden; and in 1933 Solheim and Luncke surveyed the vicinity of *Isfjord Fyr og Radiostasjon* (while the “Polarbjørn” was unloading the stores for the station).

In 1936 Solheim, and partly Askheim, carried out triangulation, terrestrial photogrammetry, measurement of coast-lines, and the building of cairns in the area between Kross- and Raudfjorden. The triangle net in the south was linked up to the astronomical point at Biscayerhuken. The same year Koller carried out some tidal observations on the east coast, and also took some photogrammetric sea-stations.

Aerial survey. The first aerial survey in Svalbard was carried out in 1936 with one of the airplanes of the Norwegian Navy, with Commander Gøsta Wendelbo and Lieutenant Sigurd Sivertsen as pilots and Luncke as air photographer. All the flights and the photographic work were exceedingly successful, and about two-thirds of the entire archipelago was photographed from the air.

Hydrographic work. In the last few years several hydrographic expeditions have been sent out to Svalbard waters.

In 1928 Hermansen and Rolf Kjær sounded the Bear Island banks and round the Island (ship: “Michael Sars”).

In 1929 the expedition also had the use of “Michael Sars” for hydrographic work in the same waters, carried out by von Krogh, assisted by Fredrik Vogt in the first half of the summer. Later von Krogh continued the work with the M/C “Blue Jacket”, which was used also for patrol work along the ice-edge, and assisted the coal-steamers when entering and leaving the Isfjorden.

Kjær continued the soundings of the banks around Bear Island and northward to Spitsbergen in 1930 and 1931 (in the “Michael Sars”), and in 1932 in the “Fridtjof Nansen”.

In 1933 only the bay at *Isfjord Fyr og Radiostasjon* on the south side of the mouth of Isfjorden, was sounded by Kjær, while the vessel of the expedition "Polarbjørn" was unloading material and stores there for the erection of the station.

In the summer of 1934 no sounding work was undertaken, but in 1935 the sea from the old coastal soundings to the submarine edge was sounded by Erling Kjær, A. Hermansen, and Odd Bostrøm in the "Veslekari", fitted out with an echo-sounding equipment. Otherwise all the sounding work has been carried out by means of a hand-lead and sounding machine, with the exception of 1932, when the echo sounder of the "Fridtjof Nansen" was used.

In 1936 the echo sounder of the "Polarbjørn" was chiefly used in the totally unknown waters north and east of Spitsbergen (by von Krogh and Bostrøm).

Oceanographic work. In 1930 Rolf Kjær made five oceanographical sections round Bear Island, and in 1931 a section between Bear Island and Sørkapp.

Magnetic declination. On Bear Island in 1930, on Bear Island and Spitsbergen in 1931 by Kjær.

Geological work. Geological investigations and mapping were carried out by Orvin in 1928 on the property of *Kings Bay Kul Comp. A/S* at Kongsfjorden. In 1930 Frebold made investigations and collections of fossils in the Mesozoic sequence in the Isfjord area, and in 1931 Horn made geological collections on the island of Hopen, Kong Karls Land, Storøya, and Kvitøya. In 1936 Hoel carried out geological work on Edgeøya, and Orvin collected coal samples in Bellsund (Claim Patent samples for the Norwegian State), and also geological mapping and investigations between Bellsund and Hornsund.

Botanical work. In 1930 collections were made by Hanssen on Hopen, Kong Karls Land, Storøya, and Kvitøya, and by Eilif Dahl 1936 at many points in Spitsbergen and Kong Karls Land.

Zoological work. In 1928 Sig Thor collected invertebrates at Adventfjorden, Grønfjorden, and on Bear Island, and in 1930 Adolf Sørensen collected on Hopen, Kong Karls Land, Storøya, and Kvitøya.

Deep drilling and test pits. Carried out on the *Kings Bay Kul Comp. A/S's* property by Orvin in 1928.

Building of huts, wireless station, and lights. In 1930 Horn ("Bratvaag" exp.) put up a small hut on Storøya. In 1933 Orvin was in charge of the building of the *Isfjord Fyr og Radiostasjon* on Kapp Linné, the Festningen light at the mouth of Grønfjorden, and the Vestpynten light at the entrance to Adventfjorden.

In 1936 the following huts were put up by the expedition of the Mining Inspector, Merckoll:

Hut of the type "main hunting station" on Kongsøya (Kong Karls Land).

Small hut ("Bistasjon") on Svenskøya (Kong Karls Land).

Hut (main hunting station) on Barentsøya.

Small hut on Phippsøya.

Discovery of the Andrée Relics. On the expedition in 1930 to Frans Josef Land (which also worked in the eastern part of Svalbard) the last camp of Andrée was discovered on the southern promontory of Kvitøya (White Island) and the fate of the Andrée expedition of 1897 was thus finally solved.

Landscape painting. Paintings and drawings were made by Wefring who in 1936 accompanied expeditions around Svalbard.

Frans Josef Land.

These islands have only been visited by one of our expeditions viz., the "Bratvaag" expedition in 1930 led by Horn. The expedition visited the following localities: Nightingalesundet, Kapp Forbes, Guntherbukta, Algerøya, Kapp Flora, and Eirahamna. Scientific collections were everywhere made by Horn (geological), Hanssen (botanical) and Sørensen (zoological). On Kapp Forbes the expedition put up a hut. (On Victoriaøya to the west of Frans Josef Land materials for a similar hut were left).

Financing the Expeditions and the NSIU.

In the period 1927—36 the NSIU has been subordinate to the Ministry of Trade, which department has introduced the bills dealing with the expeditions and NSIU. The cost of running the NSIU and most of the expedition expenses have been defrayed direct by the State, and to a smaller extent out of the Svalbard grants (Svalbardbudgett), but private individuals and scientific funds have also contributed considerably, both in cash and in kind. On p. 122 will be found a table showing the various contributions each year.

During the Greenland Case some of the expenses were covered by special grants through the Department of Foreign Affairs. Drilling at Kongsfjorden 1928 was carried out for money loaned to the owners of the coal field (Kings Bay Kul Comp. A/S) by the State. The wireless station and the lights in Isfjorden on Spitsbergen built in 1933 were charged to the Svalbard grants.

Co-operation between the NSIU and Government Institutions dealing with the same Kind of Work.

In the years 1927—36 we have co-operated with the following institutions: Technical Department of *Norges Geografiske Opmåling* (Geographical Survey of Norway) has reproduced and printed our charts. The astronomer of the Survey has taken part in two of our expeditions

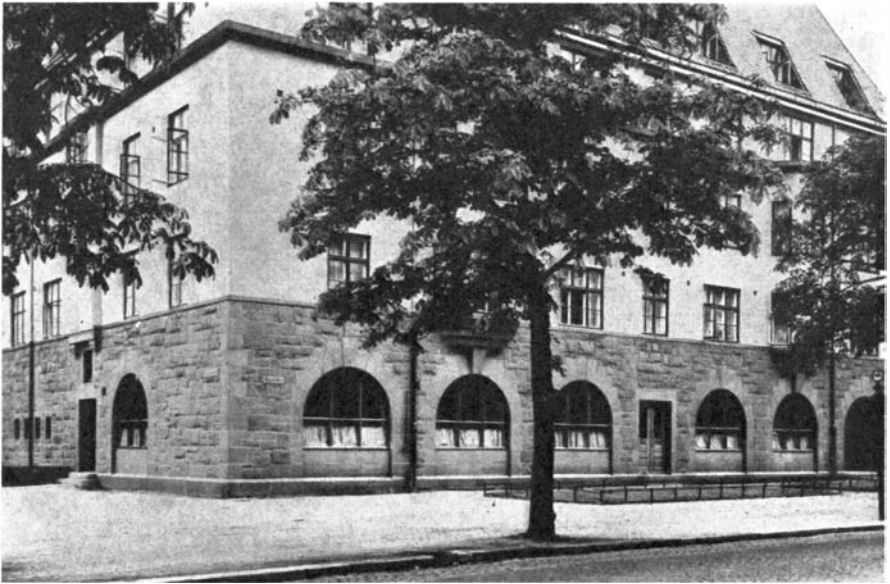


Fig. 24. Office of the NSIU 1926—34: Bygdø Allé 34, Oslo.

Solheim phot. Sept. 1932.

and he has further, with his own expedition in 1935, carried out the astronomical determination of a point at Raudfjorden in Spitsbergen, which point has been connected up with our triangulation net. The sales department of the Survey has, for the usual remuneration, handled the sale of our charts.

Norges Sjøkartverk (Hydrographic Survey of Norway) has for the period Oct. 1, 1929—Oct. 1, 1937 lent the NSIU one of its hydrographic surveyors, Rolf Kjær. From the last-mentioned date Kjær was appointed director of the Survey. The Hydrographic Survey sees that our charts are up-to-date, they do the colouring and, if necessary, the hand corrections. They further keep our charts in stock, and order new impressions after consultation with the NSIU.

Marinens Navigasjonsvesen (Navigation Department of the Navy), Horten, has placed at our disposal instruments for navigation and hydrographic work.

Marinens Flyvevåben (Naval Air Force), Horten, has placed at our disposal an airplane with pilots and crew for the air survey in 1936. *Marinens Flyvebåtfabrik* (Naval Airplane Factory), Horten, has carried out certain arrangements in the plane just mentioned to meet the special requirements of aerial survey work.

Fiskeridirektoratet (Fisheries Directorate), Bergen, has co-operated in planning the hydrographic work.

Meteorologisk Institutt (Meteorological Institute), Oslo. The Norwegian meteorological stations in East Greenland are worked by the



Fig. 25. Office of the NSIU from 1934: The former Astronomical Observatory, Observatoriegaten 1, Oslo. Luncke phot. Spring, 1935.

NSIU, which engages the necessary personnel and arranges the yearly sailings to the stations. The observations are sent to the Meteorological Institute several times daily.

Telegrafstyret (Telegraph Board), Oslo, has co-operated in the erection of Isfjord Radio in Spitsbergen in 1933.

Fyrvesenet (Lighthouse Department) has co-operated in the planning and erection of lights in Spitsbergen.

The *Natural History Museums* of the University in Oslo (the Mineralogical-Geological, the Palæontological, the Botanical and the Zoological) have received the natural history collections made on the expeditions. The museums co-operate with the NSIU as regards the working up of the material. The last two museums have also supplied personnel for the expeditions.

Norges Tekniske Høiskole (Technical High School of Norway) has supplied members of the expeditions and has received geological material for working up.

Norges Landbrukshøiskole (Agricultural High School of Norway) has worked up soil sections.

Naturhistoriska Riksmuseet (Paleozoologiska avdelningen), Stockholm, has worked up fossil material from Spitsbergen and North-East Greenland.

Technische Hochschule, Lehrstuhl für Photogrammetrie, Berlin—Charlottenburg, has constructed some of the air photogrammetric material from North-East Greenland.

Deutsche Versuchsanstalt für Luftfahrt, Berlin—Adlershof, has co-operated in the planning and construction of the air photogrammetric maps from North-East Greenland.

Hansa Luftbild, G. m. b. H., Berlin, has co-operated in the air survey and construction of the air photogrammetric maps from North-East Greenland.

Offices and Store Rooms.

On June 12, 1934 the offices of NSIU were moved to the building of the old University Astronomical Observatory, Observatoriegaten 1, Oslo, rented from the University. We have also a store room in the building of the Railway Customs House, Tomtebyggen 14, Oslo.

In 1936 the office had 2977 incoming, and 2411 outgoing letters.

Nature Protection.

The leader of the NSIU, Docent Hoel, is also president of the *Landsforeningen for Naturfredning i Norge* (Society for the Protection of Nature in Norway). As many questions pertaining to nature protection are of importance also to Svalbard, and as the activity of the Society is considered to be of general interest to the public, the Ministry of Trade has permitted the Society to have its office and archives on the premises of the NSIU, and to receive the necessary clerical assistance there.

Glacier Studies in Norway.

With contributions from various Norwegian scientific foundations Professor W. Werenskiold and Docent Hoel have commenced a detailed study of certain glaciers in Norway. The topographers of the NSIU, with their great experience and knowledge of glacier surveys in Svalbard, have done very valuable work in the mapping of the glaciers, necessary for these studies. The topographers have done this work in their vacations.

Assistance to Foreign Expeditions.

A considerable amount of work has been done for foreign expeditions. According to the Norwegian Government's Memorandum to Foreign Powers (see No. 1 of this series, p. 61), "it is essential that all expeditions intending to carry on such work in those islands give notification thereof to the Norwegian Ministry of Foreign Affairs, and, in addition, send in particulars respecting the expedition to Norges Svalbard- og Ishavsundersøkelser. This institution will, on request, supply information about literature and maps bearing upon the work contemplated, about scientific material in course of preparation and the making of maps that

may be of value to the expedition; it can also give practical hints relating to natural conditions and equipment. It is also the duty of the Norges Svalbard- og Ishavs-undersøkelser to give expeditions the necessary information relating to such Norwegian laws and regulations, e. g. close time provisions, as expeditions may be brought into contact with."

Below follows a list of those expeditions to which we have given assistance. This has been of a varied character. One expedition has been helped to charter a ship, another to obtain a passage. Other services have consisted in help in Customs clearance, hire of dogs, purchase of stores and equipment, etc., etc. The foreign expeditions have also been notified about the existing close time regulations. They have in many cases obtained lists of the literature, co-ordinates of trigonometrical points, maps, and photographs dealing with the area they intend to examine, and received our maps. The foreign expeditions with which we thus have been in communication are the following:

Svalbard.

1927.

The Hamburg Spitsbergen expedition led by Professor K. Gripp; geological and glaciological.

Cambridge expedition to Edgeøya led by H. G. Watkins. Topography, geology, biology. Professor W. Patten of Dartmouth College, N. H. (U. S. A.). Paleontological studies.

1928.

The Italian North Pole Expedition led by Colonel U. Nobile. The correspondence of the NSIU relating to this expedition amounts to 147 entries, and that of the Nobile relief expeditions to 142.

1929.

Swedish geological and paleontological expedition to the Isfjord area, led by Per A. Thorslund of Uppsala.

1930.

Cambridge expedition to area Billefjord—Widjefjord led by R. M. Jackson. Topography and geology.

Swedish geological and paleontological expedition to the Isfjord area, led by Th. Svensson of Uppsala.

1931.

The Swedish-Norwegian expedition to Nordaustlandet, led by Professor H. W:son Ahlmann. Varied programme.

Austrian expedition to N.W. Spitsbergen. Alpine and zoological.

H. Ritter's (of Prague) expedition to Kongsfjorden. Glaciology.

1932.

Cambridge expedition to area east of Widjefjord, led by R. M. Jackson. Topography and geology.

Cambridge zoological expedition to Bear Island (G. C. L. Bertram and David Lack).

Swedish Polar-Year Station 1932—33 on Nordenskiöldfjellet (led by Hilding Olsson).

J. Lagerkranz of Stockholm, botanical expedition to Isfjord area.

Polish Polar Year Expedition to Bear Island 1932—33 led by Jean Lugeon.

1933.

Oxford University Arctic Expedition led by A. R. Glen to region Billefjord—Wijdefjord. Varied programme.

Nicholas Polunin of Oxford University, botanical expedition.

1934.

Norwegian-Swedish expedition (H. W:son Ahlmann of Stockholm and H. U. Sverdrup of Bergen). Glaciology, meteorology.

Polish expedition led by S. Bernadzikiwicz to area between Van Keulenfjorden and Hornsund. Topography, geology, meteorology.

1935.

Oxford University Arctic Expedition 1935—36 (wintering on Nordaustlandet), led by A. R. Glen. Varied programme.

Dr. E. Sorge of Berlin: expedition to inner part of Isfjorden. Glaciology.

1936.

National Union of Students (London) Expedition, led by Professor F. Nusser of Vienna, to Billefjorden. Varied programme.

Professor Kurt Buch of Åbo Academy, Finland. Hydrochemical research.

German Students' Expedition to N. W. Spitsbergen. Physiography, geology, biology.

Polish expedition to traverse Spitsbergen from south to north. Led by S. Bernadzikiwicz.

Jan Mayen.**1934.**

Natural history expedition led by E. G. Bird of Cambridge University.

East Greenland.**1935.**

British East Greenland expedition 1935—36. Leader: L. R. Wager. Kangerdlugssuak (Storfjord region).

1936.

C. G. and E. G. Bird of Cambridge University wintering in Myggbukra 1936—37. Ornithological work.

Count Gaston Micard at Loch Fine 1936—37. Hunting.

Amongst the Foreign Visitors to the Office of NSIU were.

Austria.

Franz Nusser, Professor, Vienna. Leader expedition to Spitsbergen 1936.

R. Untersteiner, Salzburg. Member Austrian Spitsbergen expedition 1931.

Miss Hilda Wegener, Student, Graz.

Czechoslovakia.

Albert Straka, Journalist, Česke Slovo, Prague.

Josef Zukriegel, Professor, oceanographer. Geographical Institute of the Charles University in Prague.

Denmark.

- A. Gernow, Director of A/S Færø-Kul, Copenhagen.
 Johannes Grøntved, Botanist and librarian of Botanisk Centralbibliotek, København.
 Leader botanical Dano-Norwegian expedition South-West Greenland 1937.
 C. Holm Isaksen, Editor of Tingakrossur, Tórshavn.
 M. A. Jacobsen, Librarian Føroya Amts Bókasavn, Tórshavn.
 Henrik Kauffmann, Danish Minister in Oslo.
 Niels Nielsen, Dr. phil., secretary Royal Danish Geographical Society, Copenhagen.
 Henrik Ostermann, Parson in Greve (see p. 100).

England.

- Edward G. Bird, Ornithologist, Cambridge (see p. 84).
 Sir Edward Evans, Vice-Admiral.
 Sir William Goodenough, Admiral. President Royal Geographical Society, London.
 R. A. Hamilton, Oxford. Physicist of the Oxford University Arctic expedition to North-East Land 1935—1936.
 G. M. Nachimson, Mining Engineer. Formerly director of Anglo Russian Grumant Co., Ltd., London and Spitsbergen.
 Roberts, Scott Polar Research Institute, Cambridge.
 Edward Shackleton, Organizer and surveyor of the Oxford University Ellesmere Land Expedition 1934—1935.
 E. I. White, British Museum (Nat. Hist.), London.
 Sir Hubert Wilkins, New York. Polar explorer.
 C. J. F. R. Wingfield, British Minister in Oslo.

Finland.

- K. Albin Johansson, Director.
 Ludv. Munsterhjelm.

France.

- Armand du Chayla, Secretary at the French Legation in Oslo.
 Count Gaston Micard, Paris. Arctic traveller (see p. 84).

Germany.

- Baron von Behr, Gesandtschaftsrat of the German Legation in Oslo.
 Alexander von Bentheim, Reichsverband der deutschen Luftfahrt-Industrie Abt. Vertrieb, Berlin.
 Max Bundermann, Photographer, Berlin. Member Norwegian expedition to North-East Greenland 1932 (see p. 37).
 Hans Frebold, Professor Greifswald University. Geological work in the Arctic.
 Otto von Gruber, Professor, Jena. Construction of maps from Arctic regions.
 Ernst Herrmann, Author, Berlin.
 Herrmann Jughenn and Mrs. Carli Jughenn, members of Dr. Sorge's expedition to Spitsbergen 1935.
 Herbert Knothe, Privatdozent in geography, University of Breslau, member of German Spitsbergen expedition.
 Otto' Lacmann, Professor of Photogrammetry, Technische Hochschule, Berlin—Charlottenburg.
 Oskar Luz, member of Dr. Sorge's expedition to Spitsbergen 1935.
 Ernst Müller-Blensdorf, Sculptor of Bonn (working on the erection of an international polar monument) and Mrs. Müller-Blensdorf.
 Hans Joachim von Neuhaus, Secretary of the German Legation in Oslo.
 Vitalis Pantenburg, Engineer and journalist, Cologne. Visited Spitsbergen and Greenland.
 Arthur Pfléghar, Cand. med., Rostock i./M.

Hans Poser, Oberassistent, Geographisches Institut, Göttingen. Member of Arctic expedition.

Bruno Roemisch, Journalist, Berlin.

Ernst Sorge, Studien-Rat, Berlin, leader expedition to Spitsbergen in 1935 (see p. 84).

Mrs. Gerda Sorge, member of Dr. Sorge's expedition in 1935.

Emil Walter, Bergdirector in Berlin. Investigations of the coal deposits in Spitsbergen.

Italy.

V. Beonio-Brocchieri, Professor at the University of Pavia (see p. 99).

Nino Bussoli, Dr. ing.

Alberto Fumagalli, Milano, member of Arctic expeditions and hunting enterprises.

Davide Giudici, Correspondent of "Corriere della Sera" in Milano on the Russian relief expedition in the ice-breaker "Krassin" for the rescue of the "Italia" expedition 1928.

Count Alberto de Marsanich, Italian Minister in Oslo.

A. Romagna Manoja, Director of Istituto Idrografico della Regia Marina, Genova, commander on the "Città di Milano", mother ship of the "Italia" expedition 1928.

General Umberto Nobile, Rome.

Count Carlo Senni, Italian Minister in Oslo.

Latvia.

Leonīds Slaucītājs, Privatdozent, Latvia University, Riga.

Dr. Sergejs Slaucītājs, Assistant at the Astronom. Observatory, Latvia University, Riga.

Palestine.

Hermann Hoffner of the firm Meth & Richter, Haifa. Also business in Arctic pelts.

Poland.

Stefan Bernadzikiewicz, Engineer, Warsaw, leader of the Polish expedition to Spitsbergen 1934 (see p. 84).

Wladislaw Neuman, Polish Minister in Oslo.

Stefan Rozycki, Assistant University Warsaw. Geologist and botanist of the Polish expedition to Spitsbergen 1934 (see p. 84).

Captain Antoni Rogala Zawadzki, Photogrammetrist of the Polish expedition to Spitsbergen 1934 (see p. 84).

Stanislaw Siedlecki, Physicist of the Polish expedition to Bear Island 1932—1933, and Spitsbergen 1934 (see p. 84).

Roumania.

Constantin Dumbrava, Meteorologist, Expedition to Scoresby Sound 1930.

Sweden.

Hans W:son Ahlmann, Professor Stockholms Högskola (see p. 84).

Svén Aurén, Journalist "Aftonbladet", Stockholm.

Gerard De Geer, Professor Stockholms Högskola, with his wife Mrs. Ebba De Geer.

Sigvard Malmberg, Journalist "Stockholms-Tidningen", member of the Swedish—Norwegian expedition to Spitsbergen 1931 (see p. 83).

Hilding Olsson, Fil. cand., meteorologist, Stockholm. Swedish Polar Year expedition 1932—1933 (see p. 83).

Folke Rengmark, Geol. Inst. Lund.

Erik A:son Stensjö, Professor, Palaeozool. Dep., Riksmuseet, Stockholm.

G. Säve-Söderbergh, Professor in Uppsala, paleontologist.

Per A. Thorslund, University of Uppsala, geologist (see p. 83).

Stig Almqvist, Saxon & Lundströms Förlag, Stockholm.

Axel Gavelin, Director and chief of the Swedish Geological Survey.

Switzerland.

P.-L. Mercanton, Professor, meteorologist, professor in Zurich.

U. S. A.

Miss Louise A. Boyd, San Rafael, Cal., Arctic explorer.

A. R. Cohn, University of Illinois.

William H. Hobbs, Professor, Ann Arbor Mich., geologist.

Dudley V. Talcott, Hartford Conn., Artist and Arctic traveller.

U. S. S. R.

D. Joujin, Correspondent to "Krassnaia Gazetta", Leningrad.

Emil Mindlin, Correspondent to "Wetchernia Moskwa".

Rachmilowitch, Correspondent to "Krassnaia Gazetta".

R. L. Samoilowitch, Geologist and leader of the Arctic Institute in Leningrad.

N. Shpanoff, Correspondent to "Izvestia" and "Tass".

(All of the "Krassin" expedition to the rescue of Nobile (see p. 12).

Svalbard Place-Names.

Ever since the discovery of Spitsbergen by the Dutch in 1596 localities have been named, but more particularly in the last century when the islands have repeatedly been visited by scientific expeditions. These have been of many nationalities, and as personal names have been used to a large extent Spitsbergen comprises a medley of place-names: Dutch and English from the whaling period; Swedish personal and geographical names; descriptive names of Norwegian hunters; German, Austrian, Russian, Polish, French, Italian, and Gaelic names show the international character of past and present exploration in Spitsbergen. Then the same locality may have received several names, old ones have been transferred to a locality other than the original one, the names have been perverted, misunderstood, or translated. Old names may, in disregard of their priority have been replaced by other names, etc. When the NSIU started to publish final editions of their charts and maps it was found absolutely necessary to change the chaotic state of the Spitsbergen place-names into one of order and uniformity. The work was commenced in 1925 by a committee appointed by the Ministry of Trade. The members were: Carl Lundh, Barrister (chairman), Professor Gustav Indrebø, Lieutenant-Colonel K. G. Gleditsch, and Professor W. Werenskiold. The NSIU continued their work until the summer of 1937, when the report on the Svalbard place-names was sent to the Ministry of Trade. The revision had entailed a vast amount of work: nearly all maps, books, and papers dealing with Spitsbergen and Bear Island (Svalbard) from the Dutch discovery to the year 1934 (inclusive) were examined for the purpose of place-names. Not the least difficult has been the explanation of the names, to find out, why they were given, and the identity (and biographical dates) of the many persons commemorated in the place-names. The report contains a total of abt. 3300 final names, and the examined names total abt. 10 000. It will be published later.

The Library.

NSIU has at its disposal a library which is estimated to contain about 5000 volumes, partly purchased by Hoel, partly by NSIU, and also containing publications received in exchange for the publications of the NSIU: "Skrifter om Svalbard og Ishavet" and "Meddelelser" which are sent to a number of institutions and persons, both in this country and abroad. The library naturally contains chiefly Arctic and Antarctic literature, especially dealing with Svalbard and Greenland. In addition, there is also a very valuable and large collection of author's reprints. Keeping the library in order has been part of the routine work of the staff. However, it has now grown to such an extent that it has been found necessary to engage, temporarily, a special librarian, Hroar Vartdal, to go through it and arrange it in a more suitable way.

Literature.

A. Previously published Accounts of the Expeditions.

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1930.

- Expeditions, Norges Svalbard- og Ishavs-undersøkelser, to Svalbard, 1930. [Kjær, Hydrographic Exp. and Frebold, Geological Exp.] — Polar record. Nr. 2. Cambr. 1931. P. 40.
- Norwegian Svalbard and Arctic Ocean, 1930. [Bratvaag exp. to Frans Josef Land.] — Polar record. Nr. 1. Cambr. 1931. Pp. 5—6.
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- Frebold, H. Ekspedisjonen til Spitsbergen. — Norges Svalbard- og Ishavs-undersøkelsers ekspedisjoner sommeren 1930. — Norsk geogr. tidsskrift. B. 3. Oslo 1931. Pp. 393—95. — Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 13.
- Horn, Gunnar. Ekspedisjonen til Frans Josefs Land. — Norges Svalbard- og Ishavs-undersøkelsers ekspedisjoner sommeren 1930. — Norsk geogr. tidsskrift. B. 3. Oslo 1931. Pp. 396—405. — Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 13.
- Kjær, Rolf. Ekspedisjonen til Svalbardfarvannene. Norges Svalbard- og Ishavs-undersøkelsers ekspedisjoner sommeren 1930. — Norsk geogr. tidsskrift. B. 3. Oslo 1931. Pp. 390—92. — Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 13.

1931.

- Expedition, Norges Svalbard- og Ishavs-undersøkelser, to Svalbard, 1931. [Hydrographic] — Polar record. Nr. 3. Cambr. 1932. P. 6.
- [— Signalhorn, to South-East Greenland.] — Polar record. Nr. 3. Cambr. 1932. P. 11.

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1933.

- Expedition, Norwegian, to Spitsbergen, 1933. — Polar record. Nr. 7. Cambr. 1934. P. 25.
- Orvin, Anders K. Isfjord Fyr og Radiostasjon, Svalbard. — Norsk geogr. tidsskrift. B. 5. Oslo 1934. Pp. 117—24. — Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 25.

1935.

- Orvin, Anders K. Norges Svalbard- og Ishavs-undersøkelsers ekspedisjoner i årene 1934 og 1935. — Norsk geogr. tidsskrift. B. 5. Oslo 1935. Pp. 471—74. — Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 32.

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- Expeditions, to Svalbard, 1936. — Polar record. Nr. 13. Cambr. 1937. Pp. 19—22.
- Luncke, Bernhard. Luftkartlegningen på Svalbard 1936. — Norsk geogr. tidsskrift. B. 6. Oslo 1936. Pp. 145—54. — Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 34.
- Orvin, Anders K. Norges Svalbard- og Ishavs-undersøkelers ekspedisjoner til Øst-Grønland og Svalbard i året 1936. — Norsk geogr. tidsskrift. B. 6. Oslo 1937. Pp. 394—404. Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 37.

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1929.

- Expedition, Norwegian, to East Greenland, 1930. — Polar record. Nr. 2. Cambr. 1931. P. 52.
- Orvin, Anders K. Ekspedisjonen til Østgrønland med „Veslekari“ sommeren 1929. — Norsk geogr. tidsskrift. B. 3. Oslo 1931. Pp. 89—146. — Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 11.

1930.

- Orvin, Anders K. Ekspedisjonen til Jan Mayen og Østgrønland. — Norges Svalbard- og Ishavs-undersøkelers ekspedisjoner sommeren 1930. — Norsk geogr. tidsskrift. B. 3. Oslo 1931. Pp. 367—89. — Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 13.

1931.

- Expedition, Norges Svalbard- og Ishavs-undersøkelser, to North-East Greenland, 1931. — Polar Record. Nr. 3. Cambr. 1932. Pp. 17—18.
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- Orvin, Anders K. Norges Svalbard- og Ishavs-undersøkelers ekspedisjoner til Nordøstgrønland i årene 1931—1933. — Norsk geogr. tidsskrift. B. 5. Oslo 1935. Pp. 72—76. — Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 25.
- Vøgt, Thorolf. Norges Svalbard- og Ishavs-undersøkelers ekspedisjon til Sydøstgrønland med „Heimen“ sommeren 1931. — Norsk geogr. tidsskrift. B. 4. Oslo 1934. Pp. 289—325. — Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 20.

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- Krogh, Rolf v. Norske ekspedisjoner til Grønlands østkyst og norsk virksomhet i Grønlandsisen og på Øst-Grønland. — Norsk tidsskrift for sjøvesen. Oslo 1932. Pp. 109—19.

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- Arnesen, Odd. De norske flyvninger i Eirik Raudes Land sommeren 1932 og påvisningen av flyveplassene der. — Norsk geogr. tidsskrift. B. 4. Oslo 1933. Pp. 362—66.
- Expedition, Norwegian, to East Greenland, 1932. — Polar record. Nr. 5. Cambr. 1933. Pp. 30—32.
- Norwegian, to South-East Greenland, 1932. — Polar record. Nr. 5. Cambr. 1933. Pp. 32—33.

- Expeditions, Other Norwegian, to East Greenland, 1932. — Polar record. Nr. 5. Camb. 1933. Pp. 33—34.
- Horn, Gunnar. Norges Svalbard- og Ishavs-undersøkelsers ekspedisjon til Sydøstgrønland med „Veslemari“ sommeren 1932. — Norsk geogr. tidsskrift. B. 4. Oslo 1933. Pp. 409—27. — Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 24.
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- Orvin, Anders K. Norges Svalbard- og Ishavs-undersøkelsers ekspedisjoner til Nordøstgrønland i årene 1931—1933. — Norsk geogr. tidsskrift. B. 5. Oslo 1934. Pp. 76—89. — Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 25.

1933.

- Expedition, Norwegian, to East Greenland, 1933. — Polar record. Nr. 7. Camb. 1934. Pp. 41—42.
- Hoel, Adolf. Norvezjskaja ekspeditsija na Spitsbergen i v Vostotsjnuju Grenlandiju. — Bulletin of the Arctic Institute. Nr. 12. Leningrad 1933. Pp. 430—31.
- Orvin, Anders K. Norges Svalbard- og Ishavs-undersøkelsers ekspedisjoner til Nordøstgrønland i årene 1931—1933. — Norsk geogr. tidsskrift. B. 5. Oslo 1934. Pp. 89—94. Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 25.

1934.

- Expedition, Norwegian, to North-East Greenland, 1934. — Polar record. Nr. 9. Camb. 1935. Pp. 23—24.
- Norwegian, to South-East Greenland, 1934. — Polar record. Nr. 9. Camb. 1935. P. 24.
- Orvin, Anders K. Norges Svalbard- og Ishavs-undersøkelsers ekspedisjoner i årene 1934 og 1935. — Norsk geogr. tidsskrift. B. 5. Oslo 1935. Pp. 467—71. — Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 32.

1935.

- Expedition, Norwegian Fishery, to Davis Strait, 1935. — Polar record. Nr. 11. Camb. 1936. Pp. 40—41.
- Norwegian Hydrographic, to Spitsbergen, 1935. — Polar record. Nr. 11. Camb. 1936. P. 17.
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- Orvin, Anders K. Norges Svalbard- og Ishavs-undersøkelsers ekspedisjoner i årene 1934 og 1935. — Norsk geogr. tidsskrift. B. 5. Oslo 1935. Pp. 474—84. — Norges Svalbard- og Ishavs-undersøkelser. Meddelelse. Nr. 32.

1936.

- Expeditions, Norwegian, to East Greenland, 1936. — Polar record. Nr. 13. Camb. 1937. P. 31.
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Norges Svalbard- og Ishavs-undersøkelser. — St. Forh. 1930: St. prp. nr. 1, kap. 535; Budgett-innst. S. nr. 86; Forh. i St., s. 1082—84.
Innstilling fra veikomiteen om under hvilken myndighet kartlegningsarbeidene på Svalbard bør sortere. — St. Forh. 1930: Innst. S. nr. 107; Forh. i St., s. 1697—1705.

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Norges Svalbard- og Ishavs-undersøkelser. — St. Forh. 1931: St. prp. nr. 1, kap. 535; Budgett-innst. S. nr. 80; Innst. S. nr. 52 (norsk deltagelse i den svenske Svalbard ekspedisjon); Forh. i St., s. 764, 868, 870, 936—75.

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Norges Svalbard- og Ishavs-undersøkelser. — St. Forh. 1932: St. prp. nr. 1, kap. 535 A; Budgett-innst. S. nr. 82; Forh. i St., s. 1201

1933.

Norges Svalbard- og Ishavs-undersøkelser. — St. Forh. 1933: St. prp. nr. 1, kap. 535 A; Budgett-innst. S. nr. 83; Forh. i St., s. 1595.
Om bevilgning til bygning av fyr og radiostasjon på Svalbard m. v. — St. Forh. 1933: St. prp. nr. 1. Tillegg nr. 14; Tillegg til budgett-Innst. S. nr. 167; Forh. i St., s. 1316—17.

1934.

Norges Svalbard- og Ishavs-undersøkelser. — St. Forh. 1934: St. prp. nr. 1, kap. 535 A; Budgett-innst. s. nr. 83; Forh. i St., s. 1061—65.

1935.

Norges Svalbard- og Ishavs-undersøkelser. — St. Forh. 1935: St. prp. nr. 1, kap. 535. Budgett-innst. S. nr. 87; Forh. i St., s. 829—32.

1936.

Norges Svalbard- og Ishavs-undersøkelser. St. Forh. 1936: St. prp. nr. 1, kap. 535; Budgett-innst. S. nr. 84; Forh. i. St., s. 516.
Bidrag til en ekspedisjon til østkysten av Svalbard i 1936. — St. Forh. 1936: St. prp. nr. 1, tillegg nr. 13; Budgett-innst. S. nr. 89 b; Forh. i St., s. 986.

Every year: Budgett for Administrasjonen av Svalbard (St. prp. nr. 1).

LISTS AND TABLES

1. Members and Collaborators of the Expeditions sent out by Norges Svalbard- og Ishavs-undersøkelser 1927—1936.

The following list contains names and professions of those who have been on the staff of the expeditions 1927—1936 and also of scientific collaborators not taking part in the expeditions. The year of birth and death and year of participation in the expeditions are given.

Norwegian.

- Aagenæs, Sigurd, b. 1905, d. 1933, Flight Lieutenant. Reserve pilot North-East Greenland 1932.
- Aandstad, Sigurd, b. 1906, Cand. real. Botanist North-East Greenland 1932.
- Aaseth, Sverre, b. 1899, Wireless operator and meteorological observer Torgilsbu 1932—1933, 1935—1936.
- Aksnes, Johannes, b. 1901, Skipper of M/S "Signalhorn" South-East Greenland 1935.
- Andresen, Peder, b. 1891, Skipper of M/S "Sælbarden" North-East Greenland 1934.
- Arnesen, Victor, b. 1885, Skipper of M/S "Blue Jacket" Svalbard waters 1929.
- Askheim, Thor, b. 1889, Topographic surveyor, Norges Svalbard- og Ishavs-undersøkelser. Topographic surveyor Svalbard 1928, 1936, North-East Greenland 1931, 1932, 1933.
- Baashuus-Jessen, Johannes, b. 1887, State Studbook Registrar, Veterinary surgeon. Published paper about Arctic nervous diseases.
- Barca, Emil Toni, b. 1888, Lektor at Akers komm. gymnasium. Examination of *Lepidoptera*.
- Bergesen, Albert, b. 1893, Skipper of M/S "Isbjørn" North-East Greenland 1936.
- Birkeland, Bernt Johannes, b. 1879, Meteorologist at the Meteorological Institute, Oslo. Preparation of meteorological material.
- Bjørlykke, Bjørn, b. 1909, Cand. mag. Botanist South-East Greenland 1931.
- Bjørlykke, Knut Olai, b. 1860, Ph. D., Professor of geology at the Agricultural High School of Norway. Examination of soil sections.

- Bjørnstad, Lieutenant Harald, Norwegian Navy, b. 1897, Ship's officer H. M. S. "Fridtjof Nansen" and assistant hydrographic surveyor Bear Island waters 1932.
- Bostrøm, Odd, b. 1908, Fishery Directorate, Bergen. Assistant hydrographic surveyor Svalbard waters 1935 and 1936.
- Braastad, Johan, b. 1888, Dr. ing., geologist, secretary Norges Svalbard- og Ishavs-undersøkelser Jan. 1924—Nov. 1935.
- Breirem, Lieutenant Johan Gerhard Nilsen, Norwegian Navy, b. 1892, Wireless operator Barents Sea 1929.
- Brende, Anton Jakobsen, b. 1876, d. 1937, Draughtsman at the Hydrographic Survey of Norway. Preparation of charts.
- Briseid, Commander Trygve Sigurd, Norwegian Navy, b. 1885, Commander of H. M. S. "Michael Sars", assistant hydrographic surveyor 1931.
- Böhmer, Commander Alf, Norwegian Navy, b. 1878, Hydrographic surveyor at the Hydrographic Survey of Norway. Preparation of charts, proof reading.
- Christensen, Haakon, b. 1886, Civil engineer. Construction of maps. See Kartkontoret Stereografik A/S, Oslo.
- Dahl, Eilif, b. 1916, Student. Botanist Svalbard 1936.
- Dahl, Johan Jakob, b. 1872, Civil engineer, owner of Ing. Dahls Opmåling og Kartografiske Anstalt, Oslo. Geodetic computations, reproduction and printing of maps.
- Devold, Hallvard, b. 1898, Cand. oecon. Wireless operator and meteorological observer North-East Greenland 1930—1932.
- Devold, Joakim, b. 1908, Physician. Physician and botanist North-East Greenland 1931, South-East Greenland 1932.
- Einersen, Rudi, b. 1901, Wireless operator North-East Greenland 1929, 1930.
- Ekedal, Andreas, Martin, b. 1902, Flight mechanic Svalbard 1936.
- Eliassen, Peder Olaf Kornelius, b. 1891, Skipper of M/S "Bratvaag" Svalbard, Frans Josef Land 1930.
- Engeset, Sivert N., b. 1895, Skipper of M/C "Brandal" South-East Greenland 1934.
- Evensen, Peder Martinius, b. 1886, Skipper. Pilot Bear Island waters 1928.
- Feyling, Anders, b. 1911, Wireless operator and meteorological observer Torgilsbu 1933—1934.
- Fjeldstad, Jonas Ekman, b. 1894, Ph. D., Amanuensis (assistant) at Bergen Museum. Preparation of tidal observations.
- Giæver, John Schjelderup, b. 1901, secretary (from Nov. 1935) Norges Svalbard- og Ishavs-undersøkelser. Svalbard 1936.
- Gleditsch, Lieutenant-Colonel Kristen Gran, Norwegian Army, b. 1867, Chief of the Topographical Office of the Geographical Survey of Norway. Preparation of maps.
- Gram, Johan Fredrik, b. 1868, Ph. D., Leader of the State Railway Chemical Laboratory. Chemical analyses and investigations of coals.

- Grieg, James Alexandersen, b. 1861, d. 1936, Amanuensis (assistant) at Bergen Museum. Examination of *Echinoderma*.
- Grinaker, Major Peder Anton, Norwegian Army, b. 1883, Geodesian at the Geographical Survey of Norway. Geodetic computations.
- Gunvaldsen, Commander Oskar Alf, Norwegian Navy, b. 1891, Ship's officer on H. M. S. "Fridtjof Nansen" and assistant hydrographic surveyor Bear Island waters 1932.
- Haga, Lieutenant Rolf, Norwegian Navy, b. 1899, Ship's officer H.M.S. "Fridtjof Nansen" and assistant hydrographic surveyor Bear Island waters 1932.
- Hagen, Asbjørn, b. 1912, Student. Botanist North-East Greenland 1933.
- Hansen, Erling, b. 1901, Taxidermist at the Zoological Museum of Oslo University. Zoological collector North-East Greenland 1933.
- Hanssen, Olaf, b. 1882, of the Botanical Museum of the Oslo University. Botanist Frans Josef Land 1930.
- Haug, Henry Georg, b. 1907, Wireless operator and meteorological observer Storffjord 1932—1933, Myggbukta 1934—1935.
- Heesch, Lieutenant Gustav, Norwegian Navy, b. 1894, Ship's officer on H. M. S. "Michael Sars" and assistant hydrographic surveyor Bear Island waters 1929.
- Heintz, Anatol, b. 1898, Ph. D., Curator at the Palaeontological Institute, Oslo University. Examination of fish fossils.
- Helland-Hansen, Bjørn, b. 1877, Professor, Director of the Geophysical Institute of the Bergen Museum. Preparation of oceanographical material.
- Henriksen, Lieutenant Hans Peter, Norwegian Navy, b. 1894, Ship's officer on H. M. S. "Michael Sars" and assistant hydrographic surveyor Bear Island waters 1931.
- Hermansen, Captain Andreas Kristian Johan Encke, Norwegian Navy, b. 1876, Leader and hydrographic surveyor Svalbard waters 1928, 1935.
- Hoel, Adolf, b. 1879, Lecturer in geology at the University, Oslo, Director of Norges Svalbard- og Ishavs-undersøkelser. Leader and geologist North-East Greenland 1930, 1931, 1933, Svalbard 1936. Member of the Krassin Expedition for the relief of the Nobile Expedition 1928.
- Holm, Johan, b. 1910, Wireless operator and meteorological observer (Jonsbu 1932—1933), Myggbukta 1933—1934, 1935—1936.
- Horn, Gunnar, b. 1894, Dr. ing., Geologist, Norges Svalbard- og Ishavs-undersøkelser. Leader and geologist Svalbard and Frans Josef Land 1929, 1930, South-East Greenland 1932.
- Høeg, Ove Arbo, b. 1898, Curator at Trondheim Museum. Examination of fossil plants.
- Høst, Captain Jens Ludvig, Norwegian Navy, b. 1876, in command of H. M. S. "Fridtjof Nansen" Bear Island waters 1932.
- Høygaard, Arne, b. 1906, Physician. Erection of cairns for trigonometrical work in Svalbard 1929.

- Indrebø, Gustav Ludwig, b. 1889, Ph. D., Professor, Director of Folkeminnesamlingen of Bergen Museum. Adviser on questions concerning place-names.
- Jakhelln, Anton, b. 1904, Oceanographer, Meteorologist of the Norwegian Meteorological Institute, Oslo. North-East Greenland 1931, 1932.
- Jakobsen, Lars, b. 1883, Skipper of M/S "Heimen" South-East Greenland 1931.
- Jansen, Lieutenant Leif, Norwegian Navy, b. 1893, Ship's officer on H.M.S. "Michael Sars" and assistant hydrographic surveyor Bear Island waters 1930.
- Jelstrup, Hans Severin, b. 1893, Astronomer at the Geographical Survey of Norway. Astronomer North-East Greenland 1931, 1932.
- Jensson, Gunleik, b. 1891, Journalist and assistant North-East Greenland 1929.
- Johannesen, Ingvard, b. 1892, Skipper of S/S "Selis" South-East Greenland 1936.
- Kartkontoret Stereografik A/S, Oslo, Haakon Christensen, Director. Construction of maps.
- Kiær, Johan Aschehoug, b. 1869, d. 1931, Ph. D., Professor of Palaeontology at Oslo University. Examination of fish fossils.
- Kiærland, Captain Lars Knudsen, Norwegian Army, b. 1889, Topographic surveyor and assistant North-East Greenland 1932.
- Kjær, Captain Erling, Norwegian Navy, b. 1895, Ship's officer on H.M.S. "Michael Sars" and assistant hydrographic surveyor Bear Island waters 1930, hydrographic surveyor South-East Greenland 1932, Svalbard waters 1935.
- Kjær, Lieutenant Rolf, Norwegian Navy, b. 1897, Director of the Hydrographic Survey of Norway from 1936. Hydrographic surveyor Norges Svalbard- og Ishavs-undersøkelser from Oct. 1, 1929 to Oct. 1, 1936. Hydrographic surveyor Bear Island 1928, Leader and hydrographic surveyor Bear Island waters 1930, hydrographic surveyor North-East Greenland 1935.
- Knaben, Nils, b. 1897, Curator at Bergen Museum. Zoologist North-East Greenland 1929, 1930. Examination of *Lepidoptera*.
- Koller, Alfred, b. 1878, Civil engineer, topographer at Norges Svalbard- og Ishavs-undersøkelser. Topographic surveyor Svalbard 1928, 1932, 1936.
- Kolsrud, Oluf, b. 1885, Professor at the University, Oslo. Adviser on questions concerning the history of Greenland.
- Krogh, Captain Rolf von, Norwegian Navy, b. 1872, Leader and hydrographic surveyor Svalbard waters 1929, 1936, Davis Strait 1935, hydrographic surveyor North-East Greenland 1930, 1931, 1932, 1933.
- Kullmann, Lieutenant Olaf Bryn, Norwegian Navy, b. 1892, Ship's officer on H.M.S. "Michael Sars" and assistant hydrographic surveyor Bear Island waters 1929.
- Køste, Lieutenant Olav Gabriel Lindtner, Norwegian Navy, b. 1899, Ship's officer on H.M.S. "Michael Sars" and hydrographic surveyor Bear Island waters 1928.

- Lande, Bjarne, b. 1906, Wireless operator South-East Greenland 1932.
- Landgraff, Commander Wenzel Harboe Colbjørnsen, Norwegian Navy, b. 1886, Commander of H. M. S. "Michael Sars" and hydrographic surveyor Bear Island waters 1929.
- Larsen, Bjarne, b. 1904, Flight mechanic North-East Greenland 1932.
- Lid, Johannes, b. 1886, Curator at the Botanical Museum of the Oslo University. Botanist Jan Mayen 1930.
- Lillenes, Paul Nicolai Johan Andreassen, b. 1877, Skipper of S/S "Veslekari" North-East Greenland 1930.
- Luncke, Bernhard, b. 1894, Civil engineer, topographic surveyor at Norges Svalbard- og Ishavs-undersøkelser. Topographic surveyor Svalbard 1928, North-East Greenland 1929, 1931, 1933. Flight photographer Svalbard 1936.
- Lundbom, Eystein Emil, Lieutenant of the Reserve, Norwegian Navy, b. 1900, Topographic surveyor South-East Greenland 1931.
- Lyng, Bernt Arne, b. 1884, Ph. D., Professor in Botany at Oslo University. Botanist North-East Greenland 1929. Examination of lichens.
- Løyning, Paul, b. 1895, Lektor. Zoologist North-East Greenland 1930, 1931, 1932. Examination of marine mollusca.
- Marø, Kristoffer, b. 1884, Skipper of M/S "Polarbjørn" North-East Greenland 1931, 1932, 1933, Svalbard 1936.
- Mehren, Martin, b. 1905, Erection of cairns for trigonometrical work in Svalbard 1929.
- Münster, Commander Paul Løvenørn, Norwegian Navy, b. 1885, Commander of H. M. S. "Michael Sars", hydrographic surveyor Bear Island waters 1930.
- Münster, Thomas, b. 1855, Mining Inspector. Examination of *Coleoptera*.
- Myklebust, Johannes, b. 1894, Skipper of S/S "Buskø" North-East Greenland 1935.
- Mørk, Rolf, b. 1907, Physician and botanist North-East Greenland 1933.
- Natvig, Leif Reinhardt, b. 1894, Custodian at the Zoological Museum of Oslo University. Examination of *Culicidae* and *Mallophaga*.
- Olsen, Johan Peter Kornelius, b. 1879, Skipper of S/S "Veslekari" Svalbard and North-East Greenland 1935.
- Omang, Simen Oscar Fredrik, b. 1868. Examination of botanical material.
- Orvin, Anders Kristian, b. 1889, Ph. D., Geologist at Norges Svalbard- og Ishavs-undersøkelser. Leader and geologist Svalbard 1928, 1933, North-East Greenland 1929, 1932, geologist North-East Greenland 1930, Svalbard 1936.
- Pilskog, Monrad, b. 1897, Skipper of M/S "Veslemari" South-East Greenland 1932.
- Rekdal, Hans, b. 1889, Skipper of S/S "Veslekari" North-East Greenland 1929.
- Richter, Søren, b. 1903, Cand. mag. Archæologist North-East Greenland 1932, 1933.
- Roald, Severin Peder, b. 1884, Skipper of S/S "Korsvik" Davis Strait 1935.

- Rygg, Levy Michael, b. 1898, Lektor. Assistant botanist Jan Mayen 1930.
- Schaanning, Hans Thomas Lange, b. 1878, Custodian at Stavanger Museum. Examination of ornithological material and observations.
- Schibbye, Olav Benedictus, Flight mechanic Norwegian Navy, b. 1907, Flight mechanic Svalbard 1936.
- Scholander, Per Fredrik, b. 1905, Ph. D., Physician. Botanist and physician North-East Greenland 1930, South-East Greenland 1932.
- Schou, Georg Anton Ruud, b. 1900, Meteorologist at the Meteorological Institute, Oslo. Preparation of meteorological material.
- Seip, Lieutenant of the Reserve Jon, Norwegian Navy, b. 1899, Ship's officer on H. M. S. "Michael Sars" and assistant hydrographic surveyor Bear Island waters 1931.
- Siggesson, Einar, b. 1893, Taxidermist. Zoological collector North-East Greenland 1930, 1932.
- Sivertsen, Erling, b. 1904. Examination of *Crustacea*, *Decapoda*, *Auphausiacea* and *Nysidacea* from Greenland.
- Sivertsen, Lieutenant Sigurd Wilhelm, Norwegian Navy, b. 1907, Flight pilot Svalbard 1936.
- Smaaland, Thor, Flight mechanic, Norwegian Navy, b. 1898, Flight mechanic Svalbard 1936.
- Solheim, Salve, b. 1901. Physician North-East Greenland 1929.
- Solheim, Wilhelm, b. 1890, Topographic surveyor at Norges Svalbard- og Ishavs-undersøkelser. Topographic surveyor Svalbard 1928, 1936, North-East Greenland 1929, 1931, 1932, 1933.
- Staxrud, Olav, b. 1892, Engineer. Assistant topographic surveyor Svalbard 1928, erection of cairns for trigonometrical work in Svalbard 1929.
- Storm, Lieutenant Erik, Norwegian Navy, b. 1904, d. 1936, Flight pilot North-East Greenland 1932.
- Sundt, Lieutenant Trygve, Norwegian Navy, b. 1893, Ship's officer on H. M. S. "Michael Sars" and hydrographic surveyor Bear Island waters 1928.
- Sørensen, Adolf, b. 1904, Lektor. Zoologist Svalbard and Frans Josef Land 1930.
- Sørensen, Lieutenant Aimar August, Norwegian Navy, b. 1905, Ships officer on H. M. S. "Michael Sars" and assistant hydrographic surveyor Bear Island waters 1929.
- Thommessen, Commander Thomas Juel, Norwegian Navy, b. 1882, Commander of H. M. S. "Michael Sars" and assistant hydrographic surveyor Bear Island waters 1931.
- Thor, Thorkel Sigvaldt Thorkelson, b. 1856, d. 1937, Ph. D., Lektor. Zoologist Svalbard 1928.
- Thorstensen, John, b. 1907, Wireless operator and meteorological observer North-East Greenland 1932, Myggbukta 1932—1933, Torgilsbu 1934—1935.

- Tornøe, Johannes Kristoffer, b. 1892, Assistant Svalbard 1928, journalist North-East Greenland 1930, leader and collector of various scientific material South-East Greenland 1931.
- Tønnesen, Kaare W., b. 1908, Wireless operator North-East Greenland 1931.
- Ulstrup, Johan Fredrik Andreas Thaulow, Lieutenant Norwegian Navy, b. 1896, ship's officer H.M.S. "Fridtjof Nansen" and assistant hydrographic surveyor, Bear Island waters 1932.
- Vaage, Jakob, b. 1905, Lektor. Botanist North-East Greenland 1929, 1930.
- Vartdal, Hroar, b. 1903, Adjunkt. Author of bibliography of Greenland.
- Vinje, Olaf, b. 1898, Skipper of S/S "Hvalrossen" Barents Sea 1929.
- Vogt, Lieutenant Fredrik Lie, Norwegian Navy, b. 1895, Hydrographic surveyor of the Hydrographic Survey of Norway. Hydrographic surveyor Svalbard waters 1929.
- Vogt, Thorolf, b. 1888, Ph. D., Professor in geology at the Technical High School, Trondheim. Leader and geologist South-East Greenland 1931.
- Wefring, Gunnar, b. 1900, Landscape painter. Paintings and drawings South-East Greenland 1931, North-East Greenland 1932, Svalbard 1936.
- Wendelbo, Captain Gøsta Harald August, Norwegian Navy, b. 1894, Flight pilot Svalbard 1936.
- Werenskiold, Dagfin, b. 1892, Landscape painter. Paintings and drawings North-East Greenland 1930.
- Willoch, Commander Odd Isaachsen, Norwegian Navy, b. 1885, Commander of H. M. S. "Michael Sars" 1928.
- Øverbye, Arne H., b. 1906, Wireless operator and assistant North-East Greenland 1931, 1932.

Foreign.

- Abs, Otto August Hans, b. 1891, Dr. Med., Stadtarzt, Essen-Werden. Medical scientific examination of catarrhs in Spitsbergen.
- Alexander, Charles Paul, b. 1889, Ass. Prof. of Entomology, Massachusetts Agric. Coll., Amherst, Massachusetts, U. S. A. Examination of *Tipulidae*.
- Beonio-Brocchieri, Victor, b. 1902, Professor in political history at the university of Pavia. Member of the North-East Greenland expedition 1930.
- Block, Walter, b. 1902, Surveying engineer and scientific assistant at Deutsche Versuchsanstalt für Luftfahrt, Berlin-Adlershof. Construction of maps.
- Bodylewsky, Witalij Iwanowitch, b. 1898, Mining engineer, Assistant at the Geological Faculty of the Mining Institute of Leningrad. Examination of palaeontological material.
- Bristowe, William Syer, b. 1901, Sc. D., Holland Park, London. (Member of expedition to Jan Mayen 1921); published papers of Arctic spiders and insects from Jan Mayen and Bear Island. Examination of spiders from Bear Island.

- Bundermann, Max, b. 1904, Flight photographer at Hansa Luftbild, G. m. b. H., Berlin. Flight photographer North-East Greenland 1932.
- Burton, Maurice, b. 1898, M. Sc., Assistant Keeper, Dept. of Zool., British Museum (Nat. Hist.). Examination of sponges.
- Dahl, Maria Johanna, b. 1872, Zoological Museum of the University of Berlin. Examination of spiders from Greenland, Svalbard.
- Frebold, Hans, b. 1899, Ph. D., Professor in geology and palaeontology at the University of Greifswald. Leader and geologist Svalbard 1930. Examination of palaeontological material.
- Frey, Richard Karl Hjalmar, b. 1886, Ph. D., Custodian at the entomological division, Museum Zoologicum Universitatis, Helsinki, Finland. Examination of *Diptera*.
- Friese, Heinrich Friedrich August, b. 1860, Dr., Professor and director of Abteilung IV (biological research) am Landesgesundheitsamt, Schwerin, Mecklenburg. Examination of humble-bees.
- Gessner, Wilhelm, b. 1890, Director of Hansa Luftbild, G. m. b. H., Berlin. Construction of maps.
- Goetghebuer, Maurice, b. 1876, Dr. med., Gand, Belgium. Examination of *Chironomidae* etc.
- Heritsch, Franz, b. 1882, Ph. D., Professor in geology and palaeontology, Graz, Austria. Examination of fossil corals.
- Jackson, Arthur Randell, b. 1877, D. Sc., M. D., Westcote, Hoole Road, Chester, England. Examination of spiders from Spitsbergen.
- Lacmann, Otto, b. 1887, Dr. ing., Professor in photogrammetry at the Technical High School, Berlin-Charlottenburg and director of the division of photogrammetry and navigation at Deutsche Versuchsanstalt für Luftfahrt, Berlin-Adlershof. Adviser aerophotogrammetric survey (Greenland) and supervised the construction of the maps in Germany.
- Lind, Jens, b. 1874, Chemist, Viborg, Denmark. Examination of *Micromycetes*.
- Lindberg, Håkan, b. 1898, Ph. D., Amanuensis at Museum Zoologicum Universitatis, Helsinki, Finland. Examination of *Hemiptera*.
- Linnaniemi, Walter M., b. 1876, Dr., Professor at the Zoological Institution, Universitas Åboensis, Turku, Finland. Examination of *Collembolae*.
- Magnusson, Adolf Hugo, b. 1885, Ph. D., Göteborg, Sweden. Examination of lichens.
- Malaise, René Edmond, b. 1892, Assistant in entomological department, Naturhistoriska Riksmuseet, Stockholm, Sweden. Examination of leaf-wasps.
- Nordenstam, Åke Bernhard, b. 1895, Ph. D., Stockholm, Sweden. Examination of *Isopoda*.
- Ordnung, Franz, b. 1886, Cartographer at Hansa Luftbild, G. m. b. H., Berlin. Cartographical design of aerial maps from Greenland.
- Ostermann, Hother Bertel Simon, b. 1876, Parson in Greve, Denmark. History of East Greenland and editor of journals of Norwegians in Greenland before 1814.

- Richter, Hans, b. 1897, Photogrammeter, Hansa Luftbild, G. m. b. H., Berlin. Preparation of aerial maps.
- Ringdahl, Oscar, b. 1885, Elementary school teacher, Hälsingborg, Sweden. Examination of *Tachinidae* and *Muscidae*.
- Roman, Per Abraham, b. 1872, Ph. D., Assistant at Naturhistoriska Riksmuseet, Stockholm, Sweden. Examination of *Braconidae* and *Chalcididae*.
- Sack, Pius, b. 1865, Dr., Professor. Frankfurt a/Main. Examination of *Syrphidae*.
- Schellenberg, Adolf, b. 1882, Professor at the University of Berlin. Examination of *Amphipoda*.
- Schmidt, Daniel, b. 1902, Photogrammeter, Luftbild-Abteilung der Deutschen Versuchsanstalt für Luftfahrt, Berlin-Adlershof. Preparation of maps of North-East Greenland.
- Schwedfsky, Kurt D., b. 1905, Dr., Assistant of photogrammetry at the Technical High School, Berlin-Charlottenburg. Preparation of maps of North-East Greenland.
- Solle, Gerhard, b. 1911, Dr., Assistant Geological Institute at the University of Frankfurt a Main and Senckenberg-Museum. Examination of Devonian ostracodes.
- Stensiö, Erik A:son, b. 1891, Ph. D., Professor, Superintendent of the Palaeozoological Department, Naturhistoriska Riksmuseet, Stockholm, Sweden. Examination of fish fossils.
- Tolmatchew, Alexander I., b. 1903, Northern Branch of Academy of Science, Arkhangelsk. Examination of botanical material.
- Trägårdh, Ivar Oscar Herman, b. 1878, Dr., Professor, Superintendent of Statens Skogforsöksanstalt, Entomologiska Afdelningen. Examination of *Acarinae*.
- Zimmer, Carl, b. 1873, Dr., Professor, Director of Zoological Museum, Berlin. Examination of *Cumacea*.

2. Vessels and Members.

Year	Leaders of expeditions or captains of ships	Vessels	Members													Number of members						
			Astronomers	Topographic surveyors	Hydrographic surveyors	Oceanographers	Geologists	Archaeologists	Botanists	Zoologists	Taxidermists	Physicians	Flight pilots and mechanics	Flight photographers	Assistants		Drilling gang	Radio station and lights, men	Painters	Writers and journalists	Skipper and crew of the vessels	Wireless operators
1927	No expedition		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1928	Hermansen	H. M. S. Michael Sars	-	-	2	-	-	-	-	-	-	-	-	1	-	-	-	-	-	26	-	29
	Luncke & Solheim	Collier	-	2	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	6
	Koller	"	-	1	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	3
	Thor	"	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	2
	Orvin	"	-	-	-	-	1	-	-	-	-	-	-	-	9	-	-	-	-	-	-	10
1929	Orvin	S/S Veslekari	-	2	-	-	1	-	2	1	-	-	-	1	-	-	-	1	12	1	21	
	v. Krogh	H. M. S. Michael Sars	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	26	-	28	
	v. Krogh	M/C Blue Jacket	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-	13	
	Hørn	M/C Hvalrossen	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
	Høygaard & Mehren	Collier	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	3	
1930	Hoel	S/S Veslekari	-	-	1	-	2	-	2	2	1	-	-	5	-	-	1	2	12	1	29	
	R. Kjær	H. M. S. Michael Sars	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	29	-	30	
	Frebold	Collier	-	-	-	-	1	-	-	-	-	-	-	2	-	-	-	-	-	-	3	
	Horn	M/C Bratvaag	-	-	-	-	1	-	1	1	-	-	-	-	-	-	-	-	14	-	17	
1931	Hoel	M/C Polarbjørn	1	3	1	1	1	-	1	1	1	1	-	8	-	-	3	9	2	32		
	Th. Vogt	M/C Heimen	-	1	-	-	1	-	1	-	-	-	-	-	-	-	1	-	8	-	12	
	Tornøe	S/S Signalhorn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	9	-	10		
	R. Kjær	H. M. S. Michael Sars	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	26	-	28		
1932	Orvin	M/C Polarbjørn	1	2	1	1	2	1	1	1	2	-	3	1	7	-	1	3	13	1	41	
	Horn	M/C Veslemari	-	-	1	-	1	-	1	-	-	-	-	-	-	-	-	10	1	14		
	Devold and Scholander	M/C Polaris	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	7	-	9		
	Koller	Collier	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
	R. Kjær	H. M. S. Fridtjof Nansen	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	70	-	71		
1933	Hoel	M/C Polarbjørn	-	3	2	-	1	1	1	-	-	1	-	10	-	-	-	12	-	31		
	Orvin	M/C Polarbjørn & Collier	-	-	-	-	-	-	-	-	-	-	-	-	-	14	-	-	-	2	16	
1934	Andresen	M/C Sælbarde	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	10		
	Engeset	M/C Brandal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-	7		
1935	E. Kjær	S/S Veslekari	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	
	Hermansen	"	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	11	-	11		
	v. Krogh	S/S Korsvik	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
	Myklebust	S/S Buskø	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-	11		
	Olsen	S/S Veslekari	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-	11		
	Aksnes	M/C Signalhorn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	-	14		
1936	Hoel	M/C Polarbjørn	-	2	2	-	2	-	-	-	-	5	1	7	-	-	-	14	-	33		
	Merckoll	S/S Heimland I	-	1	-	-	-	1	-	-	-	-	-	1	-	-	1	-	10	-	14	
	Johannessen	S/S Selis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18	-	18		
	Bergesen	M/C Isbjørn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-	12		

In 1928 Hoel took part as guest in the Russian "Krassin"-Expedition to the rescue of Nobile.
S/S=denotes steamship; M/C= motor-cutter; H. M. S.=vessel of the Norwegian Navy.

3. Particulars of Vessels.

Name	Owner, Home Port	When built, Material	Length	Breadth in feet	Draught	Reg. tonnage		Engine	Year used by NSIU
						Gross	Net		
Michael Sars ..	Norwegian Navy	1900, steel	126.3	23.2	10.9	207	90	Steam	1928, 1929, 1930, 1931
Veslekari	Elling Aarseth, Ålesund	1918, wood	125.1	27	14.2	282	154	Steam 357 H. P.	1929, 1930, 1935
Blue Jacket ...	Victor Arnesen, Tromsø	1888, wood	70.3	18.5	9	65	29	Motor 107 H. P. (Avance)	1929
Hvalrossen	Konrad Nerheim (Molde); Ålesund	1912, wood	105.5	23.6	10.6	146.1	74.1	Steam 125 H. P.	1929
Bratvaag	Harald M. Leite, Ålesund	1921, wood	81	20	9.5	95	32	Motor 120 H. P. (Bollinder)	1930
Polarbjørn	Martin Karlsen, Brandal	1919, wood	135	26.1	12--16	326	130	Motor 360 H. P. (Polar Diesel)	1931, 1932, 1933, 1936
Heimen	Brødrene Jakobsen, Tromsø	1927, wood	97	22	8.5-12	127	52	Motor 230 H. P.	1931
Signalhorn	Martin Karlsen, Brandal	1915, wood	108	21	8-14	108	34	Steam 75 H. P. 1933: Motor 150/200 H. P.	1931, 1935
Vestlemari	Elling Aarseth & Co, Ålesund	1923, wood	96	21.9	10.3	113	43.9	Motor 100 H. P. (Wickman)	1932
Fridtjof Nansen	Norwegian Navy	1931, steel	239.3	34.7	16.7	1		Steamturbine 2000 S. H. P.	1932
Polaris	Martin Karlsen, Brandal	1914, wood	105	23.5	10--15	150	abt. 50	Steam 80 H. P. 1935: Motor 360 H. P.	1932
Sælbarden ²	Elling Aarseth, Ålesund	1908, wood	102	23.6	12.1	127	42	Motor 160 H. P. (Bollinder)	1934
Brandal	Martin Karlsen, Brandal	1910, wood	90	21	9-14	90	40	Motor 90/140 H. P.	1934
Korsvik	Bogen & Johnsen, Oslo	1883, iron			16.5	1067	624	Steam 573 H. P.	1935
Buskø	Elling Aarseth, Ålesund	1926, wood	105	22.7	10.7	158	68	Steam 135 H. P.	1935
Isbjørn	W. Holmboe, Tromsø	1918, wood	90	24.5	12-14	172	58	Motor 220 H. P.	1936
Selis	I. Aurstad, Tromsø	1918, wood	103.8	23.4	12-14.5	172.13	77.70	Steam 120 H. P.	1936
Heimland I ...	Brødrene Jakobsen, Tromsø	1919, wood	99	25	8.5--12	167	65	Steam 110 H. P.	1936

1 Displacement 1700 tons (max.).

2 Shipwrecked in 1937.

4. Office Personnel.

Year	Leader	Secretary	Geologists	Topo- graphic surveyors and draftsmen	Hydro- graphic surveyor	Assistants	Total
1926—1927	1	1	2	4	-	2	10
1927—1928	1	1	2	3	-	3	10
1928—1929	1	1	2	3	-	3	10
1929—1930	1	1	2	2	1	4	11
1930—1931	1	1	2	3	1	4	12
1931—1932	1	1	2	3	1	4	12
1932—1933	1	1	2	3	1	4	12
1933—1934	1	1	2	3	1	4	12
1934—1935	1	1	2	3	1	4	12
1935—1936	1	1	2	3	1	4	12
1936—1937	1	1	2	4	-	4	12

5. Instruments.

As to the instruments used for topographical surveying, construction of maps, hydrographic surveying, oceanographic work, and magnetic observations we refer to Hoel, *The Norwegian Svalbard Expeditions 1906—1926*, Skrifter No. 1, p. 77. The following list includes only instruments purchased, borrowed, or hired since 1926.

Astronomical Work.

- 1) The Prin transit (French), greater type, constructed 1929, with impersonal (self-registrating) micrometer, and special arrangement for use of Horrebow-Talcott's method for latitude.
- 2) A radio-registrator, manufactured at Norges Geografiske Opmåling, for directly registering of wireless time-signals.
- 3) A Chronograph (chiefly American pattern), also manufactured in Norway.
- 4) A box chronometer, arranged with compensation balance by the Norwegian watch- and chronometermaker Ingeberg.
- 5) A 1st order Bamberg theodolite, for linking the astronomical station with the geodetical net.
- 6) A set of Nife-accumulators.

For particulars see:

Jelstrup, Hans S., *Déterminations astronomiques de Mygg-Bukta au Grønland Oriental*. Oslo 1932. — Skr. om Svalbard og Ishavet, No. 50, pp. 6—10.

All these instruments were placed at our disposal by "Norges Geografiske Opmåling".

Topographical Surveying.

Theodolites.

Year of purchase	Firm	No.	Magnification ×	Diameter in cm		Reading to (abt.)	
				Hor. circle	Vert. circle	Hor. circle	Vert. circle
1929	A.-G. Heinrich Wild, Heerbrugg — » — ¹	148	24, 30, 40	14	9.5	1 ^{cc}	1 ^{cc}
1931		3105	24	9.5	5	10 ^{cc}	10 ^{cc}

Photo-theodolite and Serial Air Survey Camera.

Year of purchase or use	Firm	Type	No.	Size cm	Objective		Focal length cm
					Type	Aperture	
1931	Sigurd Baalsrud, Oslo	Photo-theodolite Ser. air surv. camera — » —	1133	10×15	Zeiss Tessar	1 : 4.5	16.91
1932	Zeiss-Aerotopograph, Jena ²		24565	18×18	Mess-Flieger-	1 : 4.5	20.57
1936	— » — ³		46467	18×18	Zeiss Orthometar	1 : 4.5	21.071

Plane Table Instruments.

Year of purchase	Firm	No.	Magnification ×	Diameter in cm Vert. circle	Reading to (abt.) Vert. circle
1931	Sigurd Baalsrud, Oslo	1134	27	15.5	1 ^c

Stereo-plotting Machines.

Zeiss-von Orel Stereoaograph model 1914, No. 11309. Hired occasionally 1920—1929, Kartkontoret Stereografik A/S, Oslo.

— — — model 1914, No. 11313. Hired 1931, Norges Geografiske Opmåling.

Hugershoff Autokartograph model 1924, No. 9195. Hired 1932, Technische Hochschule, Berlin.

Zeiss-Bauersfeld Stereoplanigraph model C/4 1930, No. 37135. Hired 1932, Deutsche Versuchsanstalt für Luftfahrt, Berlin.

¹ Used along with photo-theodolite No. 1133.

² Hired from Hansa Luftbild, G. m. b. H., Berlin.

³ Belongs to Norges Svalbard- og Ishavs-undersøkelser and Norges geografiske Opmåling.

Zeiss-Bauersfeld Stereoplanigraph model C/4 1930, No. 37135. 1933—1935,¹ Deutsche Versuchsanstalt für Luftfahrt, Berlin.

— — — model C/3 1928, No. 23413. 1933—1934,¹ Hansa Luftbild, G. m. b. H., Berlin.

— — — model C/5 1936, No. 37151. Purchased 1936 by NSIU and Norges Geografiske Opmåling jointly.

Zeiss Klapp-Spiegelstereoskop with Zeichenstereometer. Purchased 1935 by NSIU.

Coordinatograph. Working area: 100×110 cm. Purchased 1927 from Sigurd Baalsrud, Oslo.

Hydrographic Surveying.

Tide-gauge automatic, American type, Julien Friez, Baltimore, purchased 1929.

Sextant with Mercury artificial horizon.

Echo sounder, type Atlas on board H. M. S. Fridtjof Nansen and type British Admiralty Magneto Striction Recorder MS III on board S/S Veslekari and on board S/S Korsvik and M/C Polarbjørn 1936.

Magnetic Observations.

Declinatorium Carl Bamberg, Berlin 1930. Lent from the Hydrographic Survey of Norway, Oslo.

6. Astronomical Stations.

Year	Situation	Observer	Lat. North	Long. East	Det. of azimuth
1931	Myggbukta, North-East Greenland	H. S. Jelstrup	73 29 26.46	21 34 23.40	H. S. Jelstrup
1932	Sabineøya, North-East Greenland	H. S. Jelstrup	74 32 12.39	18 50 42.15	H. S. Jelstrup
1935	Biscayerhukken, Spitsbergen	H. S. Jelstrup ²	.	.	.

7. Base Lines.

Measured with Invar wire under a tension of 10 kilogrammes.

Year	Situation	Measured by	Length in m	Average error of two measurements
1929	Myggbukta, North-East Greenland	W. Solheim, B. Luncke	1019.9304	± 0.0032
1933	Sabineøya, North-East Greenland	W. Solheim, B. Luncke	1025.3341	± 0.0059

¹ Joint undertaking with NSIU.

² Not NSIU expedition, but special astronomical expedition led by Jelstrup.

8. Datum Points for the Computation of Altitudes.

Year	Locality	Method of measurement	Observer
<i>Svalbard.</i>			
1928	At trigonometric point Le 13 on the west side of Møllerhamna	Mean water level found by readings on a staff during 2 days.	W. Solheim
1930	Austervåg, Bjørnøya	Automatic tide gauge during 30 days	R. Kjær
1936	Virgohamna	Readings on staff 88 hours.	Th. Askheim
<i>North-East Greenland.</i>			
1929	At the astronomical point in Myggbukta (determined later)	Mean water level found by reading a staff during 2 days	W. Solheim
1931	Trigonometric point Sm 1 at the north coast of Homes Forland	— → — 1 *	— → —
1933	Water level station connected up with eastern base point Germania-hamn, Sabineøya	Mean water level by reading a staff 4 1/2 days	B. Luncke W. Solheim
1933	Trigonometric point Le 28 at Strømhytta, Geographical Societyøya	— → — 1 1/2 *	T. Askheim
1933	At trigonometric point in Tidevannskjeila, vesle Finschøya	Automatic tide gauge during 30 days	R. Kjær
<i>South-East Greenland.</i>			
1932	Finnsbu, north of Skjoldungen (tidal measurement only)	Reading a staff during 28 days	Finn Devold

9. Methods Used by the Topographical Survey.

Previously the terrestrial stereo-photogrammetry was the chief survey method. Since 1932, when air photogrammetry was employed for the first time by us, this has changed. The former method is now generally used only to obtain foundation, control points, for the construction of the air photograms.

The photogrammetric survey of coastal topography from a vessel, formerly employed, has now been made superfluous by the air method.

The measurement of coast lines with theodolite ("depression" method) is carried out as before, and gives also control points for the air survey.

The field work of the topographic survey consists in: astronomical determination of latitude, longitude, and azimuth; measurement of base line (astronomical determination and base line measurement to be done for every 80—140 km); main and secondary triangulation; levelling; trigonometric determination of elevations; photogrammetric and stereo-photogrammetric detail survey (aerial and terrestrial); survey of coast lines; determination of prominent control points; tacheometer measurements; building of cairns and other signals to mark the trigonometrical chief points; also tidal observations to fix the mean water level.

The office work consists in computations and other working up of the observations, arrangement, and numbering of the photographic material, construction of maps from the terrestrial and air photogrammetric material (using almost exclusively the automatic plotting apparatus), plotting of “depression” and tacheometer measurements, and finally map drawing, reproduction, and printing of the maps.

10. Details of Topographical Field Work.

Year	Topographic surveyors	Assistants	Trig. stations with photographs Number of		Trig. stations without photographs	Tacheometer stations	Photogr. sea stations Number of		Air photogrammetric Work Number of		Cairns built	Coast outlines Length measur. km	Area mapped in sq. km	
			Trig. st.	Photograms			Stations	Photograms	Series	Photograms			Terrestrial ¹	Photographs from the air
<i>Svalbard.</i>														
1928	Koller	2	43	163	1	1	23	69	-	-	4	-	-	-
	Luncke	2	21	177	4	9	7	32	-	-	12	-	-	-
	Solheim	2	23	170	2	6	-	-	-	-	10	-	-	-
	<i>Total</i>		87	510	7	16	30	101			26	300	560	
1929	O. Staxrud	2	-	-	-	-	-	-	-	-	16	-	-	-
1932	Koller	2	11	42	-	-	-	-	-	-	-	-	-	-
1933	Solheim	2	-	-	-	13	-	-	-	-	-	-	-	-
1936	Luncke	-	-	-	-	-	-	-	69	3300	-	-	-	-
	Askheim	2	5	35	3	-	-	-	-	-	13	30	-	-
	Koller	1	-	-	2	2	32	47	-	-	1	-	-	-
	Solheim	2	23	171	6	2	-	-	-	-	10	60	-	-
<i>Total</i>		28	206	11	4	32	47	69	3300	24	90	-	40000	
Total			126	758	18	33	62	148	69	3300	66	390	560	40000
<i>North-East Greenland.</i>														
1929	Luncke	2	20	155	2	-	14	45	-	-	14	-	-	-
	Solheim	2	17	122	8	-	10	18	-	-	16	-	-	-
	Orvin	-	-	-	-	-	24	110	-	-	-	-	-	-
	<i>Total</i>		37	277	10	-	48	173	-	-	30	500	2000	-
1931	Askheim	1	1	5	3	28	14	36	-	-	3	-	-	-
	Luncke	2	32	188	1	-	3	6	-	-	13	-	-	-
	Solheim	2	27	197	6	10	-	-	-	-	15	-	-	-
	<i>Total</i>		60	390	10	38	17	42	-	-	31	330	2500	-
1932	Bundermann	-	-	-	-	-	-	-	45	2109	-	-	-	-
	Askheim	2	16	133	1	5	18	36	-	-	13	-	-	-
	Solheim	2	36	228	5	-	-	-	-	-	11	-	-	-
	<i>Total</i>		52	361	6	5	18	36	45	2109	24	410	2200	30000
1933	Askheim	2	20	191	4	4	-	-	-	-	10	-	-	-
	Luncke	3	18	129	13	9	-	-	-	-	8	-	-	-
	Solheim	2	23	136	5	14	-	-	-	-	6	-	-	-
	<i>Total</i>		61	456	22	27	-	-	-	-	24	640	2500	-
Total		210	1484	48	70	83	251	45	2109	109	1880	9200	30000	

South-East Greenland.

1931	Vogt and Lundbom	Sketch surveys										980	
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¹ These areas are included in the air survey areas, as the methods supplement each other.

Summary of Topographical Field Work.

Year	Region	Area in sq. km	
		Terrestrial mapping ¹	Photographed from the air
1906—1926	Svalbard	18 083	
1928—1936	—»—	560	40 000
1929—1933	North-East Greenland	9 200	30 000
1906—1936	<i>Total</i>	27 843	70 000

11. Topographically Surveyed Areas.

(Map p. 63.)

Year	Expeditions	Area	Surveying staff	Area mapped sq. km	
				Terrestri- cally ¹	From the air
<i>Svalbard.</i>					
1928	Koller	Northwards from K. Thordsen. Coastal area between Revneset and Diabasodden, and W of Kapp Smith	Koller	160	
	Luncke Solheim	Prins Karls Forland and surroundings of Engelskbukta, Kongsfjorden and Krossfjorden	Luncke Solheim	400	
1932	Koller	Survey of 10 glacier fronts at Is-, Kongs- and Krossfjorden	Koller		
1936	Hoel	3 300 air photos of West-Spitsbergen, Edgeøya, Barentsøya, and adjacent islands	Luncke Wendelbo Sivertsen		40 000
		Geodetic work on the coast between Raud- and Krossfjorden, NW-area of Spitsbergen	Solheim Askheim		
		Various reconnaissance work in East Spitsbergen and Kong Karls Land	Koller		
				560	40 000

¹ Included in the air-surveyed areas, as the methods supplement each other.

11 (continued).

Year	Expeditions	Area	Surveying staff	Area mapped sq. km	
				Terrestri- cally ¹	From the air
<i>North-East Greenland.</i>					
1929	Orvin	Myggbukta with surroundings. Eastern part of Ymerøya. A little at Kapp Wynn and Herschelfjellet	Luncke Solheim	2 000	
1931	Hoel	Southern part of Claveringøya. Country west of Loch Fine, and south of Claveringfjorden with Homes Forland and Hold with Hope	Askheim Luncke Solheim	2 500	
1932	Orvin	Western part of Claveringøya and country west of Rudi-, Copeland- and the inner end of Claveringfjorden. Gauss-halvøya, SW part of Hudsonland, country W of Nordfjorden and northern part of Ymerøya	Askheim Solheim	2 200	
		The air-surveyed area extends southwards to across Trailløya, Suessland, and Frænkhalvøya, in the W across Andréeland, Stenoland, and Payerland, northwards to across Lindemanbukta and Claveringstredet	Bundermann Storm		30 000
1933	Hoel	Wollaston Forland, Sabineøya, Pendulumøya and northern part of Claveringøya. SE part of Ymerøya, N and E part of Geographical Societyøya and N part of Trailløya	Askheim Luncke Solheim	2 500	
				9 200	30 000

¹ Included in the air-surveyed areas, as the methods supplement each other.

12. Hydrographically Surveyed Areas.

(Map p. 57).

Year	Field	Hydrographic surveyors	Ships officers	Surveyed areas sq. km	Echo-sounding Naut. miles
1928	Bear Island waters	A. Hermansen Rolf Kjær	C. J. Willoch Trygve Sundt G. L. Køste	58300.00	
1929	— „ —	Rolf v. Krogh Fr. Vogt	W. Landgraff G. Heesch O. Kullmann A. Sørensen		
1930	— „ —	Rolf Kjær	P. L. Münster Leif Jansen Erling Kjær		
1931	— „ —	Rolf Kjær	Th. Thommessen T. S. Briseid H. Henriksen Jon Seip		
1932	— „ —	Rolf Kjær	J. L. Høst A. Gunvaldsen F. T. Ulstrup H. Bjørnstad Rolf Haga		
1933	West Spitsbergen, harbour chart of Kapp Linné	Rolf Kjær			
1930	North-East Greenland, Mackenziebukta, mouth of Dusén- fjorden, head of Moskusoksefjorden	Rolf v. Krogh	Paul Lillenes	300.00	
1931	North-East Greenland, mouth of Frans Josef Fjord	Rolf v. Krogh	Kr. Marø	1150.00	
1932	North-East Greenland, Loch Fine, Clavering- fjorden, Gael Hamke- bukta	Rolf v. Krogh	Kr. Marø	970.00	
1932	South-East Greenland, 3 harbours	Erling Kjær	M. Pilskog	1.2	
1933	North-East Greenland Claveringfjorden, Gael Hamkebukta, outer coast from Kapp Herschel to Bontekoe, Antarctichamna	Rolf v. Krogh Rolf Kjær	Kr. Marø	1068.00 2525.00	
				6014.2	
1935	The sea west of Spits- bergen	Erling Kjær A. Hermansen Odd Bostrøm	Johan Olsen	28000.00	1860
1935	Davis Strait	Rolf v. Krogh	Severin Roald		2985
1936	Different localities in Svalbard waters	Rolf v. Krogh Odd Bostrøm	Kr. Marø		525

Summary of Hydrographically Surveyed Areas.

Year	By expeditions to	Area surveyed sq. km	Distance sounded with echo sounder Nautical miles
1928-1936	Svalbard waters	58300.00	-
	Echo soundings 1935	28000.00	2385
	North-East Greenland waters	6014.20	-
	Davis Strait	-	-
	Echo soundings 1935	-	2985
<i>Total</i>		<i>92314.20</i>	<i>5370</i>

1907-1925	Svalbard	16196.68
1928-1936	Svalbard and North-East Greenland	92284.20
<i>Total</i>		<i>108480.88</i>

13. Beacons, Lights, and Wireless Stations.

Year	Location	Beacon Light Wireless station	Name	Built by
1931	Bontekoe, North-East Greenland	Beacon	Bontekoe Beacon	Hoel
1931	Mackenziebukta, North-East Greenland	Extension of wireless station	Myggbukta	Hoel
1932	Lindenowfj.—Øyfi., South-East Greenland	Moving of wireless station from L. to Ø.	Torgilsbu	G. Horn
1933	Kapp Linné, Spitsbergen	Light	Isfjord Fyr	A. K. Orvin
1933	Festningen (Isfj.), Spitsbergen	Light	Festningen Fyrlampe	A. K. Orvin
1933	Vestpynten (Isfj.), Spitsbergen	Light	Vestpynten Fyrlampe	A. K. Orvin
1933	Kapp Linné (Isfj.), Spitsbergen	Wireless station	Isfjord Radio	A. K. Orvin
1936	Forlandsundet, Spitsbergen	4 floating sparbuoys		v. Krogh
1936	Festningen, Spitsbergen	2 floating sparbuoys		v. Krogh
1936	Kapp Heer (Isfj.), Spitsbergen	1 floating sparbuoy		v. Krogh
1936	Ministerbåen, Sassenfjorden, Spitsbergen	1 floating sparbuoy		v. Krogh
1936	Moffen, Spitsbergen	Beacon		Hoel
1936	Amsterdamøya, Spitsbergen	Beacon		v. Krogh
1936	Fuglehuken, Spitsbergen	Beacon (rebuilt)		v. Krogh
1936	Poolepynten, Spitsbergen	Beacon (rebuilt)		v. Krogh

14. Oceanographic Work.

Year	Observer vessel	Section	Stations	Sets of observations
<i>East Greenland.</i>				
1931	Anton Jakhelln, M/C Polarbjørn	-	21	195
1932	Anton Jakhelln, M/C Polarbjørn	-	28	272
<i>Svalbard.</i>				
1930	Rolf Kjær, H. M. S. Michael Sars	5	44	342
1931	Rolf Kjær, H. M. S. Michael Sars	Bjørnøya— Sørkapp	6	32

Summary of Oceanographic Work.

Years	Region	Stations	Sets of observations
1910—1925	Svalbard	184	1688
1930—1932	Svalbard and East Greenland	99	841
1910—1932	<i>Total</i>	283	2529

15. Number of Expeditions 1906—1936.

Svalbard 1906—1926 ¹	21
Svalbard 1928—1936	12
Svalbard and Frans Josef Land 1929—1930 ..	2
North-East Greenland 1929—1936	8
South-East Greenland 1931—1936	7
Davis Strait	1
Total	51

¹ See No. 1 of this publication series.

16. Number of Photographs Taken by the Staff of Norges Svalbard- og Ishavs-undersøkelser.

Svalbard and Frans Josef Land			North-East Greenland		
Year	Photos for surveying	Photos for other purposes	Year	Photos for surveying	Photos for other purposes
1928	611	73	1929	450	208
1929	-	54	1930	36	156
1930	-	211	1931	432	303
1932	42	-	1932	2530	260
1933	-	48	1933	456	102
1936	3506	486			
1928—1936	4159	872	1929—1933	Total 3904	1029
1906—1926	9340	3729			
1906—1936	Total 13499	4601			

South-East Greenland.		
Year	Photos for surveying	Photos for other purposes
1931	-	535 ¹
1932	-	212 ¹
		747

Grand Total 1906—1936: 23780.

17. Papers and Maps Published 1929—1936.

Papers	Number of papers	Pages	Plates	Maps	Text-figures	
Resultater av de Norske Statsunderstøttede Spitsbergenekspedisjoner and Skrifter om Svalbard og Ishavet, Nr. 1, 14, and 24—67	46	2 881	202	30	539	
Norges Svalbard- og Ishavs-undersøkelser Meddelelser printed from 1926 to 1936, Nr. 1—35	35	1 058	13	18	161	
	1929—1936	81	3 939	215	48	700
	1911—1929	37	2 170	366	51	366
<i>Total 1911—1936</i>	<i>118</i>	<i>6 109</i>	<i>581</i>	<i>99</i>	<i>1 036</i>	

Maps and Charts.

Charts	9
Maps (2 printed 1925)	37

¹ Partly for surveying purposes.

In the period 1929—1936 the following papers have been published:

In the Series Skrifter om Svalbard og Ishavet:

- Nr. 1. Hoel, A. The Norwegian Svalbard expeditions 1906—1926. 1929.
- » 14. Kjær, R., and J. E. Fjeldstad. Tidal observations in the Arctic. 1934.
- » 24. Heritsch, F. Eine Caninia aus dem Karbon des de Geer-Berges im Eisfjordgebiet auf Spitzbergen. 1929.
- » 25. Abs, O. Untersuchungen über die Ernährung der Bewohner von Barentsburg, Svalbard. 1929.
- » 26. Frebold, H. Untersuchungen über die Fauna, die Stratigraphie und Paläogeographie der Trias Spitzbergens. 1929.
- » 27. Thor, S. Beiträge zur Kenntnis der invertebraten Fauna von Svalbard. 1930.
- » 28. Frebold, H. Die Altersstellung des Fischhorizontes, des Grippianiveaus und des unteren Saurierhorizontes in Spitzbergen. 1930.
- » 29. Horn, G. Franz Josef Land. Natural history, discovery, exploration, and hunting. 1930.
- » 30. Orvin, A. K. Beiträge zur Kenntnis des Oberdevons Ost-Grönlands. — Heintz, A. Oberdevonische Fischreste aus Ost-Grönland. 1930.
- » 31. Frebold, H. Verbreitung und Ausbildung des Mesozoikums in Spitzbergen. 1930.
- » 32. Abs, O. Über Epidemien von unspezifischen Katarrhen der Luftwege auf Svalbard. 1930.
- » 33. Kiær, J. Ctenaspis, a new genus of cyathaspidian fishes. 1930.
- » 34. Tolmatchew, A. Die Gattung Cerastium in der Flora von Spitzbergen. 1930.
- » 35. Sokolov, D., and W. Bодylevsky. Jura- und Kreidefaunen von Spitzbergen. 1931.
- » 36. Smedal, G. Acquisition of sovereignty over Polar areas. 1931.
- » 37. Frebold, H. Fazielle Verhältnisse des Mesozoikums im Eisfjordgebiet Spitzbergen. 1931.
- » 38. Lyngе, B. Lichens from Franz Josef Land. 1931.
- » 39. Hanssen, O., and J. Lid. Flowering plants of Franz Josef Land, collected on the Norwegian scientific expedition 1930. 1932.
- » 40. Kiær, J. †, and A. Heintz. The Downtonian and Devonian Vertebrates of Spitsbergen. V. Suborder *Cyathaspida*. 1935.
- » 41. Lyngе, B., and P. F. Scholander. Lichens from North-East Greenland. 1932.
- » 42. Heintz, A. Beitrag zur Kenntnis der devonischen Fischfauna Ost-Grönlands. 1931.
- » 43—46. Bjørlykke, B. Some vascular plants from South-East Greenland. Collected on the "Heimen" expedition in 1931. Preliminary report. — Lid, J. Vascular plants from South-East Greenland. — Lyngе, B. Lichens from South-East Greenland. — Omang, S. O. F. Beiträge zur Hieraciumflora Ost-Grönlands. 1932.

- Nr. 47. Lyngé, B. A revision of the genus *Rhizocarpon* (Ram.) Th. Fr. in Greenland. 1932.
- » 48. Vaage, J. Vascular plants from Eirik Raude's Land. 1932.
- » 49. Schaanning, H. Tho. L. 1. A contribution to the bird fauna of East Greenland. 2. A contribution to the bird fauna of Jan Mayen. — Zool. res. Norw. sc. exp. to East Greenland. I. 1933.
- » 50. Jelstrup, H. S. Détermination astronomique de Mygg-Bukta au Grønland Oriental. 1932.
- » 51. Birkeland, B. J., et Georg Schou. Le climat de l'Eirik-Raude-Land. 1932.
- » 52. Kiær, J. †. The Downtonian and Devonian Vertebrates of Spitsbergen. IV. Suborder *Cyathaspida*. Preliminary report. 1932.
- » 53. 1. Malaise, A. Eine neue Blattwespe. 2. Roman, A. Schlupfwespen. 3. Ringdahl, O. Tachiniden und Musciden. 4. Goetghebuer, M. Chironomides du Grønland Oriental, du Svalbard et de la Terre de François Joseph. — Zool. res. Norw. sc. exp. to East Greenland. II. 1933.
- » 54. Vartdal, H. Bibliographie des ouvrages norvégiens relatifs au Grønland (Y compris les ouvrages islandais antérieurs à l'an 1814). 1935.
- » 55. Omang, S. O. F. Übersicht über die Hieraciumflora Ost-Grönlands und Bemerkungen betreffend zwei Monstrositäten des Hieracium Alpinum (L.) Backh. 1933.
- » 56. Devold, J., and P. F. Scholander. Flowering plants and ferns of South-East Greenland. 1933.
- » 57. Orvin, A. K. Geology of the Kings Bay Region, Spitsbergen. 1934.
- » 58. Jelstrup, H. S. Détermination astronomique à Sabine-Øya au Grønland Oriental. 1933.
- » 59. Lyngé, B. On *Dufourea* and *Dactylina*. Three Arctic lichens. 1933.
- » 60. Vogt, Th. Late-Quaternary oscillations of level in South-East Greenland. 1933.
- » 61. 1. Burton, M. Report on the Sponges. 2. Zimmer, C. Die Cumaceen. — Zool. res. Norw. sc. exp. to East Greenland. III. 1934.
- » 62. Scholander, P. F. Vascular plants from Northern Svalbard. 1934.
- » 63. Richter, S. A contribution to the archæology of North-East Greenland. 1934.
- » 64. Solle, G. Die devonischen Ostracoden Spitzbergens. 1935.
- » 65. 1. Friese, H. Apiden. 2. Lindberg, H. Hemiptera. 3. Linnaniemi, W. M. Collembolen. — Zool. res. Norw. sc. exp. to East Greenland. IV. 1935.
- » 66. 1. Nordenstam, Å. The Isopoda. 2. Schellenberg, A. Die Amphipoden. 3. Sivertsen, E. Crustacea Decapoda, Auphausidacea, and Mysidacea. — Zool. res. Norw. sc. exp. to East Greenland. V. 1935.
- » 67. Jakhelln, A. Oceanographic investigations in East Greenland waters in the summers of 1930—1932. 1936.

II. Norges Svalbard- og Ishavs-undersøkelser. Meddelelser:

- Nr. [1.] Pettersen, K. Isforholdene i Nordishavet i 1881 og 1882. Med en innledning av Adolf Hoel. — Særtr. av Norsk geogr. tidsskrift. B. 1. H. 4.
- » [2.] Hoel, A. Om ordningen av de territoriale krav på Svalbard. 1928. — Særtr. av Norsk geogr. tidsskrift. B. 2. H. 1.
- » [3.] Hoel, A. Suverænitetssspørsmålene i polartraktene. 1928. — Særtr. av Nordmands-forbundet. Aarg. 21. H. 4. 5.
- » [4.] Broch, O. J., E. Fjeld og A. Høygaard. På ski over den sydøstlige del av Spitsbergen. 1928. — Særtr. av Norsk geogr. tidsskrift. B. 2. H. 3—4.
- » [5.] Tandberg, R. S. Med hundespenn på eftersøking efter „Italia“-folkene. 1928. — Særtr. av Norsk geogr. tidsskrift. B. 2. H. 3—4.
- » 6. Kjær, R. Farvannsbeskrivelse over kysten av Bjørnøya. 1929.
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- Greenland Case. Much of the material in the Norwegian Counter-Case and Rejoinder was prepared by the NSIU (see p. 33).
- Hoel, Adolf. The discovery of King Karls Land, Spitsbergen. — Geographical review. Vol. 25. No. 3. N. Y. 1935. Pp. 476—78.
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- Nordmennene opnar Karahavet. Ein viktug bolk av ishavssoga vår. — Norsk årbok. Bergen 1934. Pp. 43—53.
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- Record, Polar. Yearly expedition accounts see Literature p. 89.
- [Sindballe, Kristian.] Report of the Svalbard Commissioner concerning the claims to land in Svalbard. Part I. A.: Text; I. B.: Maps; II. A.: Text; II. B.: Maps. Copenh. and Oslo 1927. 52 pp., 33 maps.

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- Nr. S. 1. Bjørnøya 1:40 000. 1932.
 » S. 2. Bjørnøysfarvatnet. 1:350 000. 1930.
 » S. 3. Frå Bellsund til Forlandsrevet med Isfjorden. 1:200 000. 1932.
 » S. 5. Norge—Svalbard, Northern Sheet. 1:750 000. 1933.
 » S. 6. Norge—Svalbard, Southern Sheet. 1:750 000. 1933.
 » S. 7. Nordsvalbard.. 1:600 000. 1934.
 » S. 8. Kongsfjorden og Krossfjorden. 1:100 000. 1934.
 » S. 9. Frå Sørkapp til Hamburgbukta. 1:350 000. 1936.

Sailing Directions:

Bjørnøya. 1929 (= Meddelelse. Nr. 6).
 Norge — Bjørnøya — Spitsbergen.¹

The following topographical maps have been published:

Bjørnøya. 1:25 000. 1925.²
 Bjørnøya. 1:10 000 (in six sheets). 1925.²
 Austgrønland. Eirik Raudes Land frå Sofiasund til Youngsund. 1:200 000. 1932.
 Eirik-Raudes-Land. 1:1 000 000. [1932.]
 Svalbard. 1:2000 000. 1937 (at the back of this paper).

A preliminary edition of topographical maps (1:50 000) covering the regions around Kongsfjorden, Isfjorden, and Bellsund published in:

[Sindballe Kristian.] Report of the Svalbard Commissioner concerning [etc.] Copenhagen and Oslo 1927 (see above).

¹ Preliminary mimeographed edition 1923. Not included in the Expedition account 1906—1926 (No. 1 of this series).

² Not included in the Expedition account 1906—1926.

18. Contributions (in Norw. Kroner).

Year	The Norwegian Government	Scientific funds and private subscribers ¹	Total
1927 (1927/28)	20 000.00	1 200.00	21 200.00
1928.....	140 088.90 ²	-	140 088.90
1929.....	251 359.71 ³	46 307.63	297 667.34
1930.....	201 095.53 ⁴	16 395.19	217 490.72
1931.....	155 067.98 ⁵	31 430.00	186 497.98
1932.....	214 300.00	56 575.07	270 875.07
1933.....	267 858.21 ⁶	3 100.00	270 958.21
1934.....	161 317.87	2 000.00	163 317.87
1935.....	244 830.60	2 225.00	247 055.60
1936.....	188 203.12	3 742.50	191 945.62
1927—1936..	1 844 121.92	162 975.39	2 007 097.31
1906—1927..	1 458 010.20 ⁷	417 719.83	1 875 730.03
1906—1936..	3 302 132.12	580 695.22	3 882 827.34

Distribution of the total sum 1906—1936 on the different kind of works.

Scientific expeditions, working up of material, publishing of maps and papers. Office expenses of NSIU	3 073 501.53
Practical works: large-scale geological mapping, drilling for coal companies, etc.....	567 311.81
Meteorological stations: expeditions and running expenses. Erection of wireless station and lights	242 014.00
Total	3 882 827.34

¹ See special list on p. 123.

² Of this sum Kr. 57 474.68 is for deep drilling on the coal-field of the Kings Bay Kul Comp. A/S; and Kr. 30 000.00 is State Lottery money also included in the Kr. 250 000.00 listed in Hoel: *The Norwegian Svalbard Expeditions 1906—1926. Skrifter om Svalbard og Ishavet No. 1.* Oslo 1929. P. 101.

³ Of this sum Kr. 130 000.00 is State Lottery money included in the Kr. 250 000.00 listed in Hoel (1929) p. 101. Kr. 5000 is for the transfer of musk-oxen.

⁴ Of this sum Kr. 78 880.90 is State Lottery money included in the Kr. 250 000.00 listed in Hoel (1929) p. 101.

⁵ Of this sum Kr. 18 434.55 is money (with interest) from the State Lottery (total Kr. 250 000.00, see Hoel (1929) p. 101).

⁶ Of this sum Kr. 97 939.00 is for the erection of a wireless station and lights at Isfjorden, Spitsbergen ("Isfjord Fyr og Radiostasjon").

⁷ Exclusive of the grants from the State Lottery included in the sum for 1906—1927 in Hoel (1929) p. 101.

Contributions from Scientific Funds and Private Contributions
to the Expeditions in the Period 1927—1936.

1927.

Nansenfondet Kr. 1 200.00

1929.

Mr. Carl A. Høyer, Merchant, Oslo	Kr. 500.00
Dr. Gustav Smedal, Stavanger	500.00
Anon.	5 000.00
Anon.	3 000.00
Mr. J. L. Nerlien, Merchant, Oslo.....	2 000.00
Mr. Haldor Virik, Shipowner, Sandefjord.....	200.00
Mrs. Ingrid Smedal, Stavanger	100.00
Mr. Aksel Bye, Oslo	200.00
Consul E. Berentsen, Stavanger	100.00
Consul Sigvald Bergesen, Stavanger	100.00
Messrs. Holgersen & Hegge, Stavanger.....	100.00
Consul Gust. A. Arentz, Stavanger	100.00
Dr. A. M. Smedsrud, Stavanger	50.00
Mr. Kornelius Olsen, Shipowner, Stavanger...	100.00
Sir Karl F. Knudsen, London	1 000.00
Mr. Fr. Peterson, Merchant, Paris.....	1 000.00
A/S Norsk Varekrigsforsikrings Fond	5 000.00
—»— —»— —»—	5 000.00
	Kr. 24 050.00

Especially for the transfer of Musk-oxen to Spitsbergen.

Anon.	Kr. 100.00
Collected at meeting of Norsk Jæger- og Fiskerforening Dec. 2, 1929:	
Dr. Harald Natvig, Oslo	200.00
Mr. Oluf Wesmann-Kjær, Dentist, Oslo	300.00
Mr. Alb. Kvaal, Director, Oslo	100.00
Sundry contributors	57.43
Mr. Bredo Diesen, Dentist, Oslo	50.00
Norsk Jæger- og Fiskerforening, Oslo.....	100.00
Vest-Finnmark Jæger- og Fiskerforening	25.00
Mr. P. M. Røwde, Consul-General, Oslo	250.00
Trondhjems Jæger- og Fiskerforening	50.00
Mr. Wedel Jarlsberg, Norwegian Minister in Paris ..	5 000.00
	„ 6 232.43

(The total cost of the musk-oxen transfer was Kr. 15 859.66. As mentioned in foot-note 3 on p. 122 Kr. 5 000.00 was received from the State, contributions especially for the transfer were Kr. 6 232.43, and the rest was covered from the above private contributions to the expeditions in general).

CF Kr. 30 282.43 Kr. 1 200.00

B/F Kr. 30 282.43 Kr. 1 200.00

Contributors in Kind.

Unless otherwise stated, the persons and firms
are residents of Oslo.

A/S De Norske Melkefabriker, milk.	
A/S Norsk Brændselolje, petrol.	
Fellesslakteriet A/S through Director Lütcherath, meat, etc.	
Freia Chocoladefabrik A/S, chocolate and cocoa.	
Carl A. Høyer, Stomatol, toothpaste, etc.	
O. Mustad & Søn, margarine	
Standard, Ltd., Stavanger, canned food.	
Stavanger Preserving Co., Stavanger, canned food.	
Stavanger Sardine Co. A/S, Stavanger, canned food.	
Chr. Bjelland & Co., Stavanger, canned food.	
Sverre Østbye, ski- and boot-grease.	
Campell & Andersen, Bergen, rope.	
Apothekernes Laboratorium A/S, citrinal.	
Norsk-Engelsk Mineralolje A/S, petrol.	
Norsk Skjortefabrik, shirts.	
Conrad Langaard, tobacco.	
A/S Agra Margarinfabrik, margarine.	
Elektricitets-A/S Watt, gramophone records.	
Christiania Glasmagasinet, gramophone.	
Sell & Gurholt A/S, rubber boots.	
Brunswick Grammofon A/S, gramophone records.	
A/S Gyldendal Norsk Forlag, books.	
Oslo Kreds av Norsk Bryggeriforening, beer.	
Stavanger Canning Co. A/S, Stavanger, canned food.	
A/S Vestlandske Petroleum Compagni, Bergen, petroleum.	
Det Nordenfjeldske Dampskibsselskab, Trondheim, steam- ship fares.	
Det Bergenske Dampskibsselskab, Bergen, steamship fares.	
Vesteraalens Dampskibsselskab, Stokmarknes, steamship fares.	
Total value of contributions in kind: „	9 225.20
All private contributions..... „	39 507.63
Store Norske Spitsbergen Kulkompani, ice-patrol work „	4 800.00
“Hird”-expedition to North-East Greenland freight paid „	2 000.00
	„ 46 307.63
1930.	
Mr. Carl J. Christophersen, Merchant, Oslo	Kr. 3 000.00
Aftenposten, Oslo..... „	10 000.00
A/S Agra Margarinfabrik, Oslo } margarine	597.19
Aug. Pellerin fils & Co. A/S, Oslo }	
Oslo Kreds av den Norske Bryggeriforening, beer	„ 298.00
Statens videnskapelige forskningsfond	„ 2 500.00
	„ 16 395.19
	C/F Kr. 63 902.82

<i>1931.</i>		B/F Kr. 63 902.82
Dr. Alf Bjercke, Oslo	Kr. 100.00	
Sunnmørsposten, Ålesund	„ 30.00	
Tiedemanns Tobaksfabrik through Mr. Joh. H. Andresen, Oslo ..	„ 10 000.00	
Mr. Carl J. Christophersen, Merchant, Oslo	„ 2 000.00	
University Anatomical Institute, Oslo	„ 250.00	
Dagbladet, Oslo	„ 500.00	
Agra Margarinfabrik, Oslo	„ 5 000.00	
Indlandsposten, Kongsvinger	„ 150.00	
J. L. Nerlien, Oslo	„ 100.00	
Tiedemanns Tobaksfabrik	„ 3 000.00	
University Anatomical Institute, Oslo	„ 500.00	
Statens videnskapelige forskningsfond	„ 2 500.00	
Nansenfondet	„ 2 000.00	
Universitetets Jubilæumsfond	„ 300.00	
Norsk Varekrigsforsikrings Fond	„ 5 000.00	
	<hr/>	„ 31 430.00
<i>1932.</i>		
Freia Chocoladefabrik, Oslo, chocolate	Kr. 22.50	
Tiedemanns Tobaksfabrik, Oslo through Mr. Joh. H. Andresen ..	„ 20 000.00	
Consul Lars Christensen, Sandefjord	„ 10 601.53	
Money collected in Oslo and Trondheim (“Greenland Col- lection”)	„ 5 451.04	
Nansenfondet	„ 18 000.00	
Nansenfondet	„ 2 500.00	
	<hr/>	„ 56 575.07
<i>1933.</i>		
Nansenfondet	„ 3 100.00	
<i>1934.</i>		
Roald Amundsens Minnefond	„ 2 000.00	
<i>1935.</i>		
Roald Amundsens Minnefond	Kr. 1 500.00	
Mr. Adolf Hoel	„ 725.00	
	<hr/>	„ 2 225.00
<i>1936.</i>		
Nansenfondet	Kr. 2 000.00	
Roald Amundsens Minnefond	„ 1 742.50	
	<hr/>	„ 3 742.50
		<hr/>
	Total 1927—1936	Kr. 162 975.39

Printed January 21, 1938.

PLATES

Plate I.

Spitsbergen. In the foreground Adventfjorden and Longyeardalen with the mining settlement Longyearbyen and the mines. The loading plant on Hotellneset to the right. In the distance Bellsund and the country south of it. In the centre of the picture Nordenskiöldfjellet, 1049 Metres in height. In the foreground, next to the sea, the Cretaceous Formation outcrops. The remaining part of the area consists of Tertiary sandstones and shales with coal-seams at the base. Photograph taken towards southwest from the height of 3000 Metres. It has been reproduced in full to show the four marks which give the inner orientation.

B. Luncke phot. Aug. 4, 1936.



Plate II.

1. Spitsbergen. East side of Edgeøya at Kapp Pechuel-Løsche. The country is built up of flat-lying, soft Triassic shales. In the upper left corner perhaps also Jurassic beds. The cliff to the left has the height of 200—309 Metres. Taken towards west from the height of 3000 Metres.

B. Luncke phot. Aug. 14, 1936.

2. Spitsbergen. Inner part of Van Mijenfjorden with Paulabreen to the left. In the far distance to the right: Isfjorden. The mountains in the foreground consist of a coal-bearing Tertiary sandstone series in their upper part, and of Cretaceous sandstones and sandy shales in their lower part. Towards north-west from the height of 3500 Metres.

B. Luncke phot. Aug. 4, 1936.



1



2

Charts:

- No. S. 1. Bear Island. 1 : 40 000. 1932. Kr. 4,00.
 " S. 2. Bear Island Waters. 1 : 350 000. 1937. Kr. 4,00.
 " S. 3. From Bellsound to Foreland Reef with the Icefjord. 1 : 200 000. 1932. Kr. 5,00.
 " S. 5. Norway—Svalbard, Northern Sheet. 1 : 750 000. 1933. Kr. 4,00.
 " S. 6. Norway—Svalbard, Southern Sheet. 1 : 750 000. 1933. Kr. 4,00.
 " S. 7. Northern Svalbard. 1 : 600 000. 1934. Kr. 4,00.
 " S. 8. Kings Bay and Cross Bay. 1 : 100 000. 1934. Kr. 4,00.
 " S. 9. From South Cape to Hamburg Bay. 1 : 350 000. 1936. Kr. 4,00.
 " S.11. East Greenland. 1 : 600 000. 1937. Kr. 4,00.

A preliminary edition of topographical maps (1 : 50 000) covering the regions around Kings Bay, Ice Fjord, and Bell Sound, together with the map of Bear Island (1 : 25 000), is published in: Svalbard Commissioner [Kristian Sindballe], Report concerning the claims to land in Svalbard. Part I A, Text; I B, Maps; II A, Text; II B, Maps. Copenhagen and Oslo 1927. Kr. 150,00.

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 " 2. RAVN, J. P. J., *On the Mollusca of the Tertiary of Spitsbergen*. 1922. Kr. 1,60.
 " 3. WERENSKIOLD, W. and I. OFTEDAL, *A burning Coal Seam at Mt. Pyramide, Spitsbergen*. 1922. Kr. 1,20.
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 " 10. IVERSEN, T., *Hopen (Hope Island), Svalbard*. 1926. Kr. 7,50.
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 " 13. LIND, J., *The Micromycetes of Svalbard*. 1928. Kr. 6,00.
 " 14. KJÆR, R. and J. E. FJELDSTAD, *Tidal Observations in the Arctic*. 1934. Kr. 6,00.
 " 15. HORN, G. and A. K. ORVIN, *Geology of Bear Island*. 1928. Kr. 15,00.
 " 16. JELSTRUP, H. S., *Déterminations astronomiques*. 1928. Kr. 2,00.
 " 17. HORN, G., *Beiträge zur Kenntnis der Kohle von Svalbard*. 1928. Kr. 5,50
 " 18. HOEL, A. and A. K. ORVIN, *Das Festungsprofil auf Spitzbergen. Karbon-Kreide. I. Vermessungsergebnisse*. Kr. 4,00.
 " 19. FREBOLD, H., *Das Festungsprofil auf Spitzbergen. Jura und Kreide. II. Die Stratigraphie*. 1928. Kr. 3,00.
 " 20. FREBOLD, H., *Oberer Lias und unteres Callovien in Spitzbergen*. 1929. Kr. 2,50.
 " 21. FREBOLD, H., *Ammoniten aus dem Valanginien von Spitzbergen*. 1929. Kr. 4,00.
 " 22. HEINTZ, A., *Die Downtonischen und Devonischen Vertebraten von Spitzbergen. II. Acanthaspida*. 1929. Kr. 15,00.
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