MEDDELELSER OM GRØNLAND
UDGIVNE AF
KOMMISSIONEN FOR VIDENSKABELIGE UNDERSØGELSER I GRØNLAND
BD. 143 · NR. 2

DE DANSKE EKSPEDITIONER TIL ØSTGRØNLAND 1926–39
UNDER LEDELSE AF LAUGE KOCH

REPORT ON THE EXPEDITIONS TO CENTRAL EAST GREENLAND 1926–39 CONDUCTED BY LAUGE KOCH

PART II

WITH 258 FIGURES IN THE TEXT

KØBENHAVN
C. A. REITZELS FORLAG
BIANCO LUNOS BOGTRYKKERI A/S
1955

CONTENTS

Page

Preface 5

Introduction 8

Financing of the East Greenland expeditions 15

Payment of the publications 21

Brief report on the expedition 1930 26

The Three-Year Expedition 1931–34 33
- Instructions 33
- The expedition 1931 42
- The expedition 1932 67
- The expedition 1933 108
- The expedition 1934 160

The Two-Year Expedition 1936–38 193
- The expedition 1936 193
- The expedition 1937 208
- The expedition 1938 231

Ships and motor-boats 249

Provisions 266

Ponies 274

Wireless equipment 278

Station houses 284

Reports by various members of the expeditions 301
- H. G. Backlund 303
- David Malmqvist I—II 362
- Olof Eklund 382
- Heinrich Bütler 405
- E. Wegmann 439
- G. Säve-Söderbergh, I–II 457
- Eigil Nielsen 475
- H. Stauber 491
- A. Vischer 550
- Malthe Andersson and W. Bierther 604
- Holger Leth Pedersen 609
- A. Schwarck 617
- P. V. Glob 628
- Thorv. Sørensen 633

Literature 641

PREFACE

In 1930 the present author published a brief travelling report (L. Koch, 1930) on my two sledge journeys in East Greenland in 1926—27 between Scoresby Sund and Danmarks Havn (c. 70° to 76° N. lat.). Some time afterwards I learned that a well-known scientist, who had done a great scientific work in West Greenland, had expressed the view that it reminded him of the more or less popular travelling reports from the end of the last century, and that such accounts were now out of date and of no value.

Against this it may be urged that the regions of West Greenland visited by that scientist were so well known that there was no reason for him to publish any report on the motorboat trips he had made there; but the regions through which I had travelled had never before been visited by white men in the winter, so, although I took a greater interest in the scientific problems, I considered it my duty to write the paper, as my experience and travelling technique might be of use to future visitors.

In some respects, however, the said scientist was quite right. Too many expeditions, not only of earlier date but even up to the present time, have only published a travelling report,while a large and valuable scientific material has often been left undescribed and thus lost to posterity.

In many instances, however, we must be grateful that a travelling report was written. Even at the present day our knowledge of vast tracts of the polar countries is solely due to these more or less popular accounts, and though in many cases they do not contain any great amount of observations, they play a very great role in the history of polar exploration; by means of them we may form an idea not only of the persons who were at work, but also of the conditions under which the work was done.

An explorer may frequently make observations of great value to future travellers. Thus the reports on the early North Pole expeditions along the north coast of Greenland have been extremely useful to me; for instance, the reports by G. S. Nares and A. W. Greely,

as well as R. E. PEARY's account of his inland ice journey in 1892, contain a great many particulars of value to the man who is to plan a journey to these regions, and I have often deplored that only a very brief account is available from PEARY's journey along the north coast of Greenland in the year 1900.

During the expeditions to central Northeast Greenland carried through in the years 1930—39, I had no thought of writing any travelling report. However, at the beginning of the second world war Vice-Admiral G. C. AMDRUP, in the period 1930—47 the editor of the "Meddelelser om Grønland", in which the results of practically all the expeditions under my leadership have been published, urgently recommended that I should write a report on my East Greenland expeditions.

At first I had my doubts as to the justification of publishing such a paper, but Vice-Admiral AMDRUP had strong arguments in favour of his proposal. He had himself written the "Report on the Danmark Expedition" (AMDRUP 1913), which gives an excellent picture of the start and progress of that expedition, and contains many valuable geographical observations which would not otherwise have been available, as well as information about the weather, ice, and hunting conditions encountered by the members of the expedition on their many journeys.

Still it was with some hesitation that I set to work. I was finishing a fairly large paper (L. KOCH, 1940) and was making preparations for another work (L. KOCH, 1945), both of which would include many observations made on the East Greenland expeditions. During the war it was moreover very difficult to get into communication with the members of the expeditions. Several of them could not afford time for contributing to a report, or they had no material for such a contribution, so I soon realised that the report would be rather incomplete. Still it is my hope that its publication will prove justifiable, as it gives a picture of the working conditions in the Polar countries before the second world war, when, for instance, the flying technique was rather primitive. In addition it will give a picture of the conditions prevailing in East Greenland at the beginning of the present amelioration of the climate, which is changing life conditions in the Polar countries year by year.

It is my pleasant duty to begin this report by thanking the many persons who supported me during my leadership of the expeditions. In the first place I must mention my gratitude to the late Prime Minister TH. STAUNING, who always took a great interest in my work in East Greenland and was ever ready to grant financial aid; he showed his personal interest by often being present at the return of the expeditions and bidding us a hearty welcome back.

My special thanks are due to the late Director of the Administration of Greenland Mr. J. DAUGAARD-JENSEN, who constantly fol-

lowed our work with interest and confidence, and without whose good advice and support it would not have been possible to extend the activities of the expeditions so greatly as we did.

To the late Professor C. H. OSTENFELD and the other trustees of the Carlsberg Foundation I am greatly indebted for several large donations, in 1930 and later, which enabled me to give the expedition of 1931—34 a far wider field than any other Danish Greenland expedition.

My thanks are also due to Mr. LEIF B. HENDIL for establishing connection between myself and certain Danes, in most cases anonymous, who, because of their interest in the exploration of Greenland, by larger or smaller money gifts made it possible for me to carry out my plans.

It would take me too far to mention here each of all the government institutions, officials, and private persons who have offered me aid and support, but I will always remember them with gratitude, and I will always be glad to recall the expedition years, all the aid given, and the confidence placed in me during those years.

Copenhagen, autumn 1947.

INTRODUCTION

Although there exists a very copious literature on the political, the economic, and especially the scientific position of East Greenland, it will be necessary here to take a brief survey of the conditions during the present century and especially from 1926, when I commenced my investigations, up to the present time.

At the beginning of the present century there was still some doubt as to who had the sovereignty in several of the Polar countries, but especially after the first world war an endeavour was made to throw light on the possessory rights to the Arctic countries. Denmark had for centuries regarded the whole of Greenland as belonging to Denmark, but up to about 1880 Danish interests had centred round the colonies established on the west coast in the 18th century and inhabited by several thousand Eskimos. It is true that Danish explorers had made repeated attempts to push northward along the little known east coast of Greenland; the most important was the voyage of the Danish naval officer W. A. GRAAH up the southeast coast in 1828—31; but up to about 1900 the more northerly tracts were in part unknown or had only been sporadically explored by some foreign expeditions. Northwest Greenland north of Melville Bugt had been the scene of a number of British and American North Pole expeditions, ending in the expedition of 1909 on which R. E. PEARY reached the North Pole. These expeditions had provided a provisional knowledge of Northwest Greenland, especially of the outline of the outer coast.

About the year 1875 the Danish geologist Professor J. F. JOHNSTRUP organised the first really systematic investigation of the colonised part of West Greenland. This investigation terminated at the end of the last century, and in addition to a fairly correct outline map of the coast, various materials of great value were brought home.

However, it was not long before some of the men, chiefly Danish naval officers, who had conducted expeditions to West Greenland, became interested in the more alluring east coast and started the exploration of it. The expeditions to the east coast must, as a matter of course, be more comprehensive. Often the winter had to be passed up

there, and as a rule the expeditions were joined by a larger number of scientists than the much smaller, but more numerous, expeditions to the west coast.

The first fairly large Danish expedition to the east coast was GUSTAV HOLM's voyage in umiaks in 1883—85 to the then unknown Eskimo tribe living at Angmagssalik (c. 66° N. lat.) (G. HOLM 1889). The next large expedition, under the leadership of C. RYDER (RYDER 1895), in 1891—92 went by ship to the tracts a little south of 74° N. lat. It passed the winter in East Greenland and mapped the large fjord-complex of Scoresby Sund. In 1898—1900 G. C. AMDRUP led two expeditions, the first of which pushed northward along the coast from Angmagssalik, while the second and more important expedition carried out investigations and mapping, in part by ship, between 71° and 72° N. lat. and in Scoresby Sund, and finally AMDRUP, accompanied by three men, went southward from Scoresby Sund to Angmagssalik, mapping the coast-line (AMDRUP 1902). In 1906 L. MYLIUS-ERICHSEN started an expedition by ship, the Danmark Expedition, which passed two winters a little south of 77° N. lat. in a place called Danmarks Havn. MYLIUS-ERICHSEN and two companions perished on a journey northward from the base, but they succeeded in mapping the coast of Northeast Greenland and in linking up with the American mapping of the northwest coast (AMDRUP 1913). The Danmark Expedition was succeeded by two expeditions, one led by EJNAR MIKKELSEN, with the object of finding the dead bodies of MYLIUS-ERICHSEN and his companions. In 1909—12 the expedition stayed on the island of Shannon (c. 75° N. lat.), whence a journey was made northward over the inland ice to Danmarks Fjord and back along the outer coast. On the way various corrections were made in the available maps (MIKKELSEN 1922). The second expedition, in 1912—13, was led by J. P. KOCH and was joined by another member of the Danmark Expedition, the German meteorologist A. WEGENER. The object of the expedition was to continue the glaciological and meteorological work commenced on the Danmark Expedition. The winter was spent on the inland ice west of Danmarks Havn, whence the party travelled across the inland ice to West Greenland (J. P. KOCH and A. WEGENER 1930).

Thanks to all these Danish expeditions and several foreign expeditions to the east coast of Greenland, the coast-line became known in broad features. Of the foreign expeditions, mention should especially be made of the German expedition under K. KOLDEWEY in 1870—71 (KOLDEWEY 1873) and the Swedish expedition under A. G. NATHORST in 1890 (NATHORST 1900).

The large Danish expeditions, succeeding each other at a few years' intervals from about 1890 almost up to the first world war, had

from a scientific point of view moved the centre of the Danish investigation of Greenland from the west to the east coast.

However, even before the end of this period Danish explorers turned their eyes towards Northwest Greenland, where no Danish expedition had been at work up to the beginning of the present century. Thus in 1902—04 L. MYLIUS-ERICHSEN made a sledge journey to the Kap York District, where he spent the winter with two companions (L. MYLIUS-ERICHSEN and HARALD MOLTKE 1906), one of whom, KNUD RASMUSSEN, continued his journeys across Melville Bugt in the following years, and the year after PEARY's discovery of the North Pole, KNUD RASMUSSEN established a trading station at Thule for the small tribe that lived at Kap York. Besides being a trading and a missionary station, it was to serve as the base of a number of scientific expeditions, the first of which, in 1911—12 (KNUD RASMUSSEN 1915) under the leadership of KNUD RASMUSSEN and with PETER FREUCHEN as cartographer, crossed the inland ice to Kap York. In 1916 KNUD RASMUSSEN from his station at Thule set out on another expedition, which was joined by the Swedish botanist THORILD WULFF, and by the present author as cartographer; in 1916 Melville Bugt, and in 1917 the large fjords along the central part of the north coast were mapped (KNUD RASMUSSEN 1927). In 1920—23 the present author continued this surveying work on the so-called Jubilee Expedition, and thus material had been secured for new maps of the coast from Melville Bugt in the southwest to the areas in the northeast mapped by the Danmark Expedition.

The abundance of money available for investment after the first world war revived the interest in East Greenland. Thus owing to the wealth of game met with by the Danmark Expedition, some of the members thought that this might be utilised economically, and "Det Østgrønlandske Fangstkompagni" (the East Greenland hunting company) was founded in 1919. A number of hunting stations were built, and an attempt was made, chiefly by catching foxes and bears, to establish a firm economic basis for the existence of the company. The State granted considerable subsidies, but since nevertheless there was an increasing deficit, the Government in 1924 decided to dissolve the company, which had then cost more than 1 million Kroner, or more than all the Danish East Greenland expeditions from that of GUSTAV HOLM in 1883—85 to that conducted by J. P. KOCH in 1913.

In 1916 Denmark issued a proclamation to the effect that the whole of Greenland belonged to the Danish Crown. This step created some anxiety in Norway, for several Norwegian sealers, after hunting seals along the ice edge off East Greenland in spring, at the height of the summer went in to the coast to hunt bears and musk-oxen. Consider-

ing the Norwegian interests in East Greenland from a historical point of view, it must be borne in mind that at that time Norway had for generations taken a very great interest in the Arctic. In 1905 the country had become independent, and shortly after (c. 1910) she began to direct her attention towards Spitsbergen. At the end of the last and the beginning of the present century Spitsbergen had chiefly been investigated by Swedish scientists, but this work was stopped shortly before the outbreak of the first world war, and at the Versailles conference the sovereignty over this land was conferred to Norway, which at once started a comprehensive scientific investigation of the country in addition to the sealing activities. However, Norway constantly extended her sphere of interest, and in 1928 she acquired the sovereignty over Jan Mayen, which up to that time had generally been regarded as belonging to Denmark. It was not only the Danish proclamation of 1916 which caused some excitement in Norway, but many in that country dreamt of first acquiring the sovereignty over East Greenland and then possibly gaining a foothold in West Greenland, also. In other words, after the first world war there was a strong imperialistic feeling in Norway, a large number of the Norwegian people wishing to acquire colonies in the Polar regions.

In 1924 a convention was made between Denmark and Norway. No agreement was arrived at concerning the sovereignty over East Greenland, but the treaty contained far-reaching concessions to Norway as regards this part of Greenland. Thus Norway was given the right not only to carry on trapping, but also to do scientific work in East Greenland except within the Angmagssalik and the Scoresby Sund districts. Angmagssalik was inhabited by Eskimos, and for years it had been contemplated to remove some Eskimos from Angmagssalik to Scoresby Sund in order to establish a permanent Eskimo settlement there. Shortly after the treaty had been signed, a Danish expedition led by EJNAR MIKKELSEN set out for Scoresby Sund, a house was built near the mouth of the sound, where a number of scientists stayed during the winter, and next summer ninety Eskimos arrived from Angmagssalik, and settled in this place.

On my return in 1923 from the expeditions to the north coast some persons associated with the aforementioned East Greenland Company proposed to me that comprehensive scientific investigations based on the organisation of the company should be started in East Greenland, in order to enable the company to continue its activities. I soon realised, however, that the treaty between Denmark and Norway, which had been much criticised, would not ensure peace in the long run. And since large parts of the area in question had never been subjected to Danish investigations, I made up my mind to commence a

geological investigation of the area, all the more so since the foreign expeditions which had been at work there, notably the Swedish expedition under A. G. NATHORST, had shown that geologically these regions were among the most interesting in Greenland.

In the summer of 1925 I therefore published a plan for an investigation of Northeast Greenland (L. KOCH, 1925). The expedition was to have its base during the winter at the newly established Eskimo settlement of Scoresbysund, and was to travel by dog-sledges through the coastal tracts from Scoresbysund to Danmarks Havn and back. On the sledge journeys I was to inspect the Danish stations of the East Greenland Company, which after the winding-up of the company in 1924 had been taken over by the Government. The expedition was carried out in 1926—27 (KOCH 1930).

In the summer of 1929 I led my first expedition by ship to East Greenland to continue the geological investigations commenced in 1926—27. The work was continued again in the summer of 1930 from the Danish Government inspection ship the "Godthaab" (Commander E. RIIS-CARSTENSEN). As in 1929, the expedition was joined by experts in various geological fields.

In 1926 intensive Norwegian activities were started in these regions based chiefly on trapping and on meteorological work, but during the following years more comprehensive Norwegian scientific investigations were commenced, comprising mapping and investigations within geology, zoology, botany, archæology, and hydrography.

Shortly after my return from East Greenland in the autumn of 1930 the then Prime Minister TH. STAUNING, who had visited West Greenland during the summer, asked me to prepare a plan for a comprehensive scientific expedition on which the whole area from Scoresby Sund to Danmarks Havn was to be investigated. The plans were published in the newspapers by the Prime Minister about Christmas 1930 and caused a great sensation, not least in Norway.

In the spring of 1930 the Danish and Norwegian Governments discussed various matters concerning East Greenland, i. a. which country was to exercise the police jurisdiction in the area between Scoresby Sund and Danmarks Havn. However, these negotiations came to nothing.

In June, 1931, the planned expedition started out under my leadership. However, even before we reached the shore, it came to a dramatic crisis, since on June 29th five Norwegian trappers hoisted the Norwegian flag at Myggbukta and laid claim to the region from a little north of Scoresby Sund to a little south of Danmarks Havn in the name of the Norwegian King. After considering the matter, the Norwegian Government on July 10th proclaimed the annexation of the territory between latitudes 71°30′ and 73°40′ N. under the name of Eirik Raudes

Land (Erik the Red Land) and invested two Norwegians with magisterial powers.

As a consequence of this step the Danish Government immediately conferred on me the police authority over the area between Scoresby Sund and Danmarks Havn, and a few days later the Danish Government submitted the case to the permanent Court of International Justice at the Hague. However, next year, before the case had been settled by the Court, the Norwegian Government extended its claims by proclaiming the annexation of a large tract of Southeast Greenland.

This dispute between Norway and Denmark about East Greenland created a great international stir, but it was generally agreed by the Danish population that Denmark was by no means to give up her sovereignty over the whole of Greenland.

On April 5th, 1933, judgment was given in Denmark's favour. The Norwegian Government accepted the decision, and on April 7th ordered that the Norwegian occupation of Erik the Red Land should cease. During the controversy with Norway, Denmark had clearly stated that in case the findings of the Court should be in her favour, she did not for the present intend to alter the provisions of the convention of 1924.

After the judgment had been given, Norway stopped her scientific investigations in East Greenland except the meteorological work.

It should be mentioned here that in 1929 a Danish trapping company, called "Nanok", was founded. Like the East Greenland Company, it was a joint-stock company, but since it turned out now as before that trapping in East Greenland yielded no profit, an appeal was made to the national feeling, and the State granted free transport and a small annual subsidy. This company, whose financial loss is unknown, is still at work in East Greenland, generally some six to twelve trappers staying there every winter. Norway, too, carries on some trapping in East Greenland, but this work can only be maintained because the ship which carries supplies to the meteorological station at Myggbukta provides free transport for the trappers.

During the second world war 1940—45 German expeditions made repeated attempts to establish meteorological observing stations in East Greenland. The personnel at the Danish police stations of Ella Ø and Scoresbysund in connection with the Norwegian trappers constituted a patrol, which on several occasions were engaged in fights with the Germans. However, the German meteorological stations were soon destroyed by the British and American forces, and after the stations and a wintering ship had been bombed during an American air-raid in April 1943, the Germans both in 1943 and 1944 tried to establish meteorological stations farther north, but without success.

After the end of the second world war conditions have changed. Denmark has undertaken to erect a number of meteorological observing stations in East Greenland to serve the international air traffic. This probably implies that the Norwegian meteorological weather service in East Greenland will cease, and that the Norwegian as well as the Danish trapping activities will likewise come to an end.

It should be mentioned that when the Three-Year Expedition was completed in 1934, two of the expedition stations, Ella Ø and Eskimonæs, were taken over by the State to serve as police stations. In 1936 I started another geological expedition to East Greenland with several bases for wintering scientists, the last of whom returned in the late summer of 1939. Not till 1947 was the geological investigation of East Greenland under my leadership resumed.

FINANCING OF THE EAST GREENLAND EXPEDITIONS

In the summer of 1925 (L. Koch, 1925), as stated above, I put forward a plan for a geological expedition to East Greenland with the Eskimo settlement of Scoresbysund as a base. In the course of the winter the Administration of Greenland and its minister, Mr. C. N. Hauge, became interested in the plan, and as a consequence the expenses of my first East Greenland expedition (1926—27) were paid entirely by the Ministry of the Interior. The expedition built a house at Scoresbysund, which, in addition to dogs and various equipment, was later taken over by the Government (see below).

In the summer of 1928 I was directed by the Ministry of the Interior to carry out some work in West Greenland, but in January 1929 I had the plans for a summer expedition to East Greenland ready. I went to London to submit my plans to a number of Danish capitalists there and I succeeded in obtaining a large amount for the expedition, and as the Carlsberg Foundation likewise promised me a considerable amount, the Administration of Greenland agreed to place the vessel "Godthaab" at my disposal free of charge.

Owing to the political situation in East Greenland it was desirable that a Danish naval inspection of the central parts of the coast should be made the next year, and the Naval Department therefore undertook to defray the expenses of another expedition, which set out in the "Godthaab" in 1930. The Navy not only paid the expenses in connection with the ship and the crew, but also a large proportion of the expenses in connection with the scientific staff.

In the autumn of 1930 I submitted the aforementioned plans for a Danish scientific investigation of Northeast Greenland to last for several years. For the start of this work the Carlsberg Foundation granted an amount of 300,000 Kr. if the Government would grant free transport to and from Greenland.

When this expedition, the "Three-Year Expedition 1931—34", was completed in 1934, the Administration of Greenland invested the botanist Mr. Thorv. Sørensen with the police authority at one of the

stations (Eskimonæs), and he was thus enabled to continue his work in East Greenland for another year (1934—35), partially at the expense of the expedition.

In the autumn of 1935 I received from private quarters the promise of a large amount intended for financing the scientific work in East Greenland, and I succeeded in arousing the interest of the Greenland Administration and the Prime Minister, Mr. TH. STAUNING, in a continued investigation of central East Greenland; the starting of this expedition would be fairly easy, since the Government had taken over the stations, motorboats, and equipment of the previous expedition. As the new topographical maps of central East Greenland constructed by the Geodetic Institute were now available, it was decided (in January 1936) that a geological mapping on modern lines should be carried out on the basis of these maps, at any rate of the fairly easily accessible land areas north of Scoresby Sund. Since it was realised from the outset that the private means at our disposal would be insufficient for the solution of this task, the Ministry of State promised to support the expedition both in the form of free transport and by granting the additional amounts required for carrying out the work.

About the New Year of 1938 the sensational news was announced that four Russians, who, under the leadership of J. D. PAPANIN, had been landed by aircraft at the North Pole the previous summer, had observed some land areas out in the sea some distance east of Greenland. Since this land, if it did exist, would probably be situated fairly near the east coast of Greenland, I made up my mind to try to find it, and I therefore applied to a private person for financial aid. This was willingly granted, the Government promised free transport of the expedition to Spitsbergen, and the Naval Department placed a long-range seaplane at our disposal.

The accounts of all the East Greenland expeditions under my leadership were kept by the book-keeping department of the Administration of Greenland, and audited in the same way as other state subsidies; this applies to the private contributions, the amounts granted by the scientific foundations, and to the state grants. Detailed statements will only be given here for the two largest expeditions (1931—34 and 1936—38).

Statement of the expenses of the East Greenland expeditions carried out in the years 1926—39 under my leadership.

Expedition 1926—27.	Kr.
Government contribution	47,731

	Kr.	Kr.
Expedition in the summer of 1929		
Private contributions	50,000	
The Carlsberg Foundation	30,000	
Government contribution	1,790	
State grant (transport)	33,991	115,781
Expedition in the summer of 1930		
(Naval inspection expedition)		
Contribution of Naval Department to scientific work	13,000	
Government contribution to scientific work	11,000	
Transport (paid by the Naval Department, not specified)	0	24,000
Three-Year Expedition 1931—34		
Private contributions	405,500	
The Carlsberg Foundation	300,000	
Government contribution	63,807	
State grant (transport)	474,703	
The Navy, loan of seaplanes	61,000	1,305,010
Two-Year Expedition 1936—38		
Private contributions	145,500	
State grant	351,582	
— — (transport)	188,698	685,780
Seaplane Expedition 1938		
Private contribution	50,000	
Government contribution (transport)	38,000	
The Navy, loan of two seaplanes	c. 35,000	c. 123,000
	Total:	c. 2,301,302

The above statement, however, is not complete. Thus the expenses for transport do not include the wages of the permanent ship's officers or the repairs of damages to the ships paid by the insurance companies, etc. Furthermore, the Geodetic Institute contributed a total amount of about 35,000 Kr. to the Three-Year Expedition, the Scoresby Sund Expedition 1932, and the 6th and 7th Thule Expeditions, which amount cannot be distributed over the individual expeditions. In addition the Three-Year Expedition as well as the 1936—38 Expedition borrowed

rifles, pack-saddles, and harness from the Army; further, the Zoological Museum and the Botanical Museum supplied glass vessels, alcohol, and various scientific instruments, and the Geodetic Institute supplied all the mapping instruments for the Three-Year Expedition. All these amounts cannot be specified.

Private contributions to the various expeditions totalled 651,000 Kr., those of the Carlsberg Foundation 330,000 Kr., the Government contributions 475,910 Kr. (in cash) plus contributions in the form of transport 735,392 Kr., and the contributions of the Naval Department amounted to 96,000 Kr. (seaplanes) plus transport in 1930 plus a contribution in cash of 13,000 Kr.

It will be seen from the above that in the period 1926—39 the work in East Greenland was carried on almost continuously. Still there is some reason to point out that the various expeditions had the character of independent expeditions. Thus, whenever an expedition had been completed, nobody knew whether or not the work would be resumed, and often the necessary means were not placed at my disposal till a very short time before the expedition was to start. Much greater results might possibly have been obtained if the means had been ensured beforehand, so that the work could have been planned for a longer period of years at a time.

Three-Year Expedition 1931-34.

Income.

	1931—32 Kr.	1932—33 Kr.	1933—34 Kr.	1934—36 Kr.	total Kr.
The Carlsberg Foundation	153,000.00	73,500.00	73,500.00	..	300,000.00
Private contributions	3,100.00	79,400.00	167,000.00	156,000.00	405,500.00
Government contributions	..	7,116.75	2,800.00	53,890.00	63,806.75
	156,100.00	160,016.75	243,300.00	209,890.00	769,306.75
Government contributions (transport)	160,056	114,747	124,900	75,000	474,703
s.s. "Gustav Holm", voyage,	61,670	56,600	50,000	56,000	224,270
repairs, etc.	31,000	7,400	24,000	19,000	81,400
s.s. "Godthaab", voyage,..	50,653	45,747	40,400	..	136,800
repairs, etc.	16,703	5,000	10,500	..	32,203
Naval Department, loan of seaplanes	..	c. 31,000	c. 30,000	..	c. 61,000

Expenditure.

	1931—34 Kr.	1936—38 Kr.
Transport	474.703	188.698
Houses and furniture	37.669	18.880
Camps	12.119	8.435
Provisions	83.065	74.661
Wireless	28.196	6.505
Telegrams	27.809	9.515
Motorboats	54.226	32.730
Fuel	16.118	15.601
Rifles	6.507	10.356
Scientific equipment	81.265	18.622
Personal equipment	115.066	95.269
Wages	200.924	105.798
Greenlanders, dogs & sledges	32.825	30.980
Pay of the leader	12.350	10.250
Pay of other members	19.831	11.555
Ponies	5.534	14.283
Flying work	78.256	19.947
Sundries	18.548	13.695
	1.305.011	685-780

Number of members and stations.

Year	Summer members	Winter members	Stations	Year	Summer members	Winter members	Stations
1931	63	16	2	1936	50	15	2
1932	99	19	3	1937	56	23	4
1933	109	13	2	1938	51	2	1
1934	65						

From early times it has been customary that the leader of the expedition was to procure private means for carrying through his plans, and only after such means had been secured, was he to apply to the scientific foundations and the Government for support.

The only East Greenland expeditions led by me which were paid entirely by the Government, were the expedition 1926—27 and the summer expedition 1930 (cf. above). In the plan for the former expedition I estimated the expenses at c. 50,000 Kr. However, they proved to amount to c. 75,000 Kr., chiefly because a larger house of a more permanent character than originally planned was built as headquarters for

the expedition. But since a number of dogs and sledges, a motorboat, and other equipment were taken over by the colony (cf. above) the expenses of the expedition were reduced to 47,731 Kr.

Expenses in connection with the exercise of police jurisdiction in the period 1931—34 were defrayed by the expedition. At the return of the expedition in 1934 the Government took over, without any compensation, the assets of the expedition in East Greenland. These were estimated to be as follows:

Five stations (Kulhus, Eskimonæs, Nordfjord, Ella Ø, and Kap Brown)	Kr.	25,978.51
Wireless equipment	—	24,421.48
Furniture and fixtures of the stations	—	6,000.00
Motorboats, jollyboats, and motors	—	44,600.00
Camping outfit	—	4,000.00
Rifles and ammunition	—	800.00
Dogs and sledges	—	1,450.00
Spare provisions	—	10,000.00
Petrol and oil	—	3,950.00
	Kr.	121,199.99

Shortly after the return of the expedition in 1934 a private person promised me a large sum of money for continuation of the geological work in East Greenland. In 1936 the Government transferred to me the stations, motorboats, and other equipment, which remained at my disposal until 1938, when they were again taken over by the Government to serve in the exercise of police jurisdiction. However, this time no estimate of the values was made, but two geologists with Eskimo assistants passed the winter of 1938—39 in East Greenland, stationed at Eskimonæs.

It should be added that in the summer of 1937 the expedition ship "Gustav Holm" was not placed at my disposal until August 5th, when I took over the ship at Akureyri. Before the start I had pointed out to the Government that such a late departure from Iceland might render it impossible to visit the northern stations. Unfortunately this proved to be the case, so a larger number of scientists than planned had to spend an extra year in East Greenland, and a number of goods for the northern stations had to be unloaded at Scoresbysund. Owing to these measures, necessitated by the impossibility of calling at the northern stations, the calculated expenses of the expedition were greatly increased.

PAYMENT OF THE PUBLICATIONS

The collections brought home by polar expeditions should be worked up and described within a reasonable time.

It is most practical that the results should be published in separate papers gathered under a collective title. At the end of the last century Swedish expeditions carried out a great and admirable work in exploring Spitsbergen. A large part of the material was published, but as the papers appeared in various periodicals, it was afterwards very difficult to obtain a general idea of the work done by the individual expeditions.

In the period between the two world wars several small polar expeditions were sent out from the English universities of Cambridge and Oxford. As a rule there was not sufficient money for publishing the results as a whole, so the papers were published in different periodicals. Generally, however, the leader of the expedition secured a limited number of the reprints, which he afterwards gathered in one volume.

In Denmark the results of the Greenland expeditions, at any rate the Danish expeditions, are published in the Meddelelser om Grønland (hereinafter called the M. o. G.), and it has become customary for the papers of the individual expeditions to be provided with a subtitle and gathered in volumes numbered consecutively. Thus it may be mentioned that the preliminary results of the expedition to East Greenland in 1929 are published in the M. o. G. Bd. 74 Nos. 10—16, and the final descriptions of the results from the expeditions 1926—27 and 1929—30 in five volumes, viz. M. o. G. Bd. 83—87. If an expedition comprises various scientific branches, it is desirable that a committee of experts should undertake the distribution of the material to be worked up and procure the necessary means for its publication. It may be mentioned that after the return of the Danmark Expedition a committee was set up which arranged for the publication of the results of the expedition in the M. o. G. Bd. 41—46, and similarly, the committee of the Second Thule Expedition undertook the publication of the results of this expedition in the M. o. G. Bd. 64—65.

If mapping and geographic discoveries have been made, it is especially desirable that these should be published as soon as pos-

sible after the return of the expedition, as they may be of importance in the planning of future expeditions. After the recent extensive use of aircraft in the exploration of the polar countries far-reaching discoveries are rarely made, at any rate in Greenland, but in earlier times, when an expedition often brought home maps of unknown regions, such maps should show not only what had been observed with certainty, but also what was conjectured on the basis of observations from great distances. In conversations with and letters to the British polar explorers J. M. WORDIE, G. WATKINS, M. LINDSAY, and R. L. WAGER I have often expressed this view; to an expedition which is to continue the geographic work in a region conjectures and sketch maps of remote tracts, which could not be accurately mapped on the journey, will often be extremely useful.

If several members of an expedition have been investigating the same geologic formation at the same time, it is advisable that within a month or two after the return of the expedition these members should prepare a brief preliminary report on their results; in this way priority controversies may often be avoided. Such preliminary reports were, for instance, published shortly after the return of the 1936—38 expedition (M. o. G. Bd. 114 Nr. 1). However, this procedure involves the drawback that some authors will never write a definitive report.

Many members of the expeditions led by me were young scientists who had finished their university education but had not yet taken their doctor's degree. Such members used the description of the material collected on the expedition as a thesis for their doctors' degree, and in addition to their salary during the expedition and the authors' fee for their paper the expedition paid the printing of the latter. This principle was generally adopted during the Three-Year Expedition 1931—34 and continued during the Expedition 1936—38. The following members of expeditions led by me have used material collected on the expeditions for the theses for their doctorates:

LAUGE KOCH	M. o. G.	Bd.	73,	Afd.	2. (1933)
G. THORSON	—	-	100,	Nr.	6. (1936)
P. GELTING	—	-	116,	-	3. (1937)
A. NOE-NYGAARD	—	-	118,	-	6. (1937)
H. USSING	—	-	100,	-	7. (1938)
THORV. SØRENSEN	—	-	125,	-	9. (1941)
EIGIL NIELSEN	—	-	138,	-	1. (1942)
H. STAUBER	—	-	132,	-	1. (1942)
A. VISCHER	—	-	133,	-	1. (1943)
HANS HÜBSCHER	—	-	115,	-	3. (1943)
K. KLEIBER	—	-	115,	-	4. (1944)
J. BRÆNDEGAARD	—	-	121,	-	15. (1946)

Generally it will, of course, take several years to publish the results of an expedition, and even an energetic committee will discover that a large material will be left the working up of which cannot be planned in detail (as an example I may mention the large collections of fossil vertebrates secured in East Greenland from several geologic formations, the description of which will take several decades); further, such material as is too incomplete to be described apart, but the working up of which must be postponed until more material has been collected, or it must be treated together with material from other expeditions; and finally material which will not become topical until new views or methods of investigation have developed. Thus in 1936 a committee of zoologists was set up for the purpose of publishing, under the title of the Zoology of East Greenland (M. o. G. Bd. 121—123), specific descriptions of a number of animals collected on different expeditions. A good deal of material collected on the Three-Year Expedition 1931—34 has been treated in these volumes. Finally, there may be some material, recent or fossil, for the working up of which no expert is available.

Unfortunately, however, the committee or the leader of the expedition will often be disappointed. Thus a member who has commenced a work may for some reason or other be unable to complete it within a reasonable space of time, and even to the most skilfully led expedition some material may be lost. The point is to ensure that the material lost should constitute the smallest possible percentage. As an example of an ideal utilisation of material collected on an expedition I may mention the work carried out by the English botanist Professor Tom Harris, a member of the East Greenland expedition 1926—27. He personally secured large collections of Rhætic and Liassic plant fossils, and in the course of a reasonable period of years after his return described them in five papers (M. o. G. Bd. 85, 2, 3, 5, Bd. 112, 1, 2). They were worked up according to such modern principles and so completely that very little material was lost.

Up to 1930 the papers on my Greenland expeditions published in the M. o. G. were paid by the ordinary grant of this periodical. At the death of Vice-Admiral C. F. Wandel in 1930, Vice-Admiral G. C. Amdrup was appointed chief editor of the M. o. G. In a letter of Jan. 1930 he informed me that the ordinary grants of the "Meddelelser om Grønland" did not suffice for publication of the papers of the large expeditions under my leadership, so I was myself to provide the means for the working up of the results. I therefore applied to the Government, the Carlsberg Foundation, and the Rask-Ørsted Foundation, which granted me the following amounts for a period of two years:

The Government (through the Greenland Administration) Kr. 40,000.—
The Carlsberg Foundation ..... — 35,000.—
The Rask-Ørsted Foundation..... — 15,000.—

Later on I received Kr. 2,300 from another source. These amounts, totalling Kr. 92,300.—, were chiefly used to defray the expenses in connection with the publication of Bd. 83—87 of the M. o. G.

When the committee of the Three-Year Expedition 1931—34 was set up in December 1930, ten volumes of the M. o. G., viz. Bd. 94—103, were reserved for publication of the results, and the Government granted (through the Ministry for Foreign Affairs) an amount of 50.000 Kr. for this purpose, the Carlsberg Foundation 145,000 Kr., the Rask-Ørsted Foundation 7,050 Kr., while a private contribution amounted to 46,056 Kr.; thus a total of 248,106 Kr. was available.

In 1933 I applied to the Government and the Rigsdag for the concession of the so-called Colonial Lottery. However, this grant was not given, as the Government decided to dissolve the lottery, but at the same time to extend another lottery, the so-called class lottery, to yield an additional yearly surplus of 50,000 Kr., which amount was to be placed at the disposal of the Minister for Greenland. On the recommendation of the director of the Greenland Administration I received, in the spring of 1933, 40,000 Kr., which amount was intended to defray the expenses connected with the termination of the Three-Year Expedition in the summer of 1934. In the succeeding years I received 25,000 Kr. annually for publication of the results of the East Greenland expeditions.

However, at the beginning of the second world war these means proved insufficient for publication of the results, especially such as might be expected from the 1936—38 expedition. In 1941 I therefore applied to the Ministry of State for a grant of 120,000 Kr. distributed over six years. This grant was given on May 13th, 1941, and up to 1947 80,000 Kr. of this amount have been used.

In 1940 it was decided that the large material of fossil vertebrates collected in East Greenland on the various expeditions, from the Devonian, Carboniferous, Permian, and Triassic formations should be transferred to the Zoological Museum of Copenhagen, which would then undertake the publication of the material in a new series entitled "Palæozoologica Groenlandica", though on the condition that a certain number of copies should be placed at the disposal of the editors of the M. o. G. to appear in the volumes of this publication, and other copies were placed at my disposal for distribution among scientists or institutions associated with or displaying particular interest in the East Greenland expeditions. For instruments required for the treatment of the material at

the Zoological Museum the Carlsberg Foundation granted an amount of 7,349 Kr. and a private person contributed 100,000 Kr., which amounts have sufficed to defray the expenses connected with the publication of the papers on the vertebrate material that have hitherto appeared.

It should be added that some few minor papers have been paid of the annual grant of the M. o. G. This amount is not included in the table below showing the total expenses up to January 1948 combined with the publication of material, including the vertebrates, collected on the East Greenland expeditions under my leadership.

Up to 1948 I have received the following amounts:

Government contributions.....	Kr. 446,178
Scientific foundations and private contributions	— 358,755
	Kr. 804,933

BRIEF REPORT ON THE EXPEDITION 1930

In the summer of 1930, as stated above, the s.s. "Godthaab" was placed at the disposal of the Naval Department for an inspection of the east coast and certain hydrographic investigations in the East Greenland waters. The officers of the ship were as follows:

E. Riis-Carstensen, commander.
F. C. S. Bangsbøll, second in command.
H. Wittrup-Hansen, junior officer.
A. Lystager, first engineer.
A. Thiesen, medical officer.

The scientific staff was as follows:

Lauge Koch, geologist, leader of the expedition.
H. G. Backlund, geologist.
A. Noe-Nygaard, geologist.
G. Seidenfaden, botanist and cartographer.
B. Løppentnin, ornithologist.
Max Grotewahl, magnetician, of the Polar Institute, Kiel, sent out by the Meteorological Institute of Copenhagen to make meterorological observations.

In addition the Danish geologist R. Bøgvad, who had spent the winter in East Greenland, agreed to work as my assistant during the summer.

According to the instructions the ship should be at my disposal during its stay at the shore and in the fjords.

It was the plan that Koch, assisted by A. Noe-Nygaard and R. Bøgvad, should make stratigraphical investigations of, and collect fossils from, the Carboniferous, Permian, and Triassic beds, while Professor Backlund was to continue his investigations, commenced in 1929, of the petrography of the Caledonides as also, assisted by G. Seidenfaden, to carry out geological and geographical mapping. G. Seidenfaden was further to continue his botanical investigations commenced in 1929. As a rule one of the life-boats of the ship was at

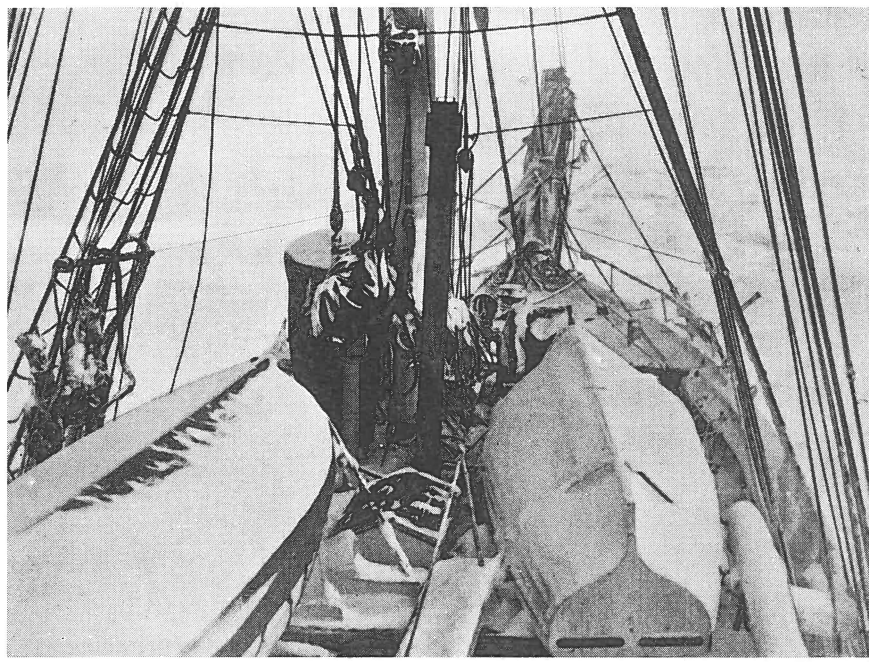


Fig. 1. In the pack-ice on the homeward voyage, September 1929. 29-30

the disposal of the present author, his two assistants, and a marine, while the other life-boat was at the disposal of Professor BACKLUND's party, which was, as a rule, joined by SEIDENFADEN and WITTRUP-HANSEN, and sometimes by GROTHEWAHL, who, however, was mostly stationed in a camp together with the zoologist B. LØPPENTHIN.

Mr. L. M. COULET-SVENDSEN, of the Royal Greenland Trade, acted as ice navigator.

The expedition started from Copenhagen on June 14th, and arrived at Thorshavn on the 20th. An echo sounding apparatus had been installed in the ship, so Mr. E. WULFF, civil engineer, accompanied the expedition to Thorshavn in order to instruct the crew as to the use of the echo sounder; as it did not function satisfactorily, we had to stay for some days at Thorshavn. During these days Thorshavn was also visited by various Danish men-of-war. His Majesty King Christian X was on board one of them, bound for Iceland. On June 22nd His Majesty paid a visit on board the "Godthaab".

On June 23rd we left Thorshavn proceeding towards Jan Mayen, where we were to inspect the remains of the Austrian meteorological station established in the Polar Year 1883 and shortly before transferred to the Danish Government. On June 28th the station was inspected. The weather was calm, but clouds were seen at a height of some few

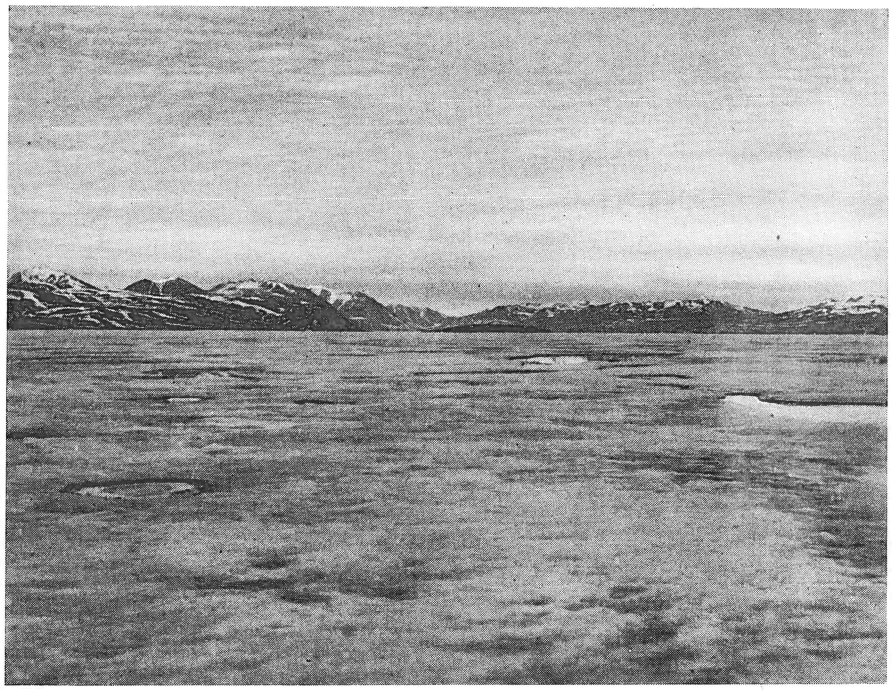


Fig. 2. Melting fjord-ice in Young Sund. July 1930. 29-30

hundred metres. After the station had been inspected, the ship proceeded eastward, and in the afternoon of June 30th reached the ice edge. As it was too foggy to proceed, a hydrographic station was established at the ice edge.

On July 1st the ship entered the ice. The ice was very scattered, so had it not been for the hydrographic observations, we might, no doubt, have passed the ice-belt and reached the shore in the course of about twenty-four hours. By noon of July 4th the ship was c. 8 miles from Flakkebugt south of Sabine Ø, and in the course of the night reached the shore. However, a northerly gale, setting in suddenly in the morning of July 5th, carried the ship southward, and in the afternoon the ship dropped anchor off Kap Borlase Warren 600 m from the shore. Owing to the continuous gale the ship had to ride by both anchors and for some time with the engines working full speed. Not till the afternoon of July 6th was it possible to lower a boat and make a short trip ashore. In the evening the ship entered Young Sund, where, however, the fast ice lay across the fjord a little north of Sandøen. In the morning of July 7th four trappers walked across the ice out to the ship, and by noon LØPPENTHIN and GROTEWAHL were set ashore in a motorboat at Kap Mary, while BACKLUND and SEIDENFADEN were set ashore near Grønnedal.



Fig. 3. Topographic mapping on Clavering Ø. 29-30



Fig. 4. Topographic mapping on Clavering Ø. 29-30

During the succeeding days the weather was unsettled and often foggy and the ground was largely covered with snow, so travelling was difficult. On August 8th the work was impeded by rain and wind, but next day it cleared, and on the 14th the ship sailed along the south side of Clavering Ø, a camp was established by means of the motorboats off the mouth of Fiskeelv east of Dødemandsbugten, and in the evening a party went out hunting, and various scientific work was done. On July 15th—16th KOCH and SEIDENFADEN climbed Brinkley Bjerg to make cartographic observations, and later in the day they went to Store Finsch Ø to continue the cartographic work. On the 17th—18th various work was done with the camp as a base, and in the evening of the 18th the whole staff returned to the ship, which lay off the mouth of Grønnedal. On the 19th various goods were set ashore for the trappers stationed at Sandodden, and in the evening the ship went northward. On the 21st she dropped anchors off the hunting station at Germania Havn. Here we encountered the American ship "Morrissey" with Captain R. BARTLETT and the well-known American big-game hunter H. WHITNEY on board. Next day an attempt was made to reach Bass Rock, but we had to give it up owing to fog, so the ship went southward again and in the evening of the 23rd a visit was paid to the camp at the mouth of Grønnedal. Next day this camp was taken on board, and the ship proceeded to Kap Stosch, where a large camp was erected in the evening. KOCH with his assistants and the zoologist were at work along the shore of Kap Stosch, while BACKLUND's party went by ship to Wordies Gl. Having set the party and the camp ashore, the ship went northward again to inspect the depot at Bass Rock. She returned to Kap Stosch in the morning of August 3rd, and in the morning of August 5th, after taking the camping parties on board, sailed along the shore of the fjord. In the afternoon a motorboat party led by KOCH was set ashore north of Terneskær. During the following days this party proceeded in the motorboat along the outer coast to meet the ship, which went to Carlshavn to land some goods for the trappers. In the afternoon of August 7th the party reached the ship, which rode by anchors off Carlshavn, and on the 8th stayed on the ship, which had to go almost right up to Jackson Ø to get clear of the land ice, which still lay along the coast of Hold-with-Hope. In the evening the commander, accompanied by a sub-lieutenant, paid a visit to the Myggbukta station. In the early morning of the 9th my party of four members was set ashore with a motorboat east of Margrethedal at the mouth of Kejser Franz Josephs Fjord, and a camp was immediately erected. During our stay in this place, which lasted till the evening of the 17th, numerous excursions were made both towards the interior of the country and in the motorboat along the shore. The weather was not particularly good, so we often had to

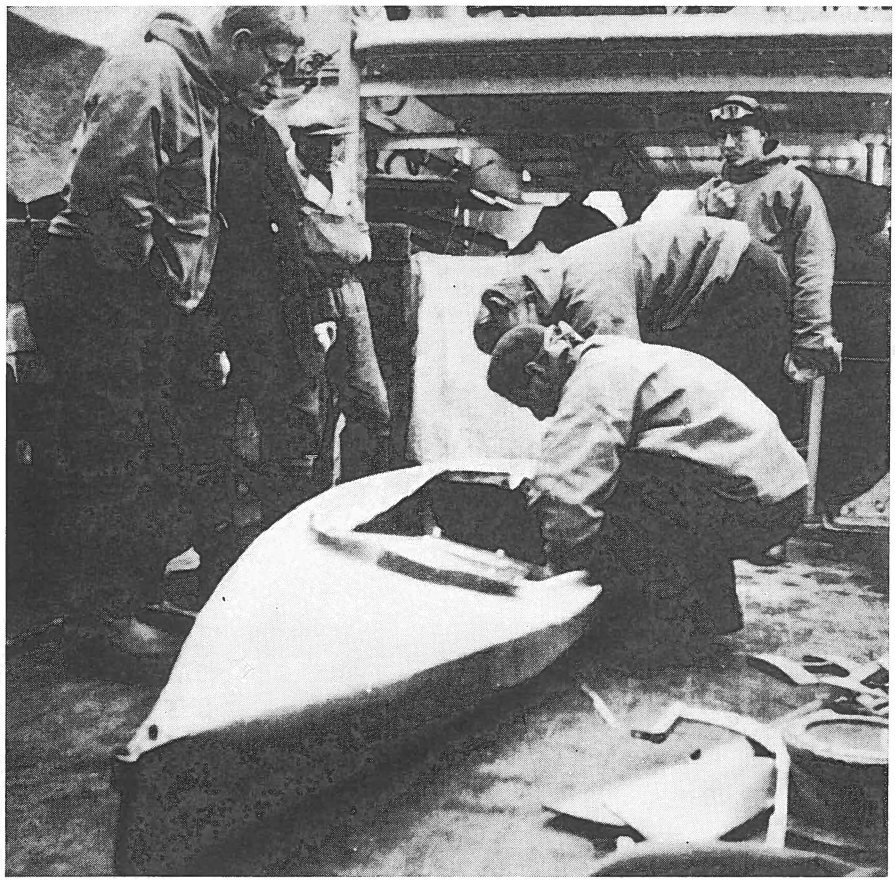


Fig. 5. Rubber-boat before a start. 29-30

keep watch at the motorboat during the night, as it was too heavy to drag ashore.

The ship went on into Kejser Franz Josephs Fjord and Moskusoksefjord, and in the evening a camp was erected in the interior of Moskusoksefjord near Kap Anker. Here the scientists were at work till the evening of August 16th, when the ship went to Margrethedal to take on board Koch's camp.

With all the members of the expedition on board, the ship now sailed across Kejser Franz Josephs Fjord and into Sofia Sund to proceed through Kong Oscars Fjord to Nathorsts Fjord. However, in the evening of the 17th she was stopped by winter ice, which extended across the fjord from the south point of Kongeborgen to Hammars Ø. She then had to go north again and in the night anchored south of Rødebjerg in Sofia Sund. In the morning of the 18th she proceeded out through Sofia Sund to Bontekoe Ø, continuing next day along the edge of the



Fig. 6. View across Gael Hamkes Bugt from Clavering Ø. 29-30

land ice towards Kap Swainson to reach Nathorsts Fjord by this route. But the ice lay unbroken off Brochs Øer and onwards along the east coasts of Geographical Society Ø and Traill Ø, past Kap Simpson towards the northern part of Liverpool Land, and it was entirely impossible to approach the coast anywhere. So we had to go southward, and on August 20th we sailed down along Liverpool Kyst to go into Scoresby Sund. As we passed Kap Tobin in the evening, a gale sprang up from the north, compelling us to go out to sea to ride out the gale. Practically no drift ice had been observed outside the land-ice belt from Bontekoe Ø to the mouth of Scoresby Sund.

The northerly gale continued on the 21st, 22nd, and 23rd, so it was decided to go direct to Reykjavik, where we arrived in the morning of August 26th. Here the members of the expedition went ashore, to leave again next evening in the liner M/S "Dronning Alexandrine", which arrived at Copenhagen on September 1st.

The most important results of the scientific work this summer are published in the M. o. G. Bd. 83 No. 2, Bd. 87 Nos. 1, 2, and 5, Bd. 91, No. 6, and Bd. 130 No. 12. In addition various collections have been worked up and described by specialists in a number of papers of the M. o. G.

THE THREE-YEAR EXPEDITION 1931–34

Instructions.

Before the expedition started in 1931, I received the following instructions from the expedition committee:

INSTRUCTIONS
for
the Three-Year Scientific Investigation of East Greenland.

Dr. phil. LAUGE KOCH.

The committee for the three-year scientific investigation of East Greenland hereby transfers to you the leadership of this expedition.

The object of the expedition is a scientific investigation of the area from Scoresby Sund to Danmarks Havn, and as an introduction to the present instructions the committee wishes briefly to summarise the various tasks to be carried out by the members of the expedition according to the more detailed instructions given for the individual subjects, to which instructions you are further referred.

1) Cartography. During the three-year investigation a topographical map of the area from 72° to 76° N. lat. should be produced on a scale of 1:500,000. At the same time, however, connection should be established with the already existing maps of more southerly regions; thus in the late summer of 1931 the southern cartographic party should map the area from 72° N. lat. southwards to and including Carlsberg Fjord to the extent that time permits. Next spring the mapping is to be continued from sledges northward from 72° N. lat. towards Ella Ø. Next summer, when it is possible to sail in motorboats, the cartographers should work in Kempes Fjord.

The northern cartographic party should commence its work in Nordfjord this summer. Next spring the party should continue the work done this year, partly by sledge and partly by motorboat, westward in the land areas between Waltershausen Gl. and Wordie Gl.

2) Geology. The southern party should work in company with the cartographers south of 72° N. lat. in the late summer of 1931, making petrographic and stratigraphic investigations, and these should be continued next spring in the same district and on the southern part of Traill Ø.

The geologist stationed at the northern station should do stratigraphical work between Waltershausen Gl. and Wordie Gl., especially studying the Hercynian earth crust movements, and should in addition carry out ordinary geological mapping.

3) Zoology. During the first year (1931—32) the zoologist at the southern station should carry out marine biological investigations for the purpose of securing as detailed knowledge as possible of the lower (invertebrate) animal life in the fjord area in question, both of the bottom fauna and of the pelagic fauna. At the same time hydrographic investigations should be made.

At the northern station the work of the zoologist during the first year will consist in a thorough systematic and biological investigation of the higher animal life, on land as well as in the sea, and over as vast an area as possible; in addition, as large a number of birds as conditions permit should be ring-marked, and collections of lower animals both from land and from fresh water should be secured.

In addition to the thorough investigation of the biological conditions, both zoologists should make as copious collections as possible to be worked up subsequently by specialists in the different fields.

In the second year (1932—33) the two zoologists should change places, making investigations corresponding to those made during the first year at the new station.

The third year (1933—34) should be reserved for supplementary investigations.

4) Hydrography. The object of the hydrographical investigations is: to secure information about the hydrography of the waters between Iceland and Greenland at the time these waters are navigated by the vessels, and to secure information about the hydrography in the Greenland fjords while the ships are staying there and during the winter. This should be done by means of the investigations specified in the special instructions and by measurement of the depths to the bottom. These investigations should be carried out to the extent that circumstances permit.

In addition water samples should be brought home for special investigations, as mentioned in the special instructions. This part of the work should in all circumstances be carried out to its full extent.

5) Botany. The botanist at the southern station should make a statistical investigation of the vegetation types occurring there, as far as possible paying due regard to the environmental factors such as snow-covering and the like, and in addition he should collect critical species.

The botanist of the northern station, in addition to collecting higher plants, mosses, lichens, fungi, and samples of soil algae, should especially study the climatic and edaphic life conditions of the different types of vegetation, and make a statistic investigation of the types of vegetation. Further he should measure the snow-covering and observe its influence on the plant life.

6) Archæology. The object of the archæological investigations is to secure information about the extent and duration of the Eskimo habitations, the level of culture of the earlier population, and their occupations. Special importance should be attached to ascertaining whether alterations in their culture have taken place during the time the inhabitance lasted, and whether causes for the disappearance of the people from these regions can be ascertained (animal migrations, climatic changes, upheavals of the land, and the like). In the excavation season proper the archæologist should concentrate on careful excavations of large house ruins. Furthermore it would be desirable that finds of skeletons in graves should be made near the places where large excavations are carried out. During the first year the main work of the archæologist should be limited to the settlement found on Clavering Ø, at which the last Eskimos were seen by Clavering in 1823.

The two vessels s.s. "Gustav Holm" and s.s. "Godthaab" will be placed at your disposal. You are urged to keep in mind, however, that in making your arrangements you can only make use of the ships to the extent that the two captains may think safe under the given conditions —notably the ice conditions, but also the conditions that may arise because the waters you are to visit are almost unknown—and the captains should likewise participate in determining the time at which the ships should leave the east coast of Greenland.

In these instructions to you the committee wishes to point out that the main work to be done during the summer will be the building of the two main stations and the two sub-stations in the places stated below, and in this way as well as in other ways to provide, in the course of the summer, as good conditions as possible for the scientists who are to pass the winter in East Greenland. At the same time the committee points out that you should see that the scientists, wireless operators, and Greenlanders who are to remain in East Greenland during

the winter should be given every possible opportunity to commence the work assigned to them already this summer. The scientists who are to be at work during the summer only, should have as good working conditions as circumstances permit, but the boats should not be used in such a way that the building of the houses would be impeded thereby, and it is a matter of course that if particularly difficult work is to be done—for instance the erection of wireless masts may be mentioned —all the members of the expedition should take part in such work.

The committee does not intend to go into details in these instructions as regards the work itself, as a number of circumstances, of course principally the uncertain ice conditions, may interfere with the plans made beforehand. If you do everything in your power to carry through the programme discussed at the meetings of the committee, you are free to make such alterations as you may deem necessary during the course of the expedition.

The plan of the voyage is as follows:

You will leave Copenhagen on June 16th with Thorshavn as your first port of destination. Here you will take on board the dogs which have arrived to Thorshavn in the s.s. "Gertrud Rask". You will then proceed as soon as possible to Seydisfjord, where you will take in bunkers, and thence to the ice edge in about 74° N. lat., which you are supposed to reach about July 1st. You will then enter the ice and try to reach the mouth of Tyrolerfjord.

As soon as the ice conditions permit, both ships should go to Eskimonæs on the south coast of Clavering Ø, where s.s. "Gustav Holm" will unload the goods destined for the station to be erected in this place. When the unloading has been finished, and the ice conditions permit, the "Gustav Holm" should go southward to Kap Graah in the mouth of Kejser Franz Josephs Fjord. Here a party of geologists, who are to work here during the summer, should go ashore, and if after consultation with Captain ROSFELDT, who should receive detailed instructions before the two ships part company at Eskimonæs, you deem it justifiable to lower the two motorboats destined for the station to be erected on Ella Ø, and to let the personnel of the southern station sail them to Ella Ø via Sofia Sund, this should be done. If it is not considered advisable to let the personnel sail the boats to Ella Ø, the boats should remain on board till the ship reaches Nordfjord, where the materials for the northern sub-station should be unloaded and deposited on Strindbergs Land, and the personnel disembarked. In case of favourable conditions, some assistance in building the house may be given to this personnel, and if at this time the "Gustav Holm" is to clean her boilers at the head of Moskusoksefjord, a small travellers' hut should be landed and erected there.

Subsequently the "Gustav Holm" should proceed to Ella Ø, where she is expected to arrive about August 10th, and—if circumstances permit—the southern main station should be erected on the north coast of the island near Kap Oswald. The stay of the "Gustav Holm" at Ella Ø will probably extend over ten days.

It may be laid down as a general rule concerning the placing of the stations that the places should be chosen as far from stations already present, if any, as is compatible with the principal scientific or practical interests.

Further, the members of the expedition should take the greatest care to avoid friction between members of trappers' expeditions and members of the Danish scientific expedition. In this respect it is especially emphasised that the members of the expedition—apart from emergencies, necessary foraging, or scientific purposes—should refrain from hunting and catching, notably foxes, bears, and musk-oxen. Altogether the last-named animals should be spared to the greatest possible extent.

After her stay at Ella Ø, the ship should continue southward to lay out and erect one or two travellers' huts in the southern part of Kong Oscars Fjord. If ice conditions permit, the ship should continue to Nathorsts Fjord, where the southern sub-station is to be erected either near Kap Brown or near Kap Biot, according to the ice conditions. In case of favourable ice conditions, the crew of the ship may build this station, and in that case the ship is to assist the scientists who are to stay here in the best possible way until September 1st, after which date she should either go out through the ice or, according to wireless arrangement, await the arrival of the "Godthaab".

The "Godthaab" should remain at the northern main station until about July 10th; however, a small travellers' hut should possibly be built near Wordie Gletscher, and, if so desired by the hunting company Nanok, part of the goods destined for that company should be unloaded and deposited at the station Sandodden in Tyrolerfjord. If the ice conditions are favourable, and it will not impede the work—whether the scientific work or the unloading and building of the station at Eskimonæs—you should send a motorboat to Germania Havn, provided the Nanok is not represented in Tyrolerfjord, so that the trappers of the company who are to return home, will understand the situation as soon as possible.

About August 10th the "Godthaab" should go northward, visiting Germania Havn on Sabine Ø, depositing goods for the Nanok Company, and, if the captain thinks it advisable in view of the ice conditions, proceeding to Kuhn Ø and Hochstetter Forland, where the small short-wave transmitter, procured for the means provided by the private collection started by the "Ekstrabladet", should be disembarked. About

August 18—20th the "Godthaab" must again pass Sabine Ø on her southward route. If necessary, a visit should again be paid to Eskimonæs, otherwise the ship should proceed to Kejser Franz Josephs Fjord, where the geologists at work at Kap Graah should be taken on board. From here the ship should go to the northern sub-station, which should be inspected, and onward to the southern main station, which should likewise be inspected, and then to the southern sub-station in Nathorsts Fjord.

In case the Norwegian inland ice expedition (MEHREN and HØYGAARD) should start to cross the inland ice, you will be kept informed over the wireless about the time this expedition leaves the west coast.

In view of this the "Godthaab" should wait at Waltershausen Gl. until September 1st in order to possibly pick up and carry home the Norwegian expedition. If after September 1st, the "Godthaab" should be obliged to leave Waltershausen Gl. without having obtained connection with the Norwegians, provisions should be made for a search for them later by boat and sledge in the places where they may be expected to arrive. Only if the ice conditions should turn out to be extremely difficult, may this plan be altered, and if so, wireless information about the alteration should be given in due time. The ship should only stay at the east coast of Greenland north of Scoresby Sund after September 1st if the captain agrees to it, and no pressure on your part should be brought to bear on the captains as to this point, and no more of the coal supplies of the ship should be used for the benefit of the stations than the captains may deem justifiable with a view to the voyage down through the ice belt to the nearest Icelandic port.

The committee considers it of importance that at the end of August before leaving East Greenland you personally should have an opportunity of inspecting the various stations. Only if it should be necessary for the sake of the Norwegian inland ice expedition to remain at Waltershausen Gl. till September 1st, and judging from the ice conditions at this time it is regarded as risky to go to Nathorsts Fjord, should you, on board the "Godthaab", go out through Kejser Franz Josephs Fjord and thence out through the ice. You should then over the wireless instruct the captain on the "Gustav Holm" to write a report on the conditions at the southern sub-station immediately before he leaves it to go out through the ice.

The committee requests you, before leaving the various main stations and sub-stations after a last inspection, on behalf of the committee to point out to the wintering persons the responsibilities and difficulties involved in carrying out the scientific tasks during the wintering in East Greenland. You should point out to the wintering personnel that their behaviour must not at any point give rise to criticism later on,

for instance that they should not without compelling reasons do anything that might put obstacles in the way of the activities which may be established in the places where the stations are placed. You should also make it quite clear to the personnel that a wintering, especially if one has but little or no experience, is a serious affair, that the object is to carry out scientific work and not to create unnecessary elements of risk by undertaking hazardous journeys at difficult seasons of the year or on to the inland ice, and that both during their stays in the houses and on journeys the personnel should use the greatest caution both as regards persons and equipment. Furthermore you should point out to the personnel that the various scientists, wireless operators, and Greenlanders should show due consideration for each other, and thus always aim at ensuring the best possible total result.

In conclusion you are requested to submit to the committee as soon as possible after your return a detailed report on the work carried out during the summer in East Greenland, while at no time either you or any of the other members of the expedition should make any statements to the newspapers regarding questions that do not come under the scientific tasks, which alone constitute the object of the expedition.

Copenhagen, June, 1931.

(signed)

Daugaard-Jensen.
Director of the Greenland Administration, President.

Fr. Graae.
Permanent Under-secretary of state, Vice-president.

Ad. S. Jensen.
Professor in the University.

Martin Knudsen.
Professor in the University.

Victor Madsen.
Director of the Geological Survey of Denmark.

N. E. Nørlund.
Professor in the University, Director of the Geodetic Institute.

Thomas Thomsen.
Curator at the National Museum.

Instructions were likewise given to the captains of the expedition ships. The subjoined instructions may serve as an example.

INSTRUCTIONS
for
Captain N. C. VESTMAR as master of the s.s. "Gustav Holm" on a voyage to Northeast Greenland with the scientific expedition sent out under the leadership of Dr. phil. LAUGE KOCH.

The ship will leave Copenhagen on June 5th, 1933, for Akureyri in North Iceland. On arrival there the captain must see that the ship's supply of coal is supplemented as much as possible with a view to the onward voyage.

The ship will carry private mail for addressees at Scoresbysund, and you should do your very best in order that this mail may reach its place of destination even in case the ship should not call at Scoresbysund on her upward voyage. Official mail and goods will not be dispatched on this occasion. Mail for addressees in Northeast Greenland should be delivered at the main stations for forwarding.

At Akureyri Dr. LAUGE KOCH will meet you to make further preparations for the continuation of the voyage to Northeast Greenland as the Administration has placed the ship at the disposal of the Three-Year Expedition to East Greenland this summer.

The leader of the expedition will be Dr. LAUGE KOCH, who will decide how the ships are to be employed, until the expedition starts its homeward voyage, possibly from Scoresbysund. The Administration urges you to keep in mind that it is a scientific expedition, and that it is desirable that the tasks which Dr. KOCH instructs you to undertake should be carried out in such a way that the ship gives the greatest possible assistance in the solution of these tasks.

As to the special tasks to be carried out by the captain of the "Gustav Holm" and her crew, you will receive from Dr. KOCH, in the name of the Committee, special, more detailed instructions, which must be followed as far as possible. If, in view of the circumstances, alterations of these instructions are considered necessary, the leader of the expedition shall, if possible, be informed hereof over the wireless. If Dr. KOCH is unable to get into communication with the ship, the captain must, to the best of his judgment, make such changes of the programme as he thinks necessary.

As regards the voyage itself, the Administration wishes to point out that you will have to pass waters very little known, and you should, of course, show extreme caution in the navigation of the ship. It is also for you to decide on the course to be taken under difficult ice conditions or other circumstances not to be foreseen, and Dr. KOCH or his substitute has been enjoined not to urge you to do anything as the master of the ship which may involve any risk for the safety of the ship or for her wintering in East Greenland. It is likewise the captain who is to decide what coal supplies can be delivered to the stations ashore. Only such quantities should be supplied that it will be possible for you to proceed, with a good conscience, from the northern district to an Icelandic port, where coal may be obtained if necessary.

The captain shall, especially during the outward and homeward voyage, at certain intervals inform the Administration of the position of the ship. This should, however, be done in the code employed by the expedition. Further, the captain should enjoin the wireless operator that none of the members of the expedition must send

home to the press private telegrams concerning the expedition or its activities.

If in the course of the summer Dr. KOCH should be prevented from sending home to the Administration a weekly report on the progress of the expedition, the master of the ship should send home such a report, and he shall be entitled at any time to ask for information about the scientific work to be used for such a brief report to the Administration.

This summer, as last summer, extensive flights will be made in East Greenland. If during one of these flights a mishap should take place which requires immediate assistance, the captain of the ship shall see that all scientific work is immediately stopped, and shall at once set out for the place whence he thinks that help may best be offered. At the same time the captain shall communicate over the wireless with the other ship in order to come to an agreement with this as to the most effective help. If both ships participate in the work of rescue, this should be organised under the leadership of Captain VESTMAR assisted by Mr. SEIDENFADEN, who on account of his knowledge of the plans and materials of the expedition will be especially well qualified as adviser for Captain VESTMAR, always provided that Dr. KOCH is unable personally to organise the measures required.

In conclusion the Administration desires to emphasise again that the object of the journey to be undertaken is scientific, and that the master of the ship, while paying due regard to the difficult conditions for navigation, should assist the work of the expedition in the best possible way.

The Administration of Greenland, June 7th, 1933.

THE EXPEDITION 1931

Personnel.

	LAUGE KOCH, leader.
	E. TULINIUS, surgeon.
	G. SEIDENFADEN, in charge of the equipment.
s.s. "Gustav Holm".	H. L. ROSFELDT, captain.
	L. M. COULET-SVENDSEN, first mate.
	P. V. FUNDER, second mate.
	R. E. NIELSEN, first engineer.
	V. S. POULSEN, second engineer.
	H. K. SANDBORG, wireless operator.
	Crew: thirteen men.
s.s. "Godthaab".	H. G. NORDHOEK, captain.
	P. M. J. HANSEN, first mate.
	P. L. RASMUSSEN, second mate and wireless operator.
	S. L. BAUMBACH, first engineer.
	A. SCHULTZ, second engineer.
	Crew: eleven men.
Topographical mapping.	1st party:
	TH. JOHANSEN, geodesist.
	2nd party:
	O. SIMONSEN, geodesist.
	S. O. STENØR, cartographer.
Practical geology.	D. MALMQVIST, geologist.
Vertebrate palæontology.	Devonian party.
	G. SÄVE-SÖDERBERGH, palæontologist.
	EIGIL NIELSEN, scientific assistant.
	DAN LAURSEN, assistant.
	H. LETH-PEDERSEN, assistant.
Stratigraphy and geological mapping.	1st party:
	H. FREBOLD, palæontologist.
	H. POSER, scientific assistant.
	2nd party:
	C. TEICHERT, geologist.
	H. HANSEN, assistant.

	3rd party: A. NOE-NYGAARD, geologist. B. PÜRSCHEL, assistant.
Zoology.	1st party: A. PEDERSEN, vertebrate zoologist.
	2nd party: G. THORSON, marine biologist.
Botany.	1st party: P. GELTING, botanist.
	2nd party: TH. SØRENSEN, botanist.
Archæology.	HELGE LARSEN, archæologist. A. SCHWARCK, assistant.
Personnel at the station Eskimonæs.	AXEL NIELSEN, wireless operator. JOHAN DAVIDSEN, Greenlander, dog driver.
Personnel at the station Ella Ø.	AA. DE LEMOS, wireless operator. JØRGEN PETERSEN, Greenlander, dog driver. BENJAMIN SAMUELSEN, Greenlander, dog driver.

In addition three trappers were engaged during the summer, chiefly to assist in building the houses.

The Voyage of the s. s. "Godthaab" and the s. s. "Gustav Holm" from Copenhagen to the East Greenland Coast.

June 16th.—At 5 p.m. the two ships of the expedition, the "Godthaab" and the "Gustav Holm", left Copenhagen. The Prime Minister Mr. TH. STAUNING, the minister of education Mr. F. BORGBJÆRG, the members of the committee of the expedition, and the secretary of the Royal Danish Geographical Society, General F. CASTONIER, were present at the departure; in addition, a number of Greenland explorers and persons taking an interest in the work in Greenland, of whom mention may be made of the discoverer of the Angmagssalik tribe, Commodore GUSTAV HOLM, after whom one of the ships had been called, Vice-Admiral G. C. AMDRUP, various members of the Danmark Expedition, Captain EJNAR MIKKELSEN, and a great many relatives of the members of the expedition. The Prime Minister held a speech, which was broadcast, and the orchestra of the Royal life-guard played national tunes.

June 25th.—In the afternoon the ships arrived at Thorshavn, where the Greenland vessel "Gertrud Rask" had arrived a few days before with 52 dogs, 2 tons of dog-food, three dog sledges, and three Greenlanders for the expedition. The ships left Thorshavn on June 27th, and called at Seydisfjord on June 30th to coal. The ships left Seydisfjord on July 2nd.

On Thirsday the 2nd of July at 9.30 a.m. both ships left Seydisfjord. The height of the barometer was 753.5 mm. Outside the fjord the wind blew from the northeast, force 1, and the sky was overcast. The ships did not keep company, but were to enter the pack-ice independently of each other a little south of 74° N. lat. and subsequently to meet at Eskimonæs on Clavering Ø. Owing to the thick weather the ships soon lost sight of each other, but, of course, they kept each other informed of their positions several times daily.

Next day the barometer was falling, and the wind gradually increased to ENE. force 5. The wind continued all night, culminating on July 4th with an ENE. wind of force 7 and rain, so early in the morning the ships had to heave to, and for the following twenty-four hours they made very little progress.

In the morning of July 5th the rain ceased, and the wind decreased so much that the ships were able to proceed.

Next morning (July 6th) it was practically calm, but foggy; in the course of the night the barometer had risen to 760 mm. At 3 p.m. the "Godthaab" sailed through a belt of scattered ice, and in spite of the fog everything indicated that we were in the immediate neighbourhood of the ice-edge. The position of the ship on meeting the ice was c. 72°15′ N. lat., 15° W. long. (estimated); owing to thick weather no observations had been made since the departure from Seydisfjord. At 9 p.m. the ship again encountered scattered ice, and steered eastward.

Next forenoon, July 7th, the "Godthaab" reached the latitude in which, according to agreement, it was to enter the ice, so she headed westward, and at 8 p.m. entered the ice-edge. The ice proved to be close-packed, so the ship advanced but slowly. In the night the barometer was high, c. 765 mm, and there was a light southerly wind with fog.

On July 6th the "Gustav Holm" had a slightly more easterly position than the "Godthaab". At 11 p.m. it encountered occasional ice floes, and at 0.40 a.m. of July 7th she reached the ice-edge and proceeded northward along the ice. At 4 p.m. the ship passed a belt of scattered ice, and at 6 p.m. she entered the ice, which was more or less open, so it was possible to advance till 4 a.m. next morning. The "Godthaab", which lay c. 10 miles farther westward, had to stop by the same time. Height of the barometer c. 760 mm. It was calm, or with a very light southerly wind, but foggy. In the evening the fog passed away.

None of the ships advanced notably on July 8th, 9th, and 10th. The positions of the ships and of the ide-edge until July 9th are rather uncertain, but on that day it cleared so much that bearings could be taken both to the sun and to the shore, and all the day the two ships

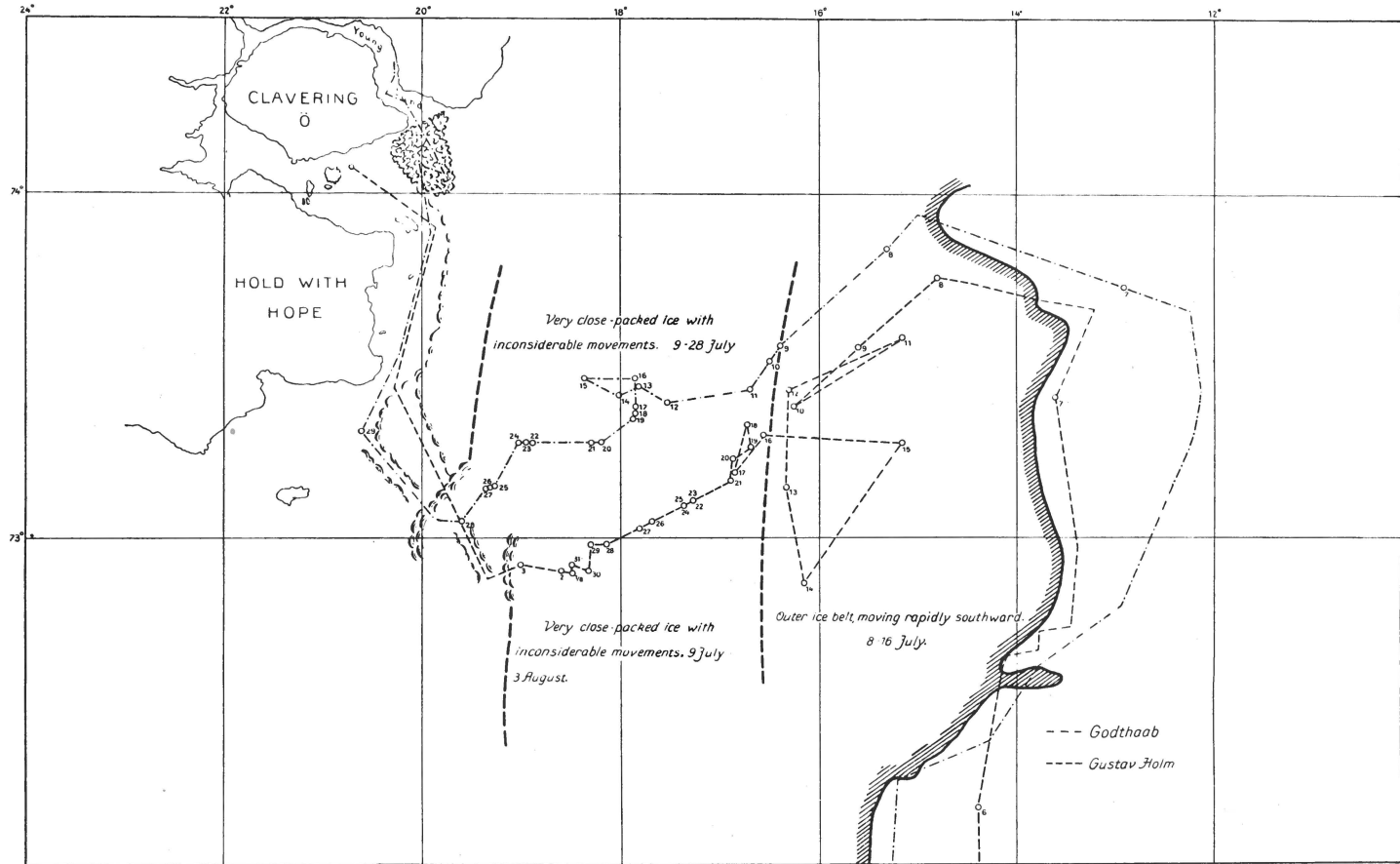


Fig. 7. Routes of s.s. "Gustav Holm" and s.s. "Godthaab" through the pack-ice belt in 1931.

were in sight of each other. From the "Godthaab" the American ship the "Morrissoy", Captain BARTLETT, and the Norwegian ship the "Polarbjørn", with Mr. HOEL on board, were seen in the ice.

The ice packed closely, and practically no open water could be sighted in any direction. However, the observations showed that in the days of July 8th—10th the ships had been drifting fairly rapidly southward; the "Gustav Holm", which lay nearest the ice-edge, drifted more rapidly than the "Godthaab".

In the evening of July 10th, when the ice grew more open eastward, the "Gustav Holm" followed a northeasterly course in order not to drift too far southward, and proceeded all night in scattered ice. In the morning of July 11th the ice began to pack, and at 2.40 p.m. no advance was possible. It was calm and practically clear, and the ship moored at an ice floe.

On July 12th the "Gustav Holm" drifted in a southwesterly, and for the next two days in a southerly direction, being carried very far southward. In the afternoon of July 14th it was possible to advance in a northeasterly direction, and by noon of July 15th the ship had covered about half the distance it had drifted southward and again lay rather far eastward. Till about 3 p.m. of July 16th the ship sailed westward in close-packed ice.

In the afternoon of July 10th and the forenoon of July 11th the "Godthaab" advanced some distance westward. It would seem that on July 11th and 12th the vessel drifted westward with the ice. On July 11th the "Godthaab" had reached the central part of the ice-belt, where the movements were inconsiderable, while the "Gustav Holm" did not reach this part of the ice-belt till July 16th.

For the next ten days the weather was very settled, and the barometer changed but little. It was mostly clear and calm, or the wind blew with force 1 alternately from the northwest and the southwest. No large areas of open water were observed from either of the ships in the central part of the ice-belt, where the "Godthaab" lay from July 11th to 27th and the "Gustav Holm" from July 16th to August 3rd. The advance of the ships during this time was inconsiderable, for long periods practically nil, though the "Godthaab" was able to move a little among the floes every day. The ice consisted of large unbroken ice fields separated by close-packed floes of thinner ice evidently formed in the months of spring. Fairly high and newly formed pressure ridges were found in several places, and often the ice packed, though slightly, around the ships. During this period the ships drifted slowly southward, but still approached the shore.

In the night between July 24th and 25th the "Godthaab" drifted rather rapidly southwestward, on July 25th, 26th, and 27th she lay in

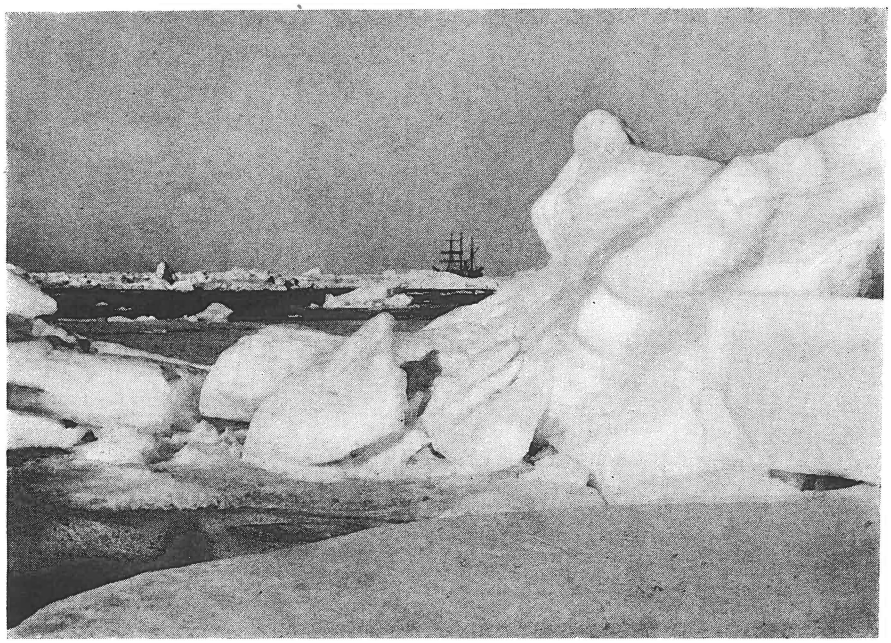


Fig. 8. From the middle part of the pack-ice belt, July 1931.

the same place, but between the 27th and 28th she again drifted rapidly southwestward. By noon of July 28th the ice began to scatter, and the ship advanced fairly well in a westerly direction. In the night it was forced to stop, but at 9 a.m. of July 29th it proceeded in scattered ice towards Hold with Hope, reaching the land water at 2 p.m. At 8 p.m. the ship passed Arundel Ø in very open ice. In the early morning of July 30th she encountered fairly close-packed ice in Gael Hamkes Bugt, but she managed to push through the ice, and at 9.30 next morning approached the shore near the trappers' station Sandodden.

In the meantime the "Gustav Holm" had drifted southward almost as far as 73° N. lat. At last, in the morning of August 3rd, after laying in practically the same place for nearly eight days, the ship suddenly reached scattered ice and shortly after land water, and sailed northward at a rapid rate all day. At 4 p.m. next day it approached Eskimonæs.

Remarks on the ice-belt in July.

The voyage through the ice showed that there was a fairly close-packed and marked ice-edge, outside which there were some few narrow belts of scattered ice. When the ships reached the ice-edge, the weather was settled and calm, but foggy, and during the voyage through the ice it was unusually clear and calm. The ice was extraordinarily compact, consisting partly of large unbroken ice fields, and partly of many small,

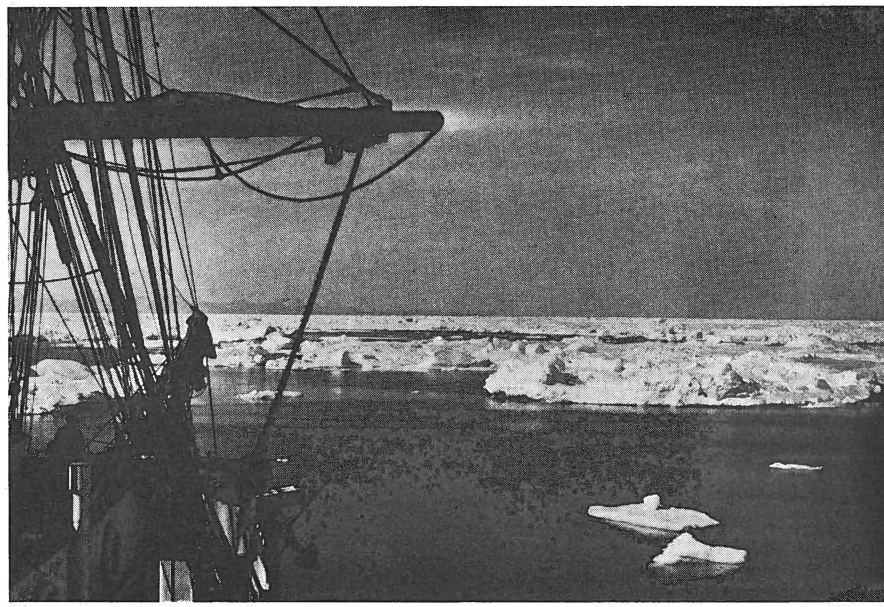


Fig. 9. One of the few leads in the pack-ice in 1931. 1931

thin floes between the large, much older floes. About August 1st these young ice floes, no doubt formed in the spring, had grown so thin by melting that they suddenly disappeared. The result was that not only the "Godthaab", but a few days later also the American and the Norwegian ships rather suddenly reached the shore. About eight days later the "Gustav Holm" struck a belt of scattered ice. That is to say, similarly to the "Godthaab", the "Gustav Holm" had gradually approached the shore, and as it was rather late in the summer, the ship suddenly passed from very close-packed ice into a belt with large spaces of open water between the ice floes, all the thin floes having melted away. Owing to the long period of calm weather in the latter half of July, there was a broad belt of land water along the whole coast about August 1st.

The Stay of s. s. "Godthaab" in Young Sund, July 30th to August 5th.

After reaching the land water, the ship went into Young Sund, for, as all the materials for the houses were found on the "Gustav Holm", the "Godthaab" chiefly carrying the provisions, it served no purpose to go to Eskimonæs before the arrival there of the "Gustav Holm". From the expedition in 1929 we knew that good working conditions for the

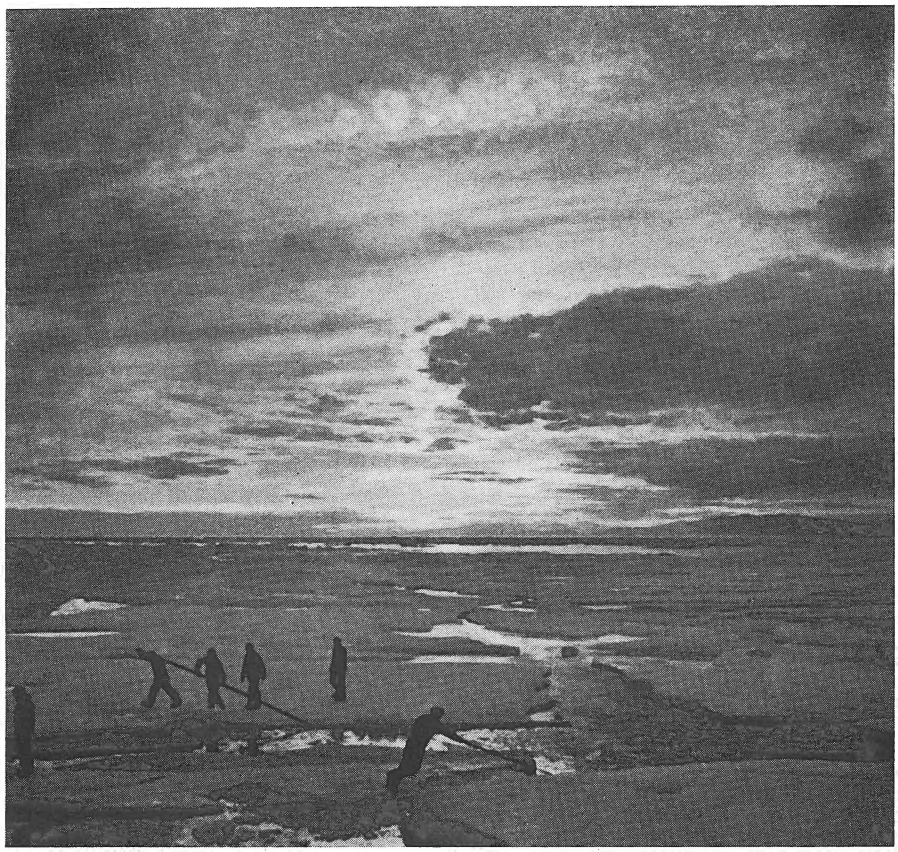


Fig. 10. Attempts at making a passage through the ice. 1931

geologists would be found in Young Sund. We therefore at once set about to make the motorboats ready, to erect camps, etc.

On July 30th, at 9.30 a.m., the ship cast anchor off the trappers' station Sandodden, and at 1.10 p.m. a motorboat with a party consisting of FREBOLD, SEIDENFADEN, POSER, and DE LEMOS started for the mouth of Skiferdal south of Cardiocerasbjerg. At the same time another motorboat started towards the northwestern point of Clavering Ø with a party consisting of SÄVE-SÖDERBERGH, NOE-NYGAARD, and LAURSEN.

Next day the ship unloaded various provisions for the trappers. As the barometer was falling, and fog set in, the ship changed its place on August 1st, casting anchor at 2 p.m. in the bay near Lille Sødal, where she was more sheltered from the ice masses that drifted into the sound. There was a lively traffic between the two camps and the ship, among other reasons in order that the scientists who were to pass the winter in Greenland might have an opportunity of making themselves acquainted with the motors.

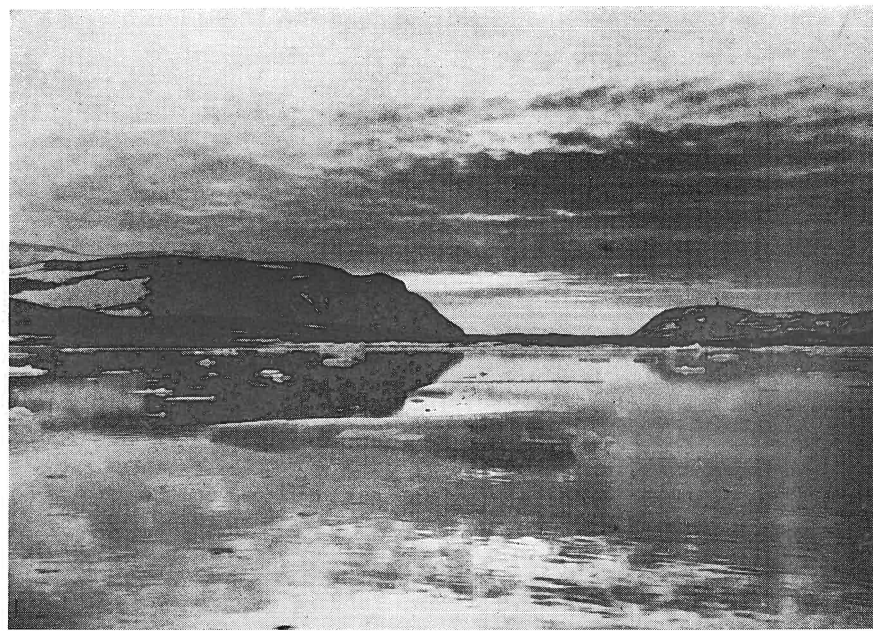


Fig. 11. Land-water along the coast. 1931

On August 4th, when the "Gustav Holm" unexpectedly began to advance in the scattered ice, a motorboat started at 1 p.m. to fetch the camp from Clavering Ø. At 8 p.m. another motorboat went to FREBOLD's camp to remove it farther up the fjord and supply it with provisions, as it was the plan that FREBOLD with two assistants were for the present to remain in the camp. At midnight both the boats were back at the ship, which then made preparations to depart, but for various reasons she did not leave the place till 1 p.m. of August 5th. The ship anchored off Eskimonæs at 8.45 p.m. without having been troubled by the ice.

Immediately after his arrival to the camp, FREBOLD made rich finds of fossils in the neighbourhood, and in company with some other members of the expedition he made excursions to the valleys around Cardiocerasbjerg. SEIDENFADEN was preparing a detailed map of the region around the camp, which was to serve for the geological investigations, and he also continued the topographic work commenced in 1929 and 1930. Thus he climbed various mountain peaks to make observations from them, for instance Zackenberg. For trips along the coast the party had a jolly-boat provided with a 5 hp outboard motor. In these days the weather was rather bad, and the party was often troubled by cold northerly winds. The camp was to be fetched to Eskimonæs about August 10th, but owing to northerly winds, very strong

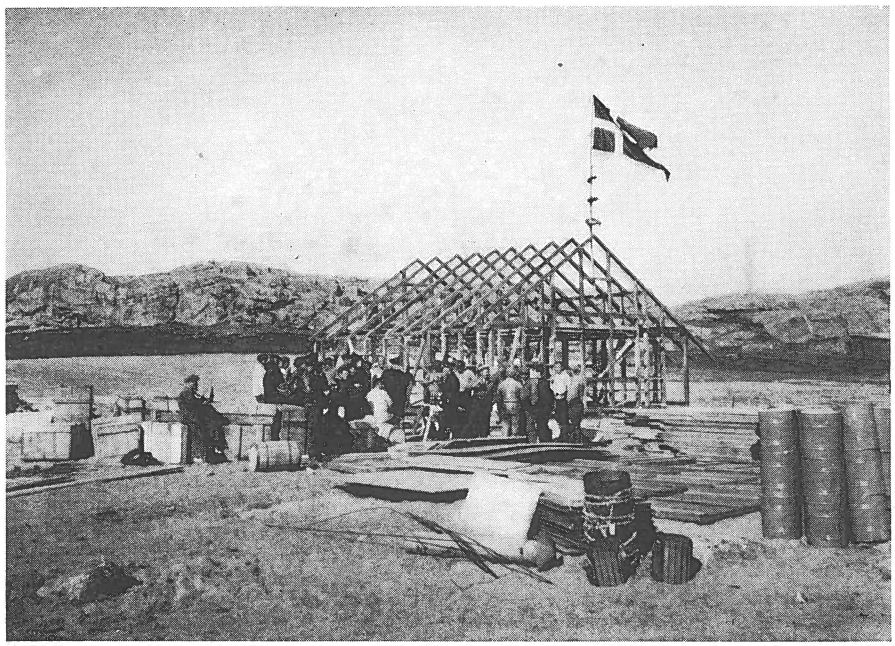


Fig. 12. Building of the station Eskimonæs. 1931

locally, the motorboat which was to fetch the camp did not arrive till August 11th at 6 p.m. It returned to Eskimonæs with the party at 2 a.m. on August 12th.

Building of the station house at Eskimonæs.

The "Gustav Holm" arrived at Eskimonæs on August 4th at 2.20 p.m., and after various investigations by motorboat to find a suitable anchorage and favourable conditions for unloading, the ship cast anchor. In the afternoon JOHANSEN, who was to be the leader of the station, and Captain ROSFELDT inspected various localities in order to find the most suitable place for erection of the station.

After the arrival of the "Godthaab" at 8.45 p.m. the two ships came to an agreement as to the most practical way of unloading. Furthermore it was decided that owing to the late arrival of the ships all the members of the expedition with the exception of the scientists who were to work in East Greenland during the summer only, and the archæologist HELGE LARSEN, were to assist in the unloading of the goods and the building of the station. HELGE LARSEN at once erected his camp near the ancient Eskimo settlement at Dødemandsbugten east of Eskimonæs. Furthermore three trappers, who were to return home that summer, were

engaged to assist in the building of the house, and thus about fifty-five men were occupied in this work.

In the morning of August 5th both the ships lowered all their boats, motor-boats, life-boats, and jolly-boats. In the afternoon the crew of the "Godthaab" went ashore to receive the goods from the "Gustav Holm". This division of the work continued next day (August 6th), but at 4.30 p.m. the unloading had to be stopped owing to a high sea and wind from the southeast. As the wind abated in the evening the work was continued from 11 p.m. to 4 a.m. of August 7th, when all the goods for Eskimonæs on board the "Gustav Holm" had been unloaded. Then the goods on board the "Godthaab" were unloaded, which work was finished at 11.30 a.m. After resting in the afternoon, all hands were at work, building the house in the evening from 7 to 22.30 p.m. Subsequently some dogs and passengers were taken on board the "Gustav Holm", which at 2.50 a.m. of August 8th weighed anchor and headed southwards.

For the next five days until August 12th incl. the whole crew of the "Godthaab" and several members of the expedition were engaged in building the house, usually from 6 a.m. to 9 p.m. On August 9th the large radio mast was erected, on the 10th the windows were fitted in and a large part of the provisions were stored in the loft and the sheds; in the evening of August 12th the house was finished outwardly so that the personnel of the station and the carpenter could easily do the rest of the work. During the period of house-building the weather was fine, generally clear, with light westerly winds, which kept the so-called East Harbour free of drift-ice.

On August 5th, as soon as the boats had been lowered into the water, SÄVE-SÖDERBERGH accompanied by his assistants and MALMQVIST set out to erect a camp at Fossilelv near Brinkley Bjerg, where they remained till August 8th, when the "Gustav Holm" started southward. Then MALMQVIST and one assistant were removed to Stensiös Plateau on Hold with Hope, whence they were fetched again in the morning of August 13th. FREBOLD was fetched from Young Sund, arriving at the ship at 2 a.m. of August 12th. On the same day my old friend Captain BOB BARTLETT in his ship the "Morrissey" visited Eskimonæs.

The trip of the "Godthaab" northward from Eskimonæs.

In the morning of August 13th SEIDENFADEN went by motorboat to Home Forland to fetch the MALMQVIST party. The boat returned at 11.15 a.m., and half an hour afterwards the "Godthaab" left Eskimonæs, heading northward in fine weather. At 5.20 p.m. the ship passed Kap Borlase Warren without having met any ice; the land water off



Fig. 13. Coal-mining at Hochstetters Forland. 1931

the cape was estimated to be about 9 miles broad. At 9.45 p.m. the ship cast anchor near Hvalrosø. Soundings were taken from motor-boats, and at 10.30 p.m. the ship moved as near as possible to the Danish house at Germania Havn. During the whole voyage SEIDENFADEN had been drawing landscape sketches, and he at once went ashore to do various cartographic work near the house.

Next morning (Aug. 14th) the ship unloaded provisions, coal, and timber for the trappers at Germania Havn, and loaded some cases with fox-skins. This work was finished at 1 p.m., when the ship proceeded northward in fine and clear weather. Off Bass Rock the belt of land water was about seven miles broad, and the ice belt beyond seemed to be close-packed. Between Bass Rock and Hochstetters Forland occasional floes of fjord ice were encountered, but they presented no hindrance to navigation. At 1.30 (Aug. 15th) the ship cast anchor off the trappers' station on the south coast of Hochstetters Forland.

In the early morning KOCH, the mate RASMUSSEN, FREBOLD, POSER, and SEIDENFADEN went by motorboat to the coal-bearing beds on the west coast of Hochstetters Forland. After a preliminary investigation KOCH and RASMUSSEN returned to the ship, while the FREBOLD-party commenced the geologlcal investigations of the coal beds along the coast. The ship unloaded various goods for the trappers from 8 a.m. to 2.30

p.m. and then started for the coal locality, where she cast anchor at 4.30 p.m. From 6.30 to 10.30 p.m. six tons of coal were mined and loaded into the ship.

Aug. 16th.—On August 16th the coal-mining was continued in clear and calm weather, and 30 tons of coal were loaded into the ship. The FREBOLD-party continued its geological investigations, in the course of the day ascending Muschelbjerg. In the evening KOCH and SEIDENFADEN went by motorboat to the trappers' station on Hochstetters Forland to negotiate with the trappers.

Aug. 17th.—Next morning (August 17th) the ship left the place at 4 a.m., called at the trappers' station, where two trappers came on board, and continued in fine weather past Bass Rock without being troubled by the ice. At 3 p.m. the ship made a short halt, and a boat was sent to the house on Sabine Ø. At 20.30 the ship passed Kap Borlase Warren, where the ice edge, which seemed to be close-packed, was observed about 10 miles from the shore. At 11.55 p.m. the ship cast anchor off the trappers' station Sandodden. SEIDENFADEN at once went ashore to make cartographic observations. Immediately after her arrival, the ship lowered her motor-boat and jolly-boat and unloaded 5 tons of coal for the station until 2.30 a.m. At 4.20 she weighed anchor and arrived at Eskimonæs at 9.35 a.m. In the afternoon and next day 18 tons of Hochstetter-coal were unloaded for the Eskimonæs station, which now had a supply of 12 tons of English coal for the first year, 10 tons of English coal extra in case the supplies should fail to arrive next year, and now in addition 18 tons of Hochstetter coal. On August 19th two men of the crew and the carpenter worked all day on the house, which might now be regarded as finished.

In the morning of August 18th KOCH, FREBOLD, POSER, and SCHWARCK started for Kap Stosch to make geological observations, which lasted till about 9 p.m., when a strong fjord wind carried the fog into the fjord. They managed to reach the south coast of Clavering Ø, and sailing along this coast the motorboat reached the ship by midnight.

Inspection of the southern stations.

In the early morning of August 20th the wintering party came on board the ship to take leave, and after a short ceremony the ship weighed anchor at 5 a.m. to leave Eskimonæs for good.

It was clear and calm. At 9.30 a.m. we passed Jackson Ø. At 1 p.m. the ship reached an ice-floe with fresh water, and for the following two hours the tanks of the ship were filled with fresh water. Meanwhile SEIDENFADEN took bearings to different points of the coast from the ice floe. At 5 p.m. the ship passed Hold with Hope. The land water

along the outer coast was estimated to be 8 miles broad. At 10.50 p.m. we passed Kap Franklin.

At 2.15 a.m. (Aug. 21st) the ship stopped off SÄVE-SÖDERBERGH's camp south of Vinterøer, where KOCH and two men went ashore. The ship continued into Duséns Fjord, and at 9 a.m. cast anchor near the head of the fjord. The following two days were spent cleaning the boilers. In the meantime POSER and SEIDENFADEN made various scientific observations in the neighbourhood of the ship. A living musk-ox calf was taken on board and later let loose on Ella Ø.

On August 24th the ship hoisted the boats, and at 9 a.m. she sailed out of the fjord. From 2 to 3 p.m. SÄVE-SÖDERBERGH's camp was taken on board. The greater number of the party were at work at Celcius Bjerg and were fetched by SEIDENFADEN in a motorboat. At 5 p.m. the ship passed Kap Graah and turned into Kejser Franz Josephs Fjord, passed Kap Ovibos about 9 p.m., and stopped off Nordfjord from 9 to 10 p.m. The house was inspected, nobody was at home, but the inmates had left message for us, stating that they were staying at the mouth of Geologfjord. Although it was rather dark and cloudy, and a rather high wind was blowing from the southeast, we found the tent at Kap Ovibos after some time's search. A boat was lowered, and from 4 to 5.15 a.m. (Aug. 25th) KOCH visited the camp, in which stayed JOHANSEN, TEICHERT, and the Greenlander JOHAN. After various negotiations the ship headed southward and anchored off the station on Ella Ø at 4.45 p.m. An attempt to unload goods for the station had to be given up owing to the high sea. A fresh wind was blowing from the southeast.

On August 26th it was clear and calm, and at 11 a.m. KOCH and the SÄVE-SÖDERBERGH party started by motorboat towards the southern part of Kongeborgen. On the return voyage the party encountered a strong northwesterly wind near Kap Elisabeth, and before the boat reached Ella Ø the wind was blowing with such a force that it was difficult to enter the ship from the motorboat.

On August 27th the WNW. wind blew nearly all day with unabated force. The crew was engaged on land in carrying provisions from the shore to the house. In the evening the wind and the swell decreased so much that 14 tons of ballast could be taken in (from 6.30 to 23.15 p.m.).

Next day (August 28th) it was slightly overcast, but the WNW. wind continued. 50 tons of ballast were taken on board. Some members of the crew were working at the station house, and at 11 p.m. the electric installation was finished, and the light could be switched on both inside and outside the house. In the evening it was calm but overcast, and the barometer was falling.

In the morning of August 29th, at the first break of dawn, the ship weighed anchor at 3.30 a.m., and after we had taken leave of the

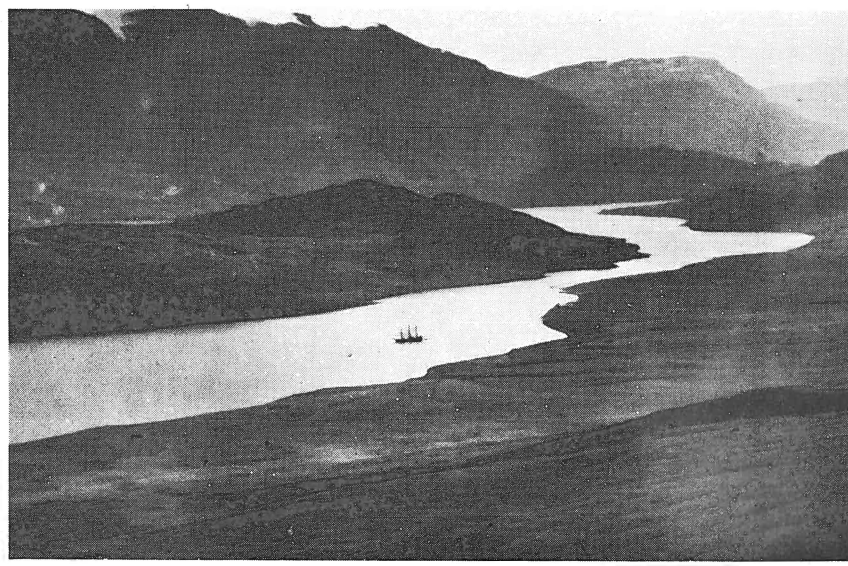


Fig. 14. s.s. "Gustav Holm" in the interior of Moskusoksefjord. 1931

wintering party, the ship went southward in calm weather. From 7.45 to 9.35 a.m. the ship stopped south of Kongeborgen to take on board SÄVE-SÖDERBERGH's party (three men). At 4 p.m. we passed Kap Biot without encountering any ice. At 6.30 to 7.50 p.m. KOCH was ashore to inspect the house at Kap Brown and make the final arrangements with NOE-NYGAARD and the Greenlander stationed there. Subsequently the ship left the Greenland coast for good. At 11.30 p.m. she passed Kap Wardlaw and sailed southward in land water along Liverpool Kyst.

Aug. 30th.—Continued southward in land water about six miles broad. It was almost calm and clear. In the afternoon a halt was made at an ice floe to fill the tanks with fresh water, and at 4.30 p.m., almost off Rathbone Ø, the ship left the coast, sailing in a southeasterly direction in scattered ice with many large icebergs.

On August 31st the weather was fine and it was almost clear, with a light NNW. wind. In the night the ice had at times packed rather closely around the ship, but in the morning we sailed in a belt of scattered ice floes and at 1 p.m. passed the ice edge.

The "Godthaab" arrived at Copenhagen on September 8th.

Building of the three southern stations. s. s. "Gustav Holm".

In the evening of August 7th the "Gustav Holm" made ready to leave Eskimonæs. At 1.45 a.m. of August 8th the passengers southward bound came on board the ship, and at 2.50 a.m. the ship started south-

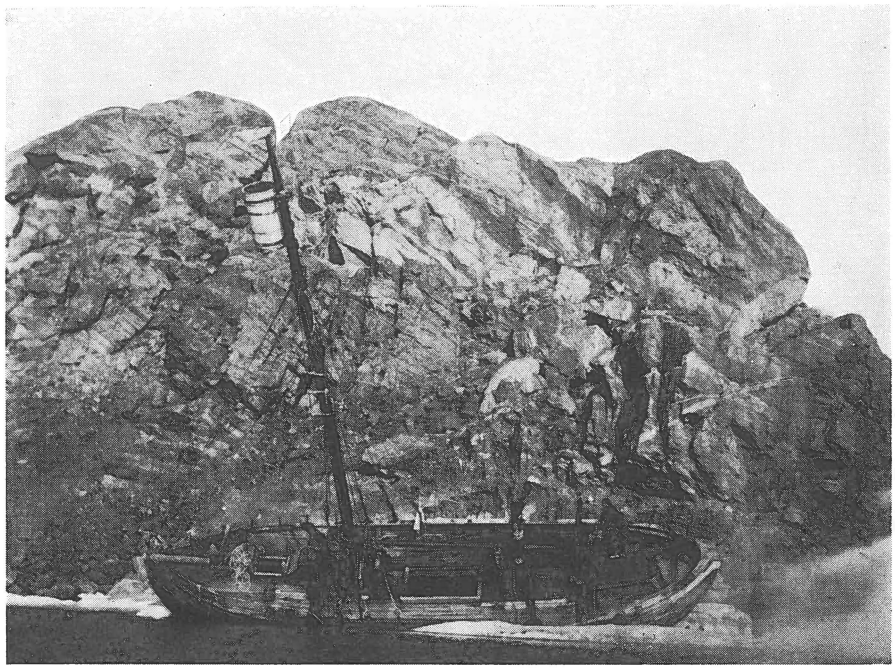


Fig. 15. Wreck of small Norwegian sealing vessel on St. Finsch Ø. 1931

ward. It was calm and slightly overcast. No ice hindrances were encountered during the southward voyage, Gael Hamkes Bugt was practically free of ice, and along the outer coast there was a broad belt of land water with occasional ice floes. After passing Jackson Ø, the ship moored at an ice floe from 11 a.m. to 4.20 p.m., taking in 15 tons of fresh water from a pool on the ice.

Next day (August 9th) the ship stopped off Vinterøer to set ashore SÄVE-SÖDERBERGH's party (SÄVE-SÖDERBERGH, EIGIL NIELSEN, LAURSEN, and LETH PEDERSEN) with camping outfit and provisions. The ship then turned into Kejser Franz Josephs Fjord and anchored at noon off the kerosene depot in Nordfjord established by the Danish expedition in 1929. The motorboat P. 1, the motorboat of the ship, and the life-boat were lowered, and from 2.45 p.m. to 9.30 p.m. all materials and provisions for the Nordfjord station, 20 tons, were unloaded.

On August 10th all hands were engaged in building the house from 6 a.m. to 9.30 p.m. The work was continued next day from 6 a.m. to 11 p.m. By noon that day the ship had to cast one more anchor owing to a strong northerly wind.

Aug. 12th.—The house-building was continued from 6 a.m. till noon, when the house was finished, and provisions and all kind of outfit

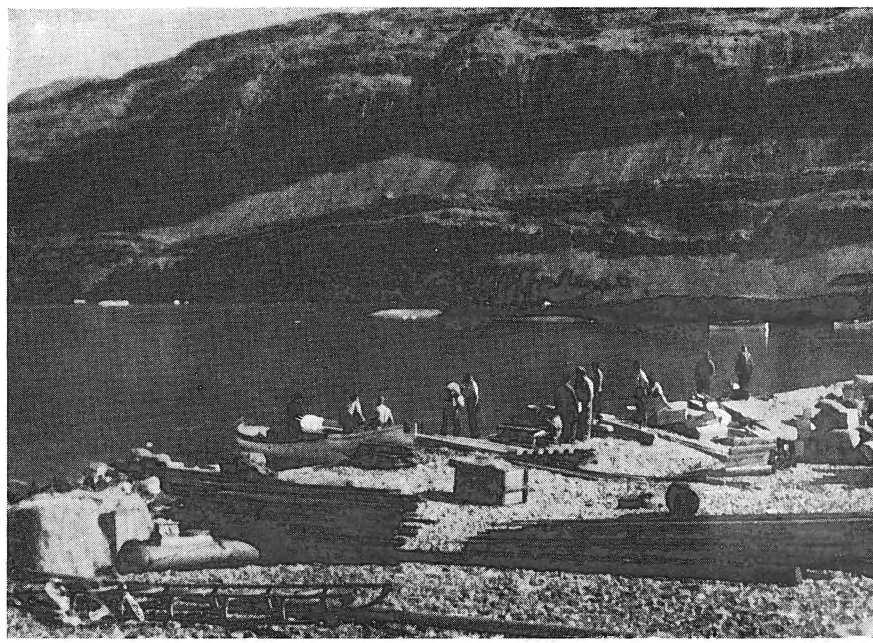


Fig. 16. Unloading of goods at Ella Ø. 1931



Fig. 17. The motorboats are taken ashore on Ella Ø. 1932



Fig. 18. The dogs are taken ashore. 1931

were stored. JOHANSEN, TEICHERT, the Greenlander JOHAN, and the motorman HAAGEN HANSEN remained at the station. The motorman was to instruct the party in attending the motor of P. 1. At 1.30 p.m. the ship left the Nordfjord station southward bound.

Aug. 13th.—At midnight she arrived at Ella Ø, where the southern main station was to be erected. Soundings were made in the harbour till 3.40 a.m. At 6 a.m. the motorboat P. 2 (hydrographers' boat), the motorboat of the ship, and other boats were lowered, and 40 tons of goods were unloaded from 7.15 a.m. to 10 p.m. The weather was fine and calm.

Aug. 14th.—The weather continued fine and calm. From 6 a.m. to 5.30 p.m. another 40 tons of goods were unloaded, which meant that all the goods for the Ella Ø station had been unloaded. The building of the house was started at once with the assistance of all hands, and continued till 10 p.m.

Aug. 15th.—From 6 a.m. till noon 15 tons of coal for the station were unloaded. The ship's two carpenters worked ashore all day till

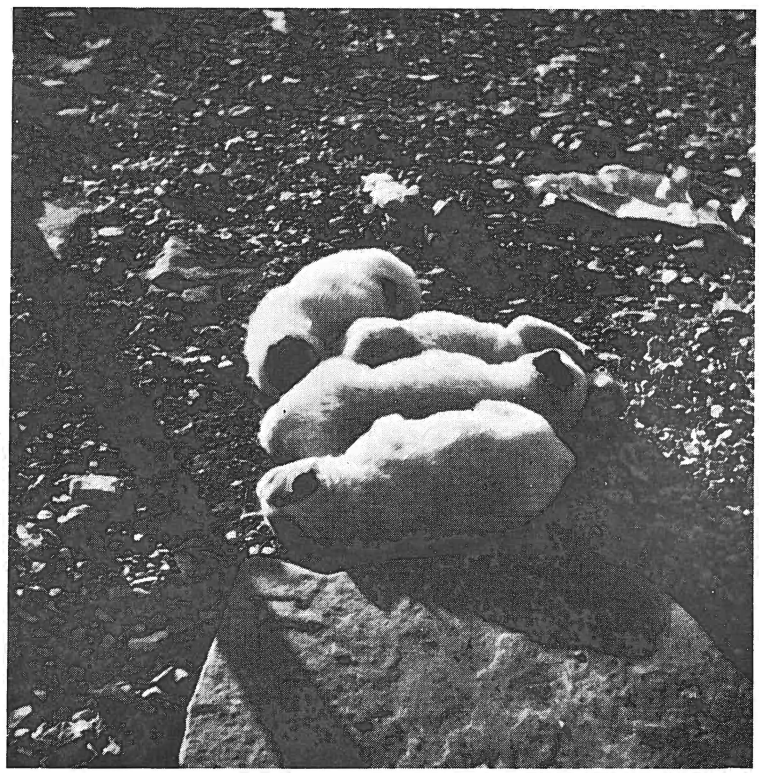


Fig. 19. New-born pups. 1931

10.30 p.m. In the afternoon coal were shifted on board the ship from the stern hold to the bunkers.

Aug. 16th.—Work on the ship. In the afternoon 9 tons of ballast were taken in. The wintering party, three trappers, and the two carpenters were at work on the shore all day, building the house.

Aug. 17th.—From 6 a.m. to 10 p.m. the building of the house was continued ashore, while the ship took in 49 tons of ballast. The weather was calm and fine.

Aug. 18th.—The building of the house was continued till 10.30 a.m., when a wireless message was received from the "Godthaab" in Young Sund, stating that the motorman HAAGEN HANSEN had injured his hand; the "Godthaab" received the message in a letter forwarded by a Norwegian ship. All the passengers of the "Gustav Holm" immediately went ashore, the motorboat was hoisted, and the ship, leaving the two carpenters ashore, headed towards Nordfjord, where she arrived at 1.15 a.m. of August 19th.

Aug. 19th.—At 8.35 a.m. the ship left Nordfjord with HAAGEN HANSEN on board, who was attended by the doctor, and at 9.30 p.m. she cast anchor off the station on Ella Ø.

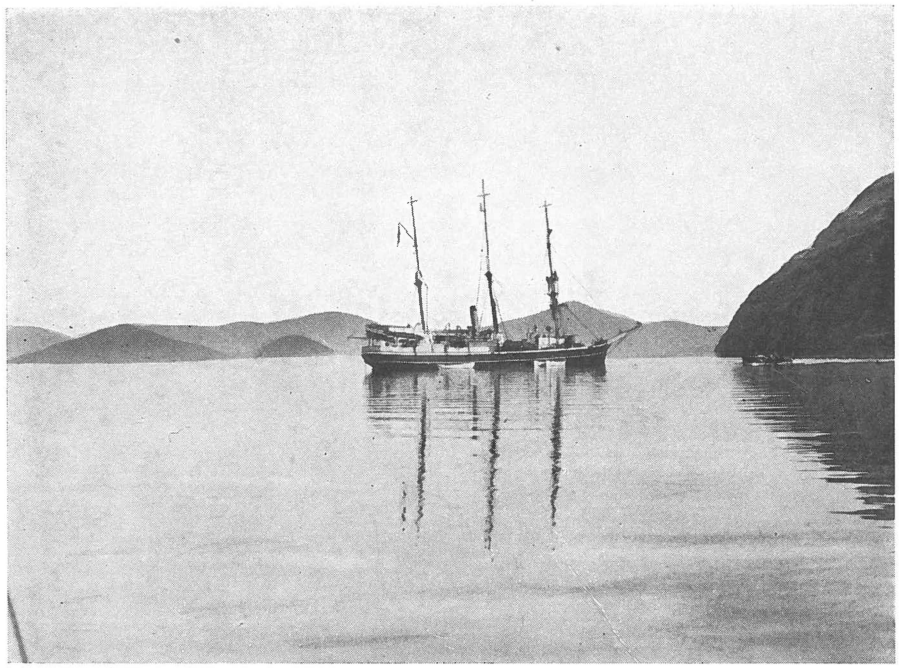


Fig. 20. The s.s. "Gustav Holm" in the harbour at Ella Ø. 1931

Aug. 20th.—All hands worked at the house from 4 p.m. to 9.30 p.m.

Aug. 21st.—All hands worked at the house from 6 a.m. to 9.30 p.m.

Aug. 22nd.—All hands worked at the house from 6 a.m. till noon, when the house was practically finished, and the provisions stored. At 1.30 p.m. the wintering party went ashore, and at 1.50 p.m. the ship left Ella Ø. It was cloudy, with a light southwesterly wind. During the whole period of house-building the weather had been fine.

Aug. 23rd.—At midnight the ship passed the easternmost of the Archers Øer and at 10.15 a.m. she cast anchor in Fleming Fjord southwest of Kap Brown. From 11 a.m. to 9 p.m. the materials for the Kap Brown house, altogether 9 tons, were unloaded. As soon as the first boards had been carried ashore, the carpenter assisted by two men commenced the building of the house, continuing the work all day. When the ship arrived to Fleming Fjord, there was a light easterly wind, it was cloudy, and the barometer was falling.

Aug. 24th.—The wind increased in force, and the fall of the barometer continued. The work at the house was continued from 6 a.m. to 9 p.m.

Aug. 25th.—The barometer was rising, but at the same time the wind increased somewhat. After intensive work from 6 a.m. till 11.30 a.m. the house was practically finished and the provisions stored, and

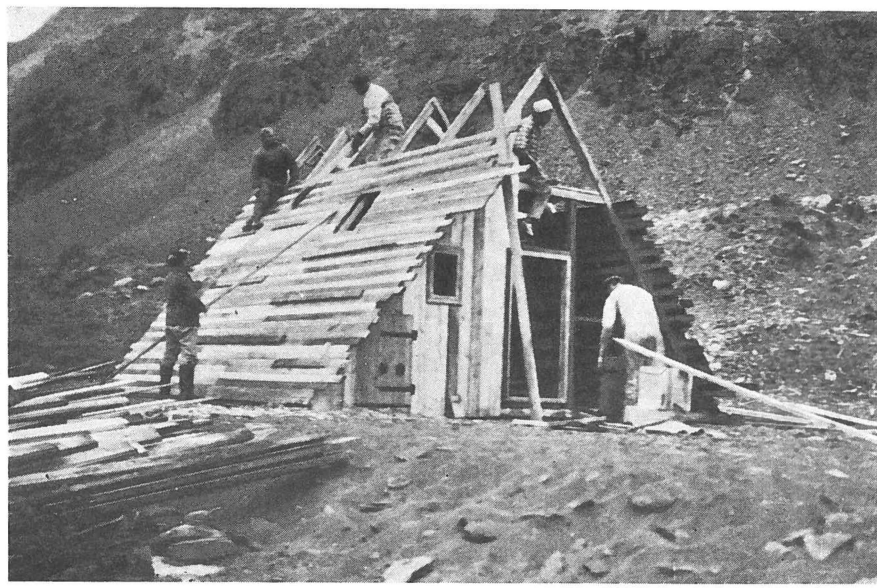


Fig. 21. Building of the station at Kap Brown. 1932

at 11.50 a.m. the ship left the place, heading in a southwesterly direction from Kap Wardlaw and sailing in scattered ice all day.

Aug. 26th.—The S.E. wind had increased to force 4. The sky was overcast, and in the night came some snow. In the morning the ship moored at an ice floe, from which it took in 8 tons of fresh water. Most of the day till midnight the ship was moored at the ice floe, advancing but slightly in the close-packed ice.

Aug. 27th.—The wind increased to N. force 5 with rain. Inconsiderable advance owing to close-packed ice until 9 p.m., when the ice began to scatter and the ship made fairly good progress.

Aug. 28th.—The rain ceased, the visibility improved, the wind decreased and at the same time became more westerly. The ship made good progress in scattered ice all day. In the evening the ice packed more closely, but at midnight she reached the ice-edge and struck open water in 71°59′ N. lat. 18°11′ W. long.

The "Gustav Holm" arrived at Copenhagen on September 6th.

Summary of the Summer Expedition 1931.

The expedition comprised two vessels and 65 members.

S.s. "Godthaab": Passage through the ice belt on upward voyage 21 days, stay at the shore 32 days, voyage out through the ice nearly 24 hours.

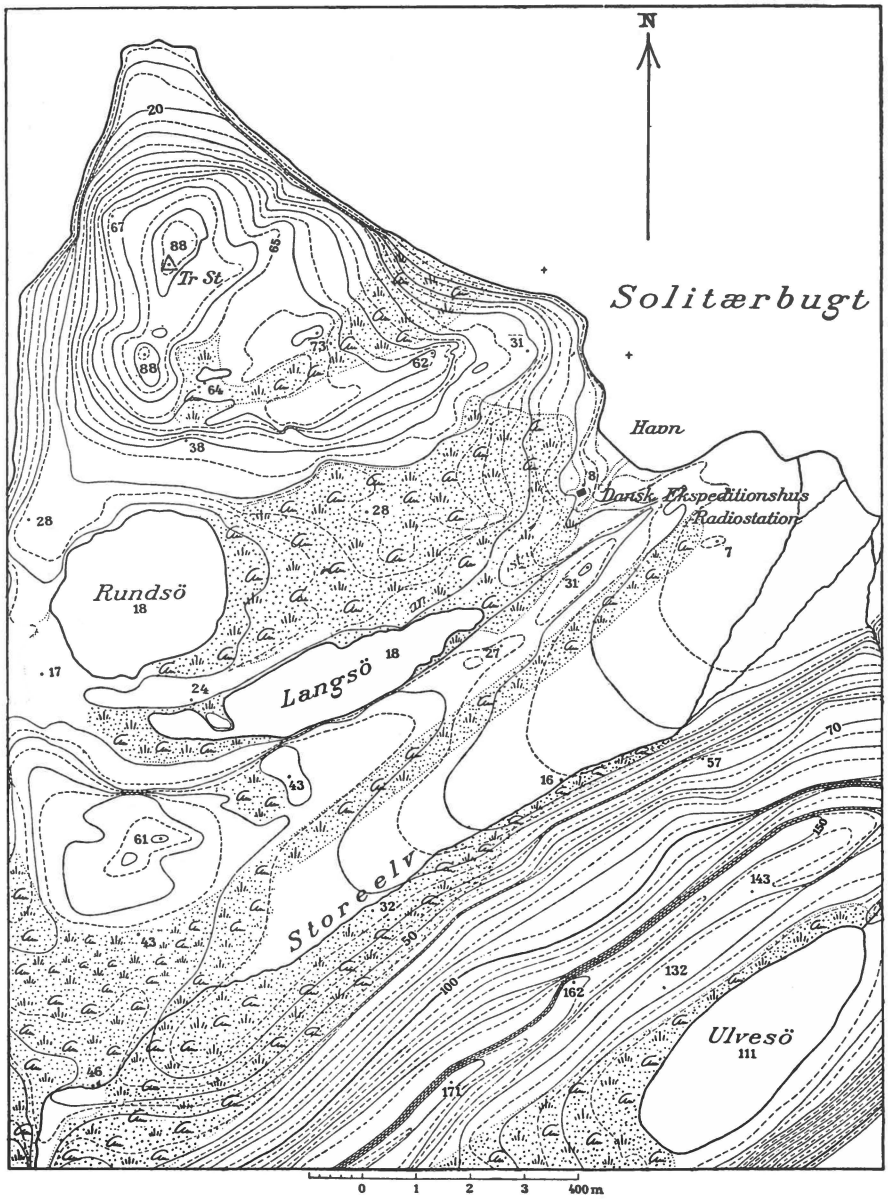


Fig. 22. Detail-map of the surroundings of the Ella Ø station.

S.s. "Gustav Holm": Passage through the ice belt on upward voyage 29 days, stay at the shore 24 days, voyage out through the ice belt about $3^1/_2$ days.

During the first part of the summer the ice conditions were extremely unfavourable, and the vessels' stay in the ice on their way to the coast was much more protracted than planned. From the end of July a belt

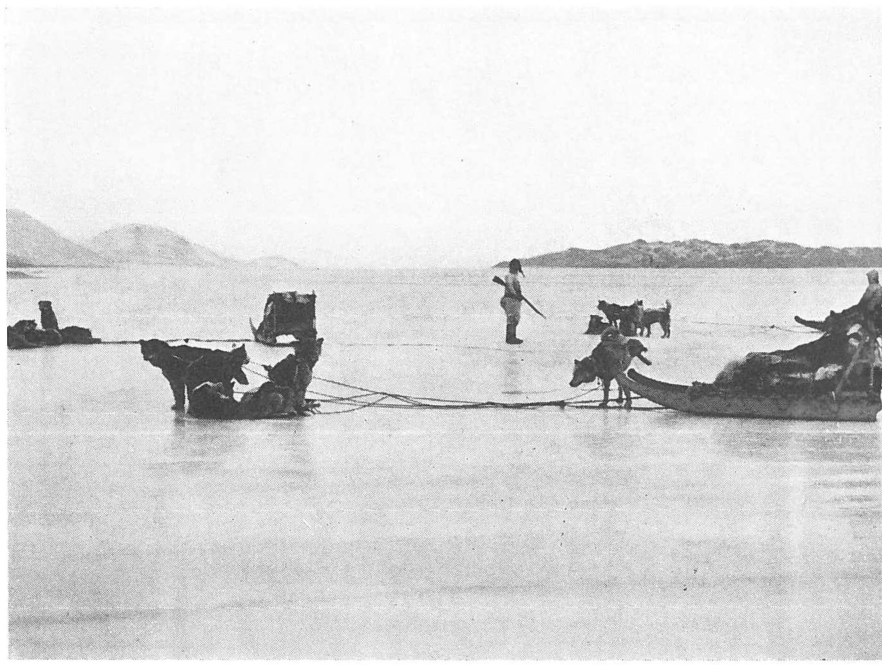


Fig. 23. Seal-hunting on young ice. 1931

of land water was found along the coast. In the fjords the weather was characterised by light or moderate westerly winds. The voyage out through the ice was not impeded very much by the ice belt.

The principal object of the expedition was the establishment of the two main stations Eskimonæs and Ella Ø and the two substations Nordfjord and Kap Brown. Materials for four smaller travelling huts were transported to East Greenland in the ships, but owing to the short stay at the coast these huts were not built, and the materials were deposited on Ella Ø. Owing to the building of the houses, the members that were to remain in East Greenland during the winter could not commence the work entrusted to them till after September 1st. On the other hand the weather was extraordinarily fine, calm, and fairly warm during the greater part of September.

The work of the summer parties was not very comprehensive, among other reasons because during the building of the houses only a limited number of motorboats could occasionally be placed at their disposal. This work comprised:

1) Practical-geological investigations. In the winter of 1930—31 various newspaper notes indicated that a Norwegian-American tourist, who had visited East Greenland in 1930, had found traces of oil. It was therefore decided that Dr. D. MALMQVIST, who had previously been



Fig. 24. Hunting trip after the first snow-fall.

at work in the oil fields of Mexico and in other places, should measure the sections through the most important sediment localities within the district. He succeeded in carrying out this programme, measuring the following sections: the Permian and Triassic beds at Brinkley Bjerg; the Triassic and Cretaceous beds on the coast southwest of Finsch Øer; the Carboniferous at Hallebjergene on Clavering Ø; and the Devonian at Celcius Bjerg on Ymers Ø and at Kongeborgen on Traill Ø.

2) Collection of vertebrate fossils. Since in 1929 large quantities of Devonian vertebrate fossils were collected on Ymers Ø near NATHORST's old locality, a party consisting of G. SÄVE-SÖDERBERGH with three assistants was equipped according to agreement with Professor E. STENSIÖ, Stockholm. At first G. SÄVE-SÖDERBERGH made a geological investigation of the northeastern part of Clavering Ø in cooperation with A. NOE-NYGAARD. Later on he and his assistents worked in company with D. MALMQVIST at Brinkley Bjerg, and finally, when the "Gustav Holm" went southward, he and his party were landed near Celsius Bjerg. Here the party was at work for more than two weeks, while several other members of the expedition temporarily assisted in collecting fossils. While the ship lay at Ella Ø, the party made collections at Kongeborgen for a couple of days.

3) Collection of invertebrates and stratigraphical investigations. The party consisted of FREBOLD and POSER, at times assisted by several of the other members of the expedition. The party was mostly at work in Young Sund, where it soon found extremely good localities in the Permian, and collections were also made from Cretaceous beds. Subsequently the party had the opportunity to make investigations around the coal mine and at Muschelbjerg on Hochstetters



1931

Fig. 25. The two Norwegian explorers shortly after their crossing of the inland ice from the west coast to Kejser Franz Josephs Fjord.

Forland. Finally, FREBOLD made observations on the tectonics of East Greenland, mostly from the ship.

The short working time was utilised to the utmost by the above-mentioned summer parties, and large collections and important results were secured.

Wintering Parties 1931—32.

Eskimonæs.

TH. JOHANSEN, cartographer.
C. TEICHERT, geologist.
A. PEDERSEN, vertebrate zoologist.
P. GELTING, botanist.
HELGE LARSEN, archæologist.
AXEL NIELSEN, wireless operator.
A. SCHWARCK, assistant.
JOHAN DAVIDSEN, Greenlander, dog-driver.

Ella Ø.

O. SIMONSEN, geodesist.
S. O. STENØR, cartographer.
A. NOE-NYGAARD, geologist.
G. THORSON, marine biologist.
TH. SØRENSEN, botanist.
AA. DE LEMOS, wireless operator.
JØRGEN PETERSEN, Greenlander, dog-driver.
BENJAMIN SAMUELSEN, Greenlander, dog-driver.

THE EXPEDITION 1932

Personnel.

	Lauge Koch, leader.
	E. Tulinius, surgeon.
	G. Seidenfaden, in charge of the equipment.
s.s. "Gustav Holm".	N. C. Vestmar, captain.
	T. M. Jørgensen, first mate.
	P. V. Funder, second mate.
	R. E. Nielsen, first engineer.
	H. Lindahl-Holst, second engineer.
	S. G. D. Christensen, wireless operator.
	Crew: 14 men.
s.s. "Godthaab".	H. L. Rosfeldt, captain.
	P. M. I. Hansen, first mate.
	P. L. Rasmussen, second mate and wireless operator.
	S. L. Baumbach, first engineer.
	A. Møller, second engineer.
	Crew: 12 men.
Topographical mapping.	1st party:
	A. B. C. Madsen, cartographer.
	P. Halfdaner, cartographer.
	A. Schwarck, assistant.
	2nd party:
	L. Bruhn, cartographer.
	L. Kofoed, cartographer.
	A. Arnholz, assistant.
	3rd party:
	Th. Johansen, cartographer.
	V. Devantier, cartographer.
	S. A. Larsen, assistant.
	4th party:
	O. Simonsen, geodesist.
	S. O. Stenør, cartographer.
Aviation and air photography.	1st party:
	N. V. Petersen, chief pilot.
	E. Overbye, pilot.

V. KRAMME, wireless operator, mechanic.
H. J. JENSEN, mechanic.
H. HERSCHEND, chief photographer.
H. H. NIELSEN, photographer.
JUUL SØRENSEN, developer.

2nd party:
H. HARMS, chief pilot.
J. MÜNTER, pilot.
FRODE HANSEN, wireless operator, mechanic.
FREDE KJÆR, mechanic.
J. TOVDAHL, chief photographer.
E. BONDE-HANSEN, photographer.
V. JENSEN, developer.

Practical geology.

H. G. BACKLUND, leading geologist.
D. MALMQVIST, geologist.
S. KAMMAN, assistant.
SCHOURUP SØRENSEN, in charge of the ponies.

Vertebrate palæontology.

Devonian party:
G. SÄVE-SÖDERBERGH, leading palæontologist.
T. SÄVE-SÖDERBERGH, scientific assistant.
A. LINDGREN, scientific assistant.
E. JOHANSSON (JARVIK), scientific assistant.

Permian-Triassic party:
EIGIL NIELSEN, palæontologist.
ALEXANDER JENSEN, assistant.
M. KØIE, assistant.

Stratigraphy and geological mapping.

1st party:
C. TEICHERT, geologist.
E. DRASTRUP, assistant.

2nd party:
E. WEGMANN, geologist.
A. E. POULSEN, assistant.

3rd party:
A. NOE-NYGAARD, geologist.
B. PÜRSCHEL, assistant.

Zoology and hydrography.

1st party:
A. PEDERSEN, vertebrate zoologist.

2nd party:
HOLGER MADSEN, zoologist.

3rd party:
J. BRÆNDEGAARD, zoologist.

4th party (on board the "Godthaab"):
R. SPÄRCK, leading zoologist.
G. THORSON, marine biologist.
HELGE KNUDSEN, hydrographer.

Botany.	1st party: P. GELTING, botanist. 2nd party: TH. SØRENSEN, botanist.
Archæology.	HELGE LARSEN, archæologist. P. V. GLOB, assistant.
Personnel of the station Eskimonæs.	AXEL NIELSEN, wireless operator. V. LUDVIGSEN, motorman. JOHAN DAVIDSEN, Greenlander, dog driver. JØRGEN BARNABAS, Greenlander, dog driver.
Personnel of the station Ella Ø.	AA. DE LEMOS, wireless operator. JØRGEN PEDERSEN, Greenlander, dog driver. BENJAMIN SAMUELSEN, Greenlander, dog driver.

Introduction.

The expedition left Copenhagen on June 15th and arrived at Akureyri on June 25th. The leader and some members of the expedition went by the liner to Reykjavik, arriving there on June 30th and continuing in the naval inspection ship the "Hvidbjørnen" to Akureyri next day. In the morning of July 5th all the three ships started from Akureyri northward bound.

The summer expedition 1932 was to a great extent characterised by the planned flights. The Royal Danish Navy had placed two seaplanes and a personnel of four pilots and four mechanics at our disposal. Furthermore, there were four air photographers from the Army Flying Corps and two developers. Since flying and air photographing in Greenland as well as transport of seaplanes to Greenland had never been done before, we were confronted with a number of tasks which in the first instance caused various difficulties. It was generally held that the "Gustav Holm" would be able to transport one of the seaplanes, whereas the "Godthaab" was regarded as too small to carry a plane across the Atlantic. The other seaplane, transported to Reykjavik on board the liner, was therefore placed on the after-deck of the naval inspection ship the "Hvidbjørnen", which was stationed in the waters around Iceland that summer. The plan was that the "Hvidbjørnen" with the seaplane, the leader of the expedition, a pilot, and a mechanic on board should go from Iceland to the ice edge almost off Clavering Ø, where the seaplane should be lowered to fly to Clavering Ø.

Voyage from Iceland to Eskimonæs. s. s. "Gustav Holm".

July 5th.—The three ships, "Gustav Holm", "Godthaab", and "Hvidbjørnen", left Akureyri on July 5th, at 10.10 a.m., northward

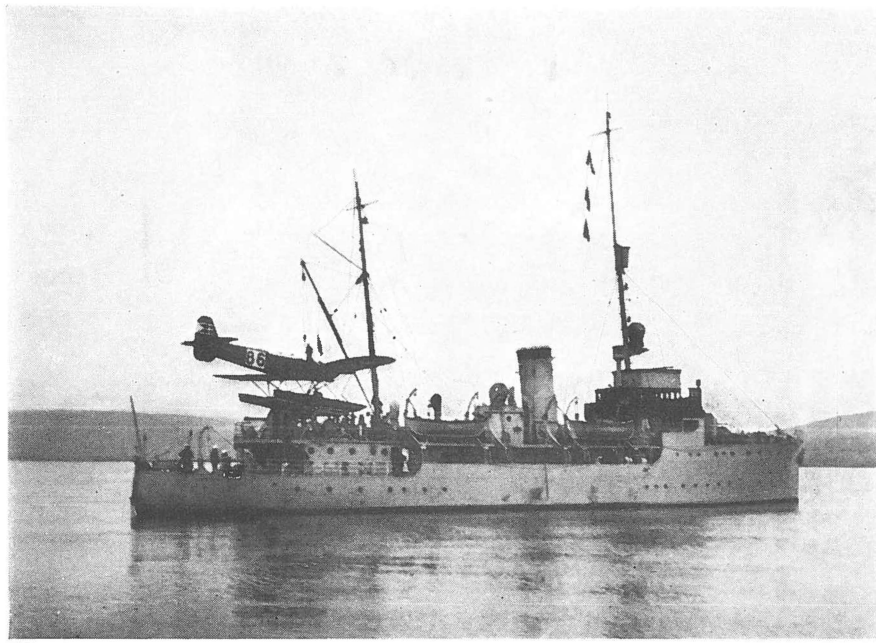


Fig. 26. The "Hvidbjørnen" with one of the seaplanes of the expedition. 1932

bound. It was cloudy, with banks of fog and light winds from the north. During the whole week a strong wind had been blowing from the north owing to a depression over Iceland which still seemed to linger there. However, the wireless messages from Scoresbysund reported extraordinarily favourable ice conditions at the mouth of the sound, and moreover we might encounter better weather if we moved away from the depression.

The "Hvidbjørnen", which proceeded twice as rapidly as the "Godthaab" and the "Gustav Holm", lost sight of these two ships even at the mouth of Øfjord. North of Iceland there was a heavy swell owing to the strong and continuous north winds that had been blowing for the last eight days. The "Hvidbjørnen" shaped her course towards Scoresby Sund to meet the ice edge there and subsequently to proceed northward along the ice edge.

July 6th.—At about 2 p.m. the "Hvidbjørnen" encountered the first ice floes. There was a light easterly wind and a heavy swell from the north, and in the afternoon it grew foggy. At first the ice was very scattered, so the "Hvidbjørnen" was able to keep her course. However, soon the ice grew more packed, and as the swell was very heavy, and a collision with an ice floe would mean a catastrophe to the "Hvidbjørnen", which was not built for ice navigation, it was decided that

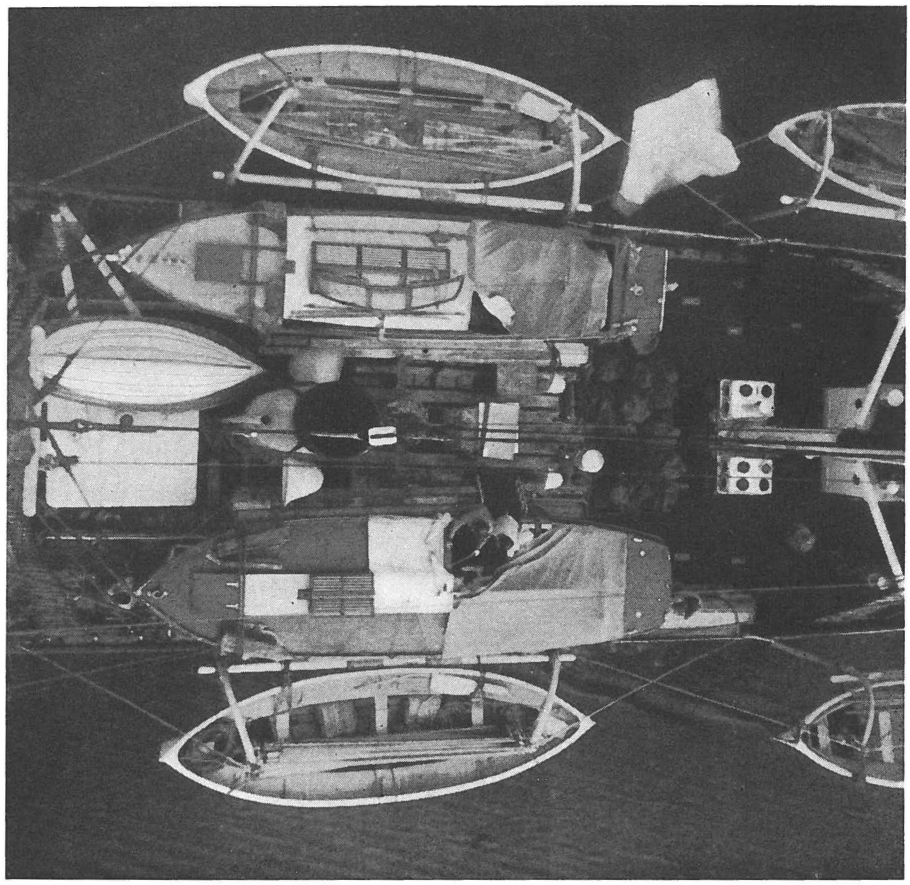


Fig. 27. View of the "Gustav Holm" from the crow's nest.

the "Hvidbjørnen" should return to Akureyri and leave the seaplane there; it was then to be fetched by the "Gustav Holm" when this ship had carried the other seaplane to Scoresbysund. However, as it was desirable that the cartographic work from the air should begin as soon as possible, an attempt was made in the afternoon to obtain wireless communication with the "Gustav Holm", in order that the leader of the expedition and the flying personnel might go on board that ship and take over the seaplane there.

Over the wireless the chief pilot on the "Gustav Holm", the mechanic, and the two captains BRUHN and HERSCHEND were ordered to make ready to go on board the "Hvidbjørnen". The chief pilot was then to continue the negotiations with the French expedition at Akureyri about the transport of one of the seaplanes to Scoresbysund on one of the French ships.

July 7th.—At midnight the two ships met, guided by wireless signals. It was calm and foggy, but the heavy swell continued. The passengers were exchanged without great difficulty, and at 0.30 a.m. the "Hvidbjørnen" continued to Akureyri, while the "Gustav Holm" headed towards Scoresby Sund. In the forenoon it was blowing up from the northwest; later the wind became more northerly, increasing at the same time to force 6. At 3 p.m. the ship encountered the first ice floes, and in the evening she passed, in the course of an hour, a belt of very close-packed ice, which moderated the swell, so that it was possible to advance in spite of the wind.

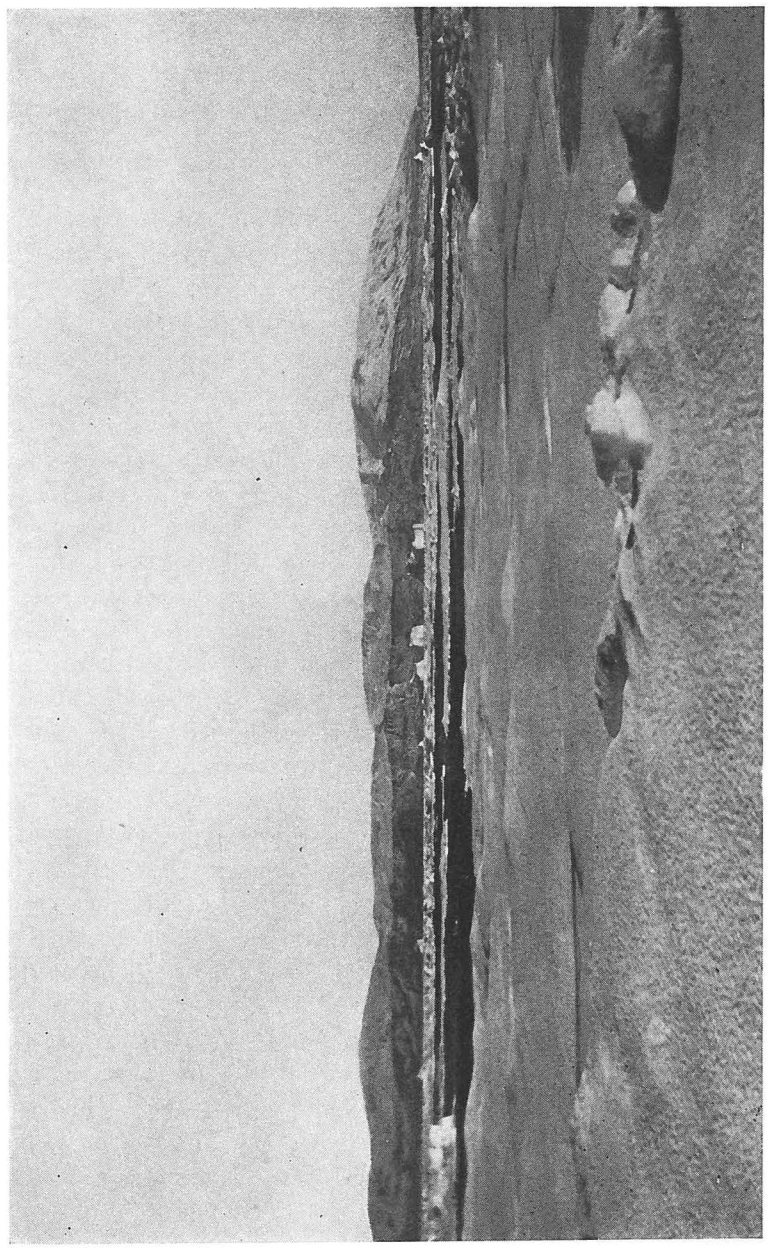
July 8th.—Wind from the north, force 8, with squalls of snow and rain; the ship advanced very slowly. In places the ice was close-packed, but it was mostly scattered with occasional large ice fields. At noon the radio of Scoresbysund reported that the ice conditions had grown worse, so that it would probably be difficult to approach the colony. At the same time a wireless message was received stating that the negotiations with the French ship about the transport of the other seaplane proceeded favourably; it was therefore decided to give up the attempt to reach Scoresbysund and to go northward in order to reach the working field as soon as possible.

July 9th.—In the course of the night the wind decreased, and in the morning the wind blew from the north, force 3. It was hazy with rain and later fog. As the wind decreased, the ship made better progress. Owing to the thick weather it was impossible to get a general view of the ice conditions, but the ice was mostly scattered. Apparently we were sailing in land water bounded seawards by large ice fields or more probably close-packed ice belts.

July 10th.—In the night the wind grew more westerly and finally almost calmed down. In the forenoon it rained, but later it cleared, and the barometer rose. The ice was scattered all day, and the ship made good progress northward (position at noon 72°37′N. lat., 20°11′W. long.). At 11 p.m. the ice suddenly grew more packed, and it was impossible to advance, so the ship moored at an ice floe.

July 11th.—The rise of the barometer which had taken place during the last few days continued, and it was clear and calm. The ship lay some distance south of Bontekoe Ø, but to the northward we sighted very close-packed ice consisting of large unbroken floes. In the forenoon an attempt was made to proceed, but without result. In the evening the ship had to change its place among the ice floes, as the ice packed around the ship. The weather seemed now to be settled, the barometer was still rising, and it was calm and clear. The latitude taken at noon showed that the ship drifted slowly southward with the ice.

July 12th.—All advance impossible.



1932

Fig. 28. Large floes near the coast.

July 13th.—The weather continued fine. The observations showed that the southward drift had ceased, and that the ship had advanced inconsiderably westward. In the evening it advanced some distance northward.

July 14th.—In the morning another attempt was made to proceed, and the ship was labouring hard in the ice all the forenoon. In the afternoon she hardly moved, but in the evening she advanced slightly northward. The ice was very thick.

July 15th.—In the night things looked rather distressing. The ship lay among some very large ice floes, and no open water was seen in any direction. However, in the early morning the ice suddenly began to scatter and from 5.30 to 8.30 a.m. the ship approached Bontekoe Ø. Then a space of open water formed, large enough for the seaplane to start, and at 10.25 it set off towards Eskimonæs with its personnel and the leader of the expedition on board. For the time being the ship remained near Bontekoe Ø, where a geologist party, led by H. BACKLUND, was set ashore. The seaplane set its course due north to near Myggbukta, then it followed the coast of Hold with Hope, continuing past Jackson Ø to Eskimonæs, where it landed at 11.15 a.m. Wireless messages about the ice conditions had been sent to the ship during the flight, and immediately after the arrival at Eskimonæs a detailed message was dispatched, informing the ship about the best route to follow to Eskimonæs. At 3 p.m. the geologist party came on board, and the ship then went towards the coast to follow it northward, and for the rest of the day sailed in comparatively open ice towards Hold with Hope. It was calm and clear.

July 16th.—At 8 a.m. the ship passed Holland Ø very near the shore after having sailed through very close-packed ice near Hold with Hope. By noon she passed the sound between Hold with Hope and Jackson Ø, north of which the ice was very close-packed, so the ship advanced but slowly. About 11 p.m. she was unable to move and had to moor at an ice floe.

July 17th.—In the forenoon calm and clear, in the afternoon a light northeasterly wind carried the fog into the bay. In the forenoon the ship advanced slowly in close-packed ice. At noon she had to moor, and in the afternoon she sailed in between the Finsch Øer in fog. The ice was very close-packed and the rudder so much damaged that it had to be replaced on arrival of the ship at Eskimonæs.

In the early morning the seaplane started on its first flight across the inland ice to Dronning Louises Land. The flight was carried out to plan, but outside the Finsch Øer lay a low, partly transparent fog. The seaplane did not land at Eskimonæs, but flew out to meet the ship and advise it about the ice conditions. With some difficulty the



1932

Figs. 29. Unloading of equipment at Eskimonæs.

ship was sighted and various directions were given it over the wireless, after which the seaplane returned to Eskimonæs. The ship arrived at 9.55 p.m. and cast anchor in the West Harbour.

The s. s. "Gustav Holm" at Eskimonæs and Ella Ø.

July 18th.—At 8 in the morning the ship started westward to a place on the south coast of Clavering Ø called Mining Camp to set ashore some geologists and ponies. Subsequently the ship returned to Eskimonæs, and cast anchor in the West Harbour at 5 p.m.. The unloading of goods for the Eskimonæs station was at once begun and continued till 10 p.m.

July 19th.—The unloading was continued from 6 a.m. to 5.30 p.m., when it had to be postponed owing to the heavy swell, the wind now blowing from the south. The sky was overcast, and there were squalls

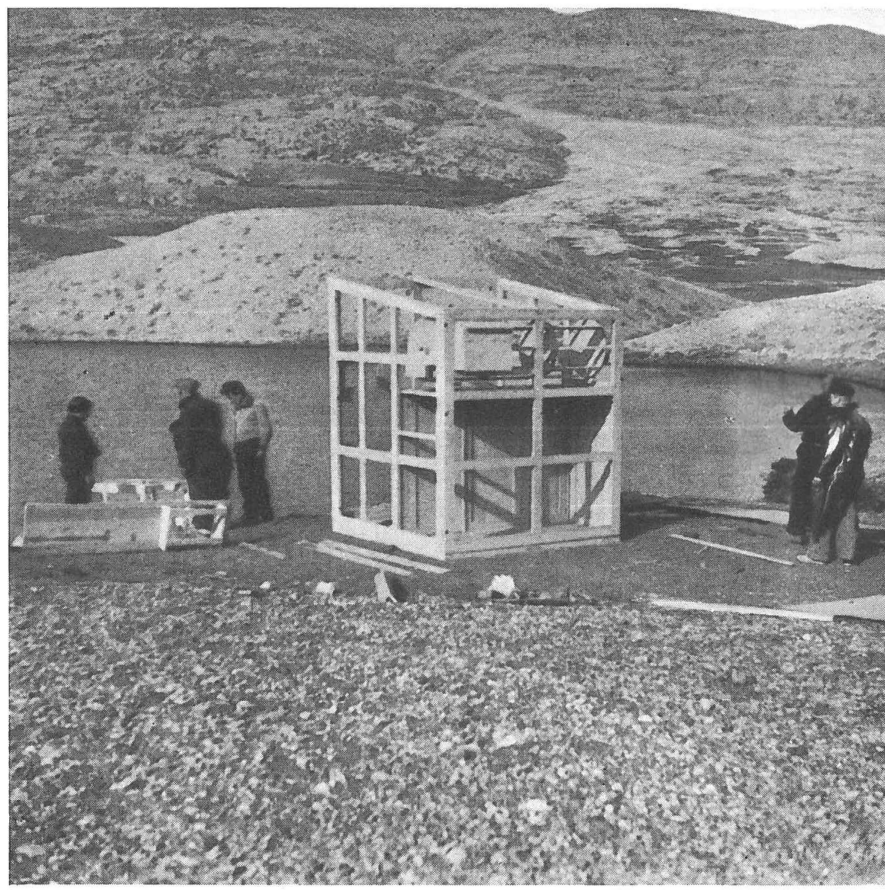


Fig. 30. Construction of a dark-room near Eskimonæs. 1932

of fog. However, in the evening the wind calmed down, and the unloading was resumed at 8 p.m. continuing till 0.30 a.m., when all the goods for Eskimonæs had been carried ashore. All day the carpenter and the air photographers were occupied in building a dark room for development of films some distance inland near a lake, whence running water could be led through a pipe to the dark room.

July 20th.—The replacement of the rudder was commenced. However, since the rudder had been in use for several years, the work was attended with various difficulties, and not till July 24th was the new rudder in place.

For the last few days the weather had been fine and had not impeded the movements of the expedition.

July 25th.—The ship loaded goods for the Ella Ø station. The Norwegian Hydrographic Expedition under the leadership of Commander

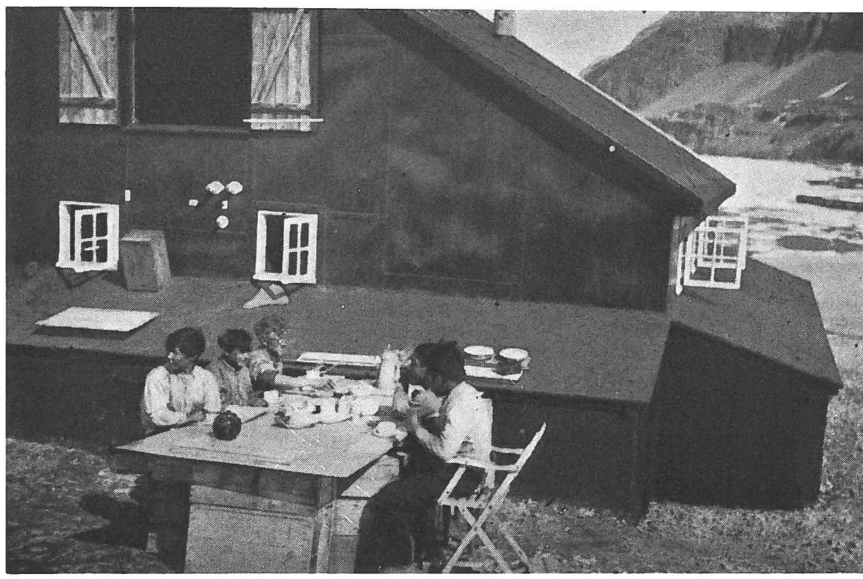


Fig. 31. A summer day at the Ella Ø station. 1932

VON KROGH paid a visit on board the ship. At 10 p.m. the "Godthaab" arrived at Eskimonæs.

July 26th.—In the night goods and passengers from the station and the "Godthaab" came on board, and at 9.30 a.m. the "Gustav Holm" left the West Harbour and sailed southward along the coast in very open ice. Passed Myggbukta about midnight.

July 27th.—In the early morning the ship stopped at Kap Graah to set ashore a geodesist party with a motorboat, and subsequently sailed through Sofia Sund towards Ella Ø, where she anchored at 6.22 p.m. Fine weather.

July 28th.—The ship unloaded petrol for the seaplanes and various other goods for the Ella Ø station, and took on board timber for the establishment of a new station on Hochstetters Forland. Furthermore, some anchor-beacons were made and placed in the harbour after various soundings.

July 29th.—The loading of timber for the northern stations was continued. At 3.15 p.m. the "Godthaab" arrived. From this ship seven barrels of kerosene for the new station on Hochstetters Forland were loaded into the "Gustav Holm".

July 30th.—At 4.15 KOCH arrived in the seaplane from the north after a flight from Eskimonæs and around Petermanns Bjerg, and at 7.15 p.m. the other seaplane arrived from Scoresbysund, having been transported there by the French ship. Shortly after the other seaplane with KOCH on board started for Scoresbysund.



Fig. 32. The Ella Ø station seen from the northeast. 1932

July 31st.—The ship loaded various goods for Eskimonæs as also a depot to be laid out at Kap Humboldt. At 1.45 p.m. Seaplane 87 arrived at Ella Ø with HERSCHEND on board, and at 3.45 p.m. the "Gustav Holm" left Ella Ø to go northward. At 10 p.m. a large depot of provisions and kerosene was established at Kap Humboldt.

Aug. 1st.—From 0.35 to 2.10 a.m. the ship stopped off Kap Graah, where BRUHN discussed with JOHANSEN the plans for the geodetic work. Subsequently the ship continued northward along the coast, but stopped for five hours at an ice floe to take in 15 tons of fresh water. A fairly broad belt of land water with occasional large ice fields, which, however, did not hinder the navigation very much, was encountered along the outer coast of Hold with Hope. Out here the weather was calm and foggy.

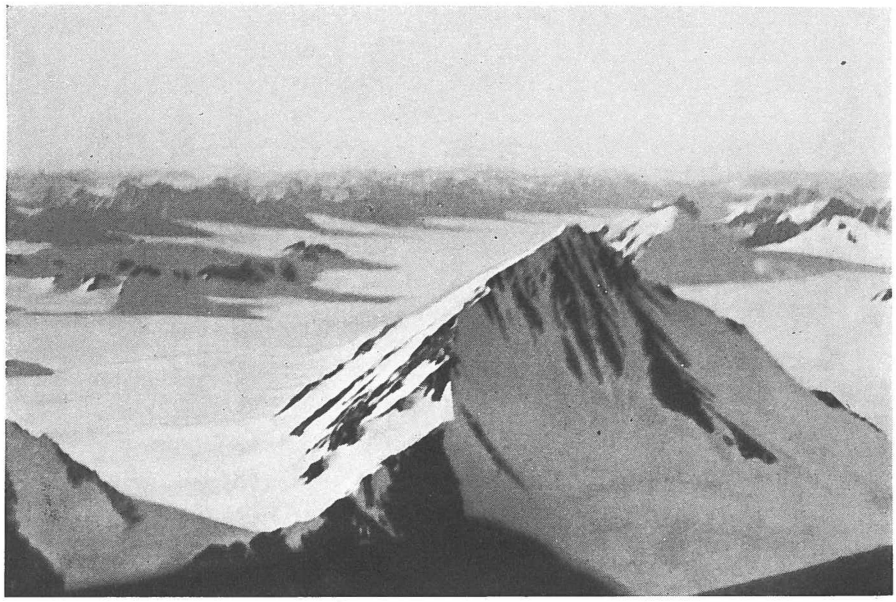


Fig. 33. Petermanns Bjerg seen from the air. 1932

Aug. 2nd.—Fog banks along the outer coast. The ship had a difficult voyage between Jackson Ø and Finsch Øer, the ice floes being rather close-packed there. At 8.20 a.m. she cast anchor in the West Harbour at Eskimonæs, and unloaded passengers, goods, and timber for the Eskimonæs station.

Aug. 3rd.—All the members of the expedition were now at work, and at 7.20 a.m. the "Gustav Holm" left the West Harbour to call at the hunting post Sandodden. The ice conditions were unfavourable, the whole of Gael Hamkes Bugt being filled with ice, and all evening and part of the night the ship was moored at an ice floe.

Aug. 4th.—It was calm, but there was a thick fog. The ship sailed all day in close-packed ice and made only little progress. In the evening she had to moor at an ice floe for about an hour owing to the fog, but at 8.10 p.m. she cast anchor off Sandodden. In the course of well over two hours all the goods for the hunting posts Sandodden, Germania Havn, and Knudshoved were unloaded, and various goods, dogs, and a motorboat were taken on board.

Aug. 5th.—In the early morning the ship went into Young Sund to the so-called Lakseelv near Zackenberg, where it rode at anchors from 8.25 a.m. to 3 p.m. to unload various goods for the trappers and to secure some salmons. The ship then went to Sandodden, where various goods were taken on board in the course of two hours, and at 10.20 p.m. she headed towards Eskimonæs. In the

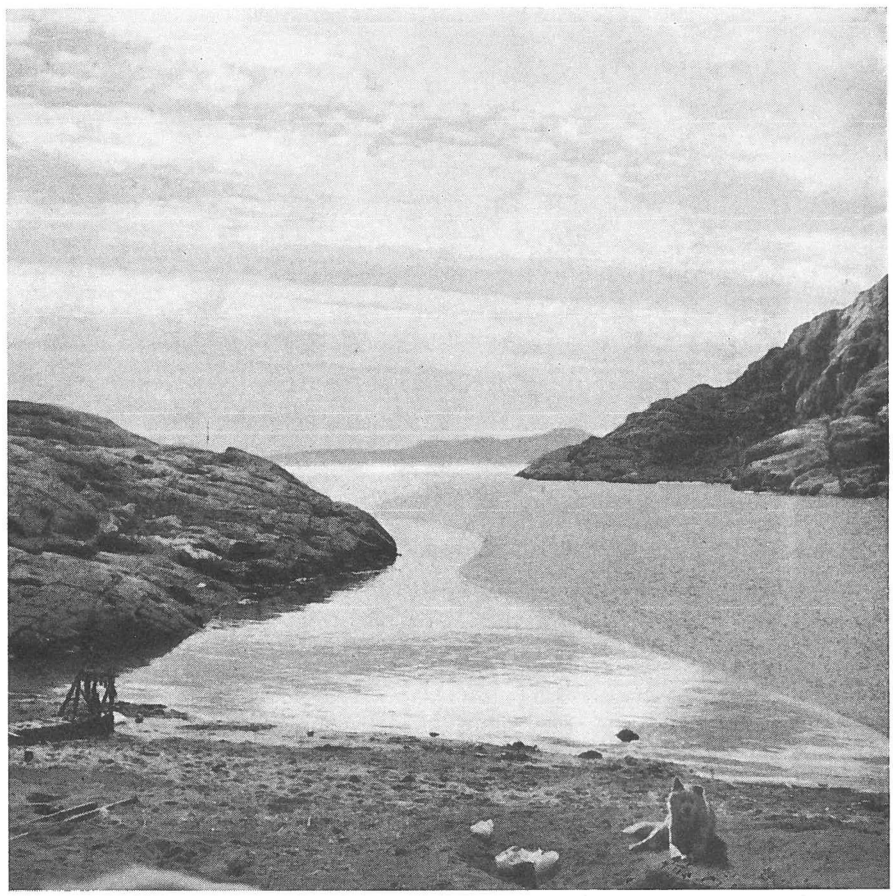


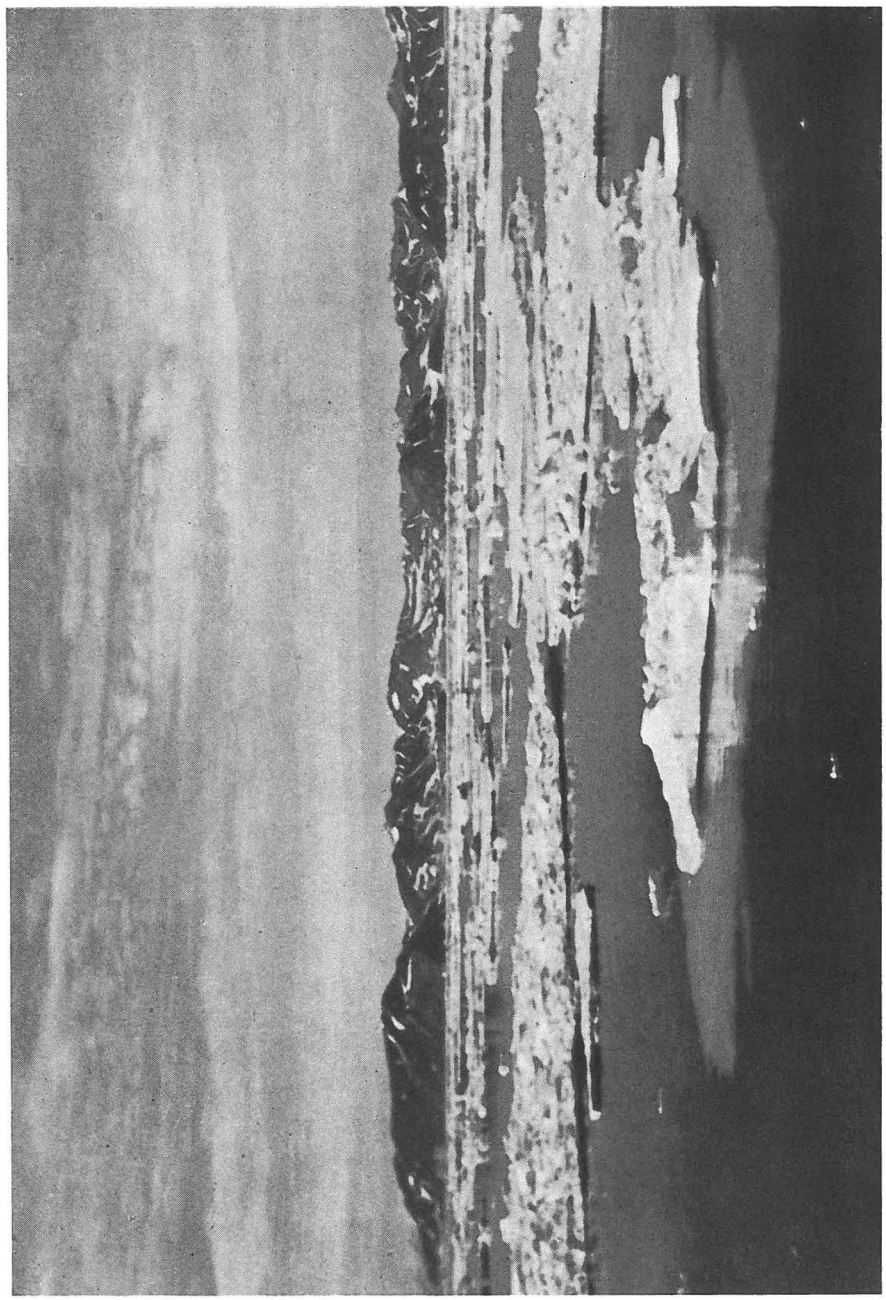
Fig. 34. Melting ice in the harbour of Eskimonæs.

meantime the ice conditions had improved, the ship encountering only scattered ice.

Aug. 6th.—At 5.45 a.m. the ship cast anchor in the West Harbour. In the course of the day the wind increased to E. force 5, and both anchors had to be dropped.

Aug. 7th.—The ship's personnel took a day off. The weather was fine, and MADSEN spent the day in computing the magnetic variation in the West Harbour, which he found to be 45°47′.

Aug. 8th.—Soundings were taken from the ship, and beacons and anchor buoys were laid out in the West Harbour. An ice reconnaissance was made from Eskimonæs across Kap Borlase Warren to Bass Rock, round Lille Pendulum Ø and back to Eskimonæs. It was hazy, and the wind was SE. force 4, but still it was clear enough for a reconnaissance of the land water up past Bass Rock. The ice proved to be scattered



1932

Fig. 35. Ice floes along the coast.



Fig. 36. The station at Eskimonæs seen from the east. 1932

as far as Bass Rock, where fairly great ice masses were seen seawards, but the belt of land water along the coast was broad enough for navigation, and north of Bass Rock to near Hochstetters Forland there was hardly any ice.

Aug. 9th.—The ship prepared to go northward. Various goods were taken on board, which was very difficult, the harbour being filled with ice. The pilots' camp was likewise taken on board to be removed northward where the ship was to serve as a base for the flights there, and at 7 p.m. the ship left Eskimonæs. It was foggy, but in Gael Hamkes Bugt the ice was scattered along the coast.

The voyage northward from Eskimonæs.

Aug. 10th.—The foggy weather continued with a light southerly wind as far as Bass Rock. Near Pendulum Ø several large ice fields



Fig. 37. The Eskimonæs station seen from the northwest. 1932

and thick ice floes occurred, but they presented no great obstacles to the navigation. About noon the ship passed Bass Rock, and shortly after it grew clear, the fog lay only along the outer coast from Bass Rock towards Shannon. The ice was very scattered. At 5.30 p.m. the ship's motorboat was lowered to carry mail to the Nanok trappers' post west of Kap Rink, and at 7 p.m. the ship cast anchor on the west side of Hochstetters Forland. All boats were immediately lowered, and the unloading was commenced. Already that evening the first part of the material for the new wintering station, Kulhus, was carried to the plateau. This work was finished shortly after midnight.

Aug. 11th.—The weather was fine, with some clouds and light winds blowing now from the southwest now from the east. In the morning a boat full of dog food was unloaded, after which the ship went to the

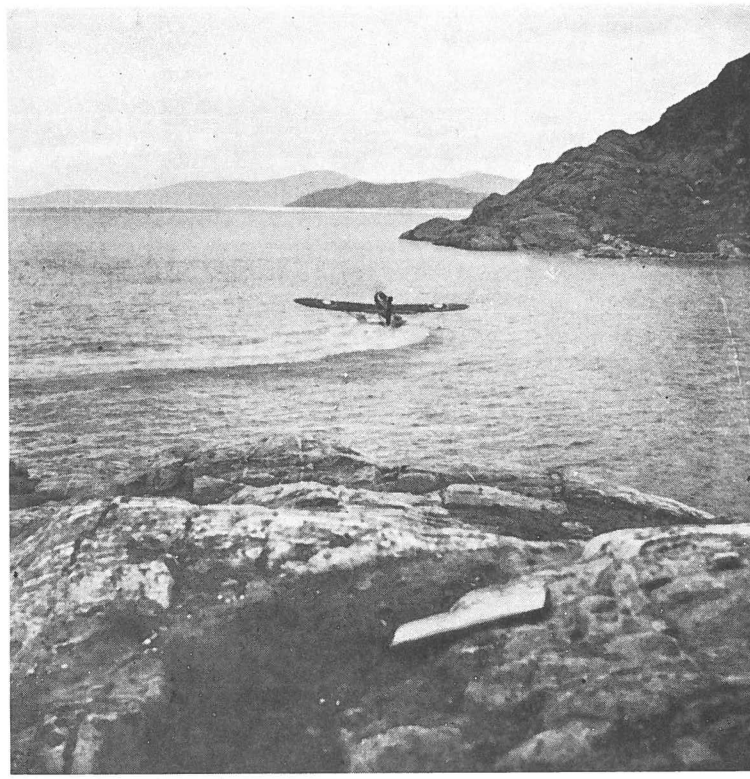


Fig. 38. Take-off of a seaplane at Eskimonæs. 1932

trappers' station and from 9.20 a.m. to 10 p.m. unloaded all the goods for the trappers. The ship's carpenter and all the members that were to pass the winter there were at work all day, building the house at Kulhus. In the forenoon the seaplane arrived from Eskimonæs. I availed myself of the opportunity to fly round Sabine Ø in order to examine the possibilities for navigation through Claveringstrædet in case no land water should be found at Bass Rock, where the ice often extends right in to the shore. It turned out that Claveringstrædet was full of skerries, but between them there was open water, so that motor-boats and small vessels could pass the strait without difficulty. Even the "Gustav Holm" might, if absolutely necessary, pass through the strait, using great caution; however, it would be a rather risky undertaking on account of the strong currents and tides, and the voyage was only to take place in calm and clear weather and only at the turn of the tide, and if possible directed by seaplanes.

In the afternoon I made an ice reconnaissance from Kulhus along the coast to some distance north of Haystack. The return flight took place along Barths Bjærge for mapping purposes. The ice conditions in

the sound outside Hochstetters Forland were tolerably good; there were many icebergs and several ice floes, and fairly large ice masses were seen northward, but it was considered justifiable to sail up through the sound, if the passage was made soon, and the stay northward was not to be of particularly long duration.

Aug. 12th.—The day opened with clear and calm weather and the barometer was rising. At 7.30 the ship weighed anchor and left Kulhus. The voyage up through Shannon Sund took place among fairly close-packed ice floes. Before the departure from Kulhus the seaplane had started on a photo flight, and after the flight it had landed at the mouth of Bessels Fjord. When the party had impatiently awaited the arrival of the ship for some time, it returned to a place on the shore near Kap Oswald Heer. At 2.30 p.m. the seaplane was observed from the ship, which shortly after stopped to take the seaplane on board (3.10 p.m.). As the ice was rather close-packed here, the ship awaited a scattering of the ice and then went northward at 7.30 p.m. The ice conditions improved northward. Approaching the mouth of Bessels Fjord, where the depths were entirely unknown, a motorboat was lowered at 10.45 p.m. to take soundings in front of the ship. The ice was very open.

Aug. 13th.—The weather continued fine till the evening, when there came a light southerly wind with banks of fog. At 1.50 a.m. the ship cast anchor at the north side of the mouth of Bessels Fjord off the place where a trappers' station was to be erected, and the unloading of the goods for the station was immediately commenced. It was finished at 10 a.m., and at 11.05 a.m. the ship left Bessels Fjord to return southward. The ice in Shannon Sund was more scattered than during the upward voyage.

Aug. 14th.—At 0.55 a.m. the ship cast anchor off Kulhus. In the morning more timber for the station was unloaded, and all the provisions were likewise carried ashore. The unloading of the whole station and its supplies was finished at 4.30 p.m. Two men of the crew were at work all day, building the house. The seaplane was hoisted for repairs of the floats, which had suffered some damage on the shore near Kap Oswald Heer. In the afternoon the current was very strong around Kulhus, and the ship had to change its anchorage owing to ice floes drifting towards the shore. In the course of the day several air routes had been photographed in the fine weather.

Aug. 15th.—Continuous fine weather, but a little cloudy. In the morning the seaplane was lowered, coal was trimmed on the ship in the forenoon, and from 2 to 9.30 p.m. 13 tons of Jurassic coal were mined ashore and carried on board to serve as ballast and spare fuel Two members of the crew were occupied in house-building all day. At 6 p.m. the seaplane was hoisted owing to ice drift.

Aug. 16th.—Clear weather. Early in the morning the seaplane was lowered to make photo flights, and in the course of the day three air routes were photographed, one northward beyond Dronning Louises Land, the other two eastward and southward across Kuhn Ø. The wintering party and two men of the crew were occupied all day building

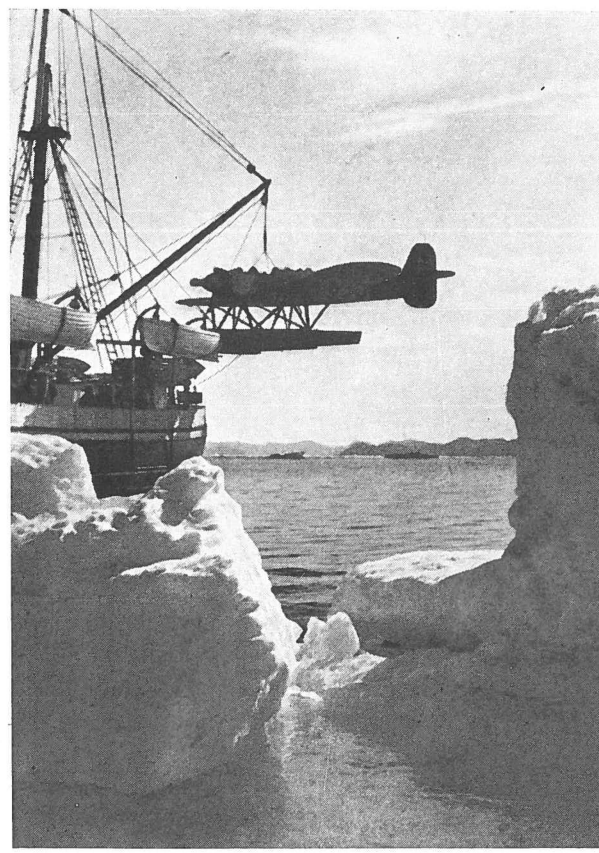


Fig. 39. Lowering of one of the seaplanes. 1932

the house. The coal mining was continued all day till 7 p.m., 31 tons being mined and taken on board. At 9 p.m. the seaplane was hoisted on to the deck.

Aug. 17th.—Fine weather, though with some clouds, but they meant no obstacles to the photo-flights. In the forenoon the routes across Sabine Ø and Bredefjord were photographed, and the air photography around the station on Hochstetters Forland was thus finished in all essentials. From 6 a.m. to 4 p.m. 11 tons of coal were mined and stoved in the hold and five tons in the bunkers. Two men of the crew and the wintering party worked at the house, and from 6 to 10 p.m. all



Fig. 40. Seaplane in the air. 1932



Fig. 41. Seaplane in the air. 1932

members of the crew took part in the work. In the afternoon I made an air reconnaissance inland through Grandjeans Fjord and southward to Lindemans Fjord. A strong foehn wind was blowing in the upper layers of the air.

Aug. 18th.—In the night the foehn wind began to make itself felt at Kulhus. A strong north wind set in, later changing to west, and at 4 a.m. a large ice field pressed the ship towards the shore. With some difficulty the anchor was weighed, and owing to the increasing wind and strong ice drift the ship headed towards Kap Buch, where she cast anchor at 11.50 a.m. Here the ship was fairly well sheltered from the foehn wind that now blew out through Ardencaple Fjord almost with the force of a gale. At 12.15 p.m. the anchor slid off the bottom, and as it seemed to be calm in the direction of Kuhn Ø, the ship remained here for some hours keeping the engines going at reduced speed. In the afternoon the wind increased in force, and at 5.30 p.m. the ship dropped anchors off Kulhus. Here a motorboat and some goods were set ashore. The building of the house had now proceeded so far that only the internal fitting remained to be done, and at 6.50 p.m. the ship left Hochstetters Forland for good. Sailed in scattered ice till 10.45, but near Pendulum Øer the foehn wind had made open water.

Aug. 19th.—Passed Bass Rock about midnight. The ice was very scattered, it was clear, but the wind increased again to NW. force 4. Passed Hvalrosø at 4 a.m. South of this island the foehn wind decreased somewhat, and farther southward along the coast the ice was very scattered with occasional large ice fields. In the forenoon the ship moored for two hours at an ice floe to take in fresh water. Around Kap Borlase Warren, which was passed at 4 p.m., the ice lay close to the shore, and between this cape and Kap Herschell the ship sailed in very little water keeping the lead going. The ice was close-packed seawards, but west of Kap Herschell the ice became more scattered with a few large floes along the outer coast of Clavering Ø. At 10.10 p.m. the ship cast anchor in the West Harbour at Eskimonæs.

During the stay at Hochstetters Forland it was necessary, owing to the constant ice drift, to place the seaplane on the ship during the night. In the course of the summer the ship's crew had acquired great skill in hoisting and lowering the seaplane, and as it was far more convenient for the flying personnel to live on board the ship than in tent camps, watch having to be kept at the seaplane when not in use, the seaplane was now placed on the ship, and the flying personnel likewise stayed on board.

While owing to difficulties with the camera and rather bad weather the photographs from the air routes around Clavering Ø were not as good as expected, the flights made with Kulhus as a base owing



1932

Fig. 42. The aviator camp at Eskimonæs.

to the greater training in treating the camera and the fine weather had yielded surprisingly good results. Furthermore, the station Kulhus had been fitted for a winter residence, the trappers' stations had been visited, and some scientific work had been done, mostly, however, from the motorboat "Asut" and independently of the ship.

Aug. 20th.—Calm and slightly overcast, but the barometer was falling, and in the course of the day a rapidly increasing haze was approaching from the inland ice. Easterly wind of force 4. A planned flight to Ole Rømers Land and Wilkins Nunatakker had to be given up, but for mapping purposes I made a short flight from Eskimonæs to the head of Tyrolerfjord and Pasterze Gl. and round Payers Land. It was my hope that it would be possible to fly inland across Holger Danskes Tinde, but the weather conditions did not permit this, and we had to return to Eskimonæs via Wordies Gl. In the course of the day



1932

Fig. 43. Seaplane just before landing at Eskimonæs.

35 tons of spare provisions were moved from the stern hold to the main hold. In the evening a motorboat was sent to Dødemandsbugten to fetch the archæologist camp and all the collections. The boat returned to the ship at 2 a.m.

Aug. 21st.—Slightly overcast, NW. wind of force 5. The ship took in water till 5 p.m., when the heavy swell prevented the work, and at 7 p.m. the ship moved to the East Harbour, where it was sheltered from the wind.

Aug. 22nd.—The barometer rose. The wind had changed from a strong northwest to a light easterly wind, and the sky was overcast. In the forenoon till 11 a.m. coal were shifted from the stern hold to the bunkers. In the afternoon till 6 p.m. 17 tons of ballast were taken in from the shore. The easterly wind carried the ice into the East Harbour, so at 10.40 p.m. the ship had to move to the West Harbour, where she anchored for the night. In the afternoon a telegram had been received from the Administration of Greenland inquiring whether anything was known about the "Gefion", the ship of the trappers' company Nanok, which had no wireless, and from which no news had been received

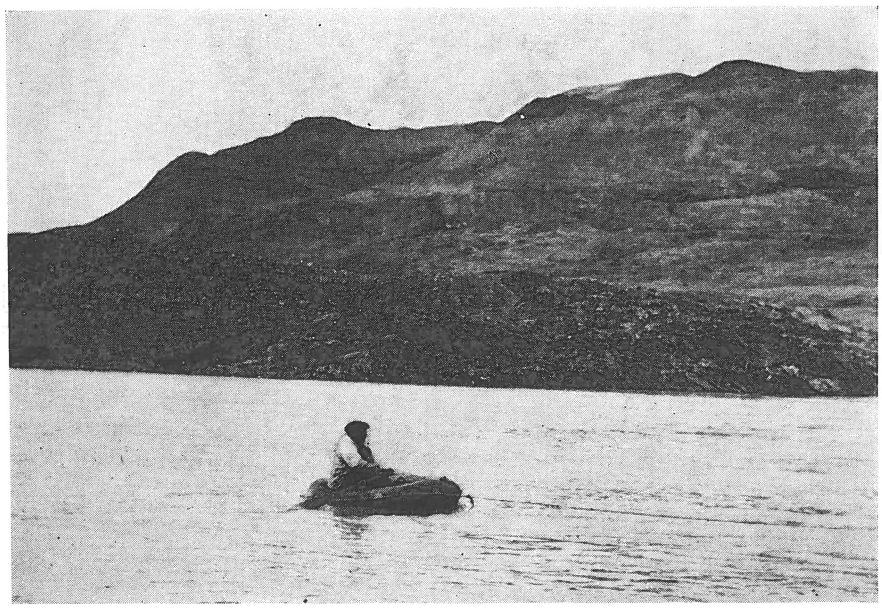


Fig. 44. Rubber-boat belonging to the equipment of the seaplane. 1932

for a long time. Half an hour later I started northward in the seaplane to look for the ship. The seaplane took the course across Wollaston Forland, past Kuhn Ø, along the outer coast of Store Koldewey Ø to Danmarks Havn, where a landing was made. It was evident that the "Gefion" had called here, but as no persons were present, we started again and flew to Hvalrosodden, where we met a trapper, who informed us that immediately after her arrival to the shore the ship had lost both her life-boats, and as only a small jolly-boat was left for the unloading, the plan of navigation had to be changed. The trapper thought the ship was now in the southern part of Dove Bugt. We then flew to Storstrømmen Gl. along the northern point of Rechnitzers Land, thence to the outer coast, which we followed until discovering the ship some distance out in the southern part of Dove Bugt almost off Kap Carl Ritter. A short landing was made at the ship, where we received a report on her voyage, and then we returned southward. Near Kap Rink a landing for a few minutes was made at a southward-going motorboat manned with three trappers, after which we returned to Eskimonæs. A report on the voyage of the "Gefion" was dispatched to Copenhagen.

Aug. 23rd.—Calm and overcast, the barometer was falling. The ship took in freshwater and 14 tons of ballast in the stern hold. BACKLUND's camp was fetched in a motorboat. Both on the 21st and the 22nd short photo flights had been made in the neighbourhood of the station in spite of the overcast weather. In the evening of August 23rd (at 10 p.m.)

Seaplane H. 86 arrived from the camp on Ella Ø to be hoisted on to the "Gustav Holm".

Aug. 24th.—The barometer had risen, but it was overcast and hazy, and there was a light southeasterly wind. Seaplane H. 86 made a short flight, and despite of the thick weather photographed a route. The ship continued taking in water and ballast. Four tons of coal were filled in sacks and deposited on the shore as spare fuel. Cabins were arranged in the hold for use during the return voyage, and various passengers' goods were taken on board. At 2.30 p.m. I started in H. 87 from Eskimonæs to Ella Ø, continuing, after a short landing there, southward through Kong Oscars Fjord to Kap Biot and onwards through Fleming Fjord, across Jameson Land and Hurry Fjord, to Scoresbysund.

From Eskimonæs to Reykjavik.

Aug. 25th.—In the night it was foggy, and in the day it was overcast with a light southeasterly wind. In the forenoon the ship made ready to leave Eskimonæs, the life-boat was hoisted, goods were taken on board, buoys, anchors, and the seaplane were hoisted, and the motorboat P. 1 was placed on the deck. At 3.45 p.m. the ship left Eskimonæs and sailed southward. Passed Jackson Ø at 8 p.m. Scattered ice with occasional large floes was encountered along the coast. In the night some fog.

Aug. 26th.—Light easterly wind in the morning, later calm with fog banks which did not obstruct navigation. The ice was very scattered. At 11.30 a.m. a motorboat was lowered to fetch SÄVE-SÖDERBERGH's camp in Margrethedal (73°25′ N. lat., 23°46′ W. long.). Started from here at 2.10 p.m., and at 6.35 dropped anchor off the Nordfjord station.

Aug. 27th.—Calm and foggy, but gradually it cleared somewhat. In the morning the motorboat of the Nordfjord station was set ashore, and at 7.15 a.m. the ship left Nordfjord, and anchored at Ella Ø at 9.40 a.m. Goods for the station were unloaded, passengers' goods were taken on board, and passengers exchanged with s.s. "Godthaab".

Aug. 28th.—In the morning calm, later light easterly winds with slightly falling barometer. At noon the ship left Ella Ø and sailed in ice-free water to Kap Wardlaw, which was passed at midnight. Some ice was met with here.

Aug. 29th.—A northerly wind of force 4 blew along the coast of Liverpool Land, and the weather was thick and foggy. Fairly large ice masses occurred along the northern part of Liverpool Land, but at 5 a.m. a southeasterly swell set in. At 9 a.m. the ship sailed along the edge of a belt of heavy floes, but at 5 p.m. the swell again made itself felt, and several times scattered, sometimes close-packed, ice was passed.

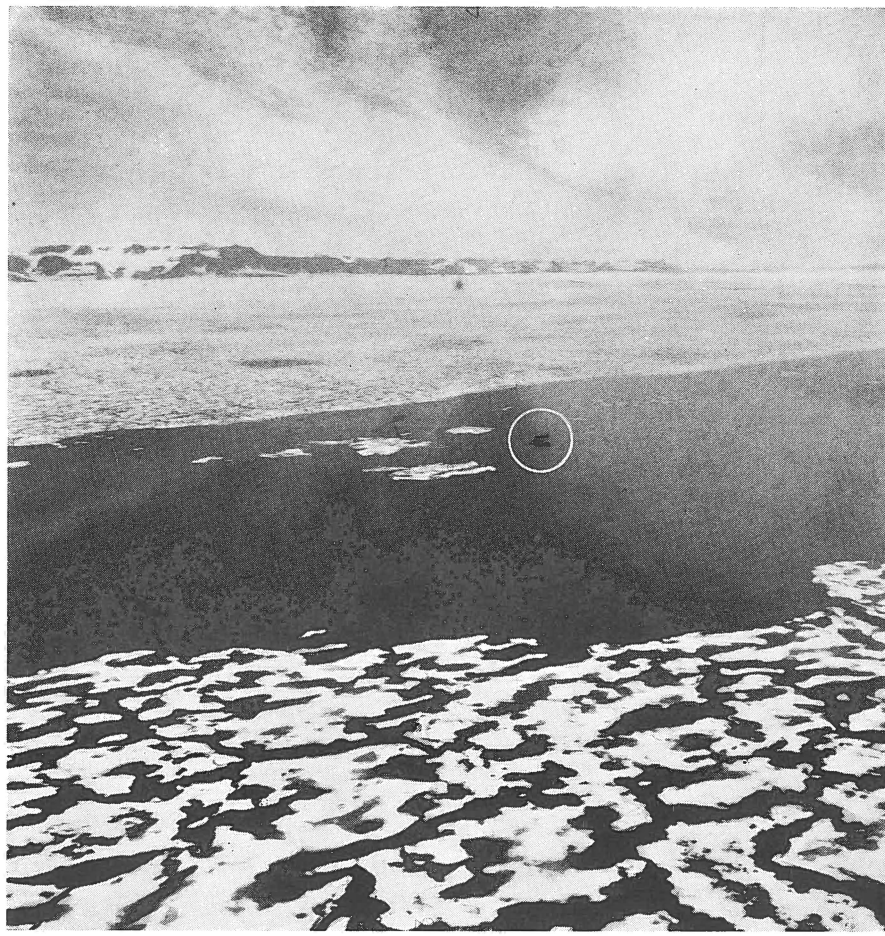


Fig. 45. Seaplane after a forced landing in the interior of Scoresby Sund. 1932

At 10.30 p.m. the ship had to hove to owing to darkness and fog. Northeasterly wind of force 4.

Aug. 30th.—The fog continued. The wind had changed to ESE. and increased in the course of the day to force 7; falling barometer. At 2.10 a.m. the ship started again, and at 10 a.m. encountered a heavy southeasterly swell. At 23.45 the engines had to be reduced to half speed.

Aug. 31st.—At 1 a.m. the ship had to hove to. In the morning the wind was ENE. force 9—10 with a rapidly falling barometer and haze, later rain, passing into heavy squalls. In the afternoon wind of force 11.

Sept. 1st.—The wind decreased in the course of the night to force 7—5, but later it increased again to force 8, with rain squalls. At 4.30 a.m. the engines were again working full speed. Passed Straumnæs lighthouse on the E. coast of Iceland at 4 p.m. within a distance of five miles.

Sept. 2nd.—Cloudy, with rising barometer and wind, which decreased from force 8 to 5 in the course of the day. At 9 p.m. the ship cast anchor in the harbour of Reykjavik.

The voyage from Iceland to Eskimonæs. s. s. Godthaab.

The heavy swell encountered by the ships off the mouth of Øfjord showed that the low pressure which gave rise to the strong gale from the north that had been blowing during our stay at Akureyri, had remained long over Iceland. Now the depression had almost passed, and for the first few days the ships met light easterly winds. It is interesting to note, however, that the "Gustav Holm", which shaped her course towards Scoresby Sund, on approaching the coast of Greenland was again headed by north winds, whereas the "Godthaab", which sailed in an east-north-easterly direction, only met light winds. This shows that the bad weather encountered by the "Gustav Holm" around the mouth of Scoresby Sund and along the coast of Liverpool Land was merely of a local character. Although the exact positions of the ships could not be determined till they approached Hold with Hope, their ice observations show very distinctly that in the days about July 1st, 1932, only small quantities of ice were found along the east coast of Greenland, but the protracted strong north winds blowing during this period had packed the ice into long north-south directed, often close-packed belts, while smaller ice belts and scattered floes had been carried far eastward.

In the evening of July 7th (at 8 p.m.) the "Godthaab" encountered a number of washed ice floes in about 72° N. lat., 12° W. long. Late in the evening the patent log was streamed, and the ship sailed southeastward among scattered ice floes to avoid the ice.

July 8th.—Until 3 p.m. the ship sailed in various directions, mostly due north, but with minor deviations in an easterly direction through scattered, but later on close-packed ice. Subsequently the ship sailed in ice-free water till 9 p.m., when she proceeded along the edge of a close-packed belt of ice.

July 9th.—At 3 a.m. the ship entered the ice-belt. It was close-packed, but was passed in about an hour. West of the belt some scattered ice floes were encountered, but gradually the water became almost free of ice. At 3.30 p.m. the ship passed through a second ice belt, reaching open water at 4.15 p.m. Since the departure from Iceland, there had been light easterly winds and some fog.

July 10th.—Thick weather, with a light easterly wind and squalls of rain. At 3.30 p.m. the ship met close-packed drift ice, so she turned southwestward along the ice edge, and at 6 p.m. entered the ice, which soon became scattered, but at 5.50 p.m. the ship had to moor,



Fig. 46. The "Godthaab" with one of the seaplanes. 1932

being unable to proceed.—Zoological station 1, 7.30 p. m., 74°05′ N., 17°47′ W., 35 miles NE. of Jackson Ø. Depth 205 m. Bottom sample $^1/_5$ sq.m. Water sample (organic matter) 100 m. Hydrography down to 175 m.

July 11th.—Wind NE. force 3. Most of the day the sky was overcast with fog-banks The position was determined by taking bearings to the coast. The ship lay among large unbroken ice fields with occasional spaces of open water about one degree of longitude farther westward than estimated by dead-reckoning. The ship proceeded only a couple of miles that day, but drifted rather rapidly southwards.—Zoological investigations of various thaw-water pools on the ice floes.

July 12th—14th.—For the next three days the weather was calm, mostly overcast, but still fairly clear, and the ship made practically no progress. By taking bearings to the shore it was ascertained that the ship did not drift southward during these four days, but now approached, now drifted away from, the shore.—Three zoological stations east of Jackson Ø, bottom samples 170—400 m, vertical hauls (50—0, 100—0 m), and plankton hauls.

July 15th.—Owing to close-packed ice the ship made no progress, but bearings to the shore showed that she had drifted several miles north-northeastward. Subsequently she drifted southward.

July 16th.—In the afternoon the ship sailed about ten miles in a westerly direction among the ice floes.

July 17th.—The ship got on two miles in a westerly direction. It was calm with banks of fog.

July 18th—20th.—Till noon of July 20th the ship was ice-bound, without moving in any direction. It was foggy, and a light southwesterly wind blew. In the afternoon the ship is stated to have covered 13 miles, but the bearings taken to the shore showed that by noon of July 21st she was laying in practically the same place as at noon on July 16th.—Zool. station July 20th, at 11.15 a.m., 73°39′ N. lat., 18°14′ W. long., bottom sample, depth 202 m.

July 21st—24th.—For the following four days the ship sailed about three miles every day, but the positions show that in the night between the 21st and 22nd the current carried the ship a great distance westward, so by noon of the 22nd the ship lay slightly north of, but in the same degree of longitude as shown by the noon position of the 18th. On the 23rd and 24th the ship lay practically in the same place. It was calm or with a light southwesterly wind, mostly clear or hazy with occasional fog.

July 25th.—In the night between the 24th and 25th the ship made little progress but drifted some distance southwestward. By noon the ice grew more open and the ship advanced somewhat, and at 2 p.m., a little south of Arundel Ø, she struck a belt of land water about seven miles broad along Hold with Hope. Without meeting any ice obstacles of importance the ship then passed north of Jackson Ø, and cast anchor off Eskimonæs at 10.20 p.m.

Thus it will be seen that in about 11° W. long. (later corrected to 12° W. long.) and 72° N. lat. the ship encountered a belt of ice of unknown width, which she followed northward. In about 73° N. lat. the ship turned eastward, and in about 10°(11°) W. long., c. 73°4′ N. lat. she first met scattered ice and subsequently again an east-west directed narrow belt of ice of unknown north-south extension.

In c. 16° W. long., a little south of 74° N. lat., the ship encountered a close-packed and fairly broad belt of ice, which she penetrated, and after proceeding in scattered ice she met very close-packed ice, which prevented all advance, in c. 18°20′ W. long, c. 74° N. lat.

In the period July 11th to 25th the ship was enclosed in this ice belt most of the time, incapable of moving. She got through the ice belt off the mouth of Gael Hamkes Bugt. It would seem that the ice belt was moving in the direction east-west with out- and in-going sea currents, and likewise, on some days the ship drifted rather much in a north-south direction among the ice floes without the influence of the wind. Inside this ice belt there was a broad and nearly ice-free zone of land water.

From Eskimonæs via Nordfjord to Ella Ø.

July 26th.—The arrival of the ship at Eskimonæs had been anxiously awaited, and in the course of the night passengers who were to go south with the ship came on board. In the forenoon the ship sailed into Godthaabs Golf for zoological work. Station at 10 a.m. Depth 405 m, bottom sample $^1/_5$ sq.m., two vertical plankton hauls 50—0 m. Water sample (organic matter). Hydrography 0—375 m. By noon the ship made a short stop at Eskimonæs to take the last passengers on board, and then headed southward, stopping for zoological work along the way. Three stations near Store Finsch Ø: 1) depth 310 m., bottom sample $^1/_5$ sq.m.; 2) depth 160 m., bottom sample $1/_5$ sq.m.; 3) vertical plankton haul, hydrography 0—125 m. Station four miles east of Holland Ø: Depth c. 130 m., bottom sample $^1/_5$ sq.m., Hydrography 0—125 m. Settled weather, clear or slightly overcast, calm or with local winds.

July 27th.—From 11 to 12 a.m. the ship stopped off the Vinteröer, where a party (G. SÄVE-SÖDERBERGH, T. SÄVE-SÖDERBERGH, JOHANSSON, LINDGREEN) was set ashore. The ship then sailed through Kejser Franz Josephs Fjord to the Nordfjord station, where she cast anchor at 8 p.m. A party of three (TEICHERT, JOHAN, and DRASTRUP) was set ashore.

July 28th.—The ship remained at the Nordfjord station. Worked all day on repairing the motorboats of the station.

July 29th.—The ship left the station at 4 a.m. and cast anchor at Ella Ø at 4 p.m. Unloaded 10 tons of goods for the station till 9.30 p.m.

Voyage to the house at Kap Brown.

July 30th.—The remaining goods for the Ella Ø station (20 tons) were unloaded. Three men of the crew were carrying provisions from the shore to the house and the carpenter built a dark room.

July 31st.—All members of the crew were ashore carrying provisions to the house and working at the dark room. Furthermore, provisions and camping outfit were delivered to the seaplane party. At 5 p.m. the boats were hoisted, and at 5.30 p.m. the ship went southwards through Kong Oscars Fjord.

Aug. 1st.—At 11.40 a.m. the ship cast anchor off the house at Kap Brown, where provisions were carried ashore. So far the weather had been fine and calm. At 12.40 p.m. the ship weighed anchor and sailed into Davy Sund for zoologic-hydrographic work.—Three stations, depth 27, 115, 215 m., bottom samples $^1/_{10}$ sq.m. Two plankton hauls 25—0 m. Hydrography 0—5 m, 0—200 m. — It grew foggy, there was a rather

strong southeasterly wind, and at 6.20 p.m. the ship hove to, awaiting an improvement of the weather.

Aug. 2nd.—Sky overcast and fairly strong easterly winds, which rendered the zoologic-hydrographical work very troublesome. One station off Drømmebugten, depth 225 m., bottom sample $^1/_{10}$ sq.m. Vertical plankton haul 50—0 m., hydrography 0—200 m. At 2.50 p.m. a party with camping outfit (NOE-NYGAARD, PÜRSCHEL) was landed in Drømmebugten, after which the ship returned northward through Davy Sund. Shortly before midnight she passed Kap Weber and turned into Moskusoksefjord.

Aug. 3rd.—In the early morning the ship cast anchor off Ankerbjerg at the head of Moskusoksefjord for zoological work. At 9 a.m. the ship sailed slowly out of Moskusoksefjord, zoologic-hydrographical work being done all the while till midnight.—Thirteen stations. Dredge hauls 0.5—23 m. Bottom samples $^1/_{10}$ sq.m. at depths 35—230 m. Vertical plankton hauls 25—0 and 50—0 m. Hydrography at various depths.

Aug. 4th.—At 1.20 a.m. the ship anchored off the Nordfjord station. In the forenoon 4 tons of goods were unloaded for the station, and at 1 p.m. the ship weighed anchor and sailed into Geologfjord. Zoologic-hydrographical work was carried on during the voyage. Five stations. Bottom samples $^1/_{10}$ sq.m. from depths 8—270 m. Hydrography, various depths 0—8 to 0—350 m. Vertical and oblique plankton hawls 50—0 m.

Aug. 5th.—At 3 a.m. the ship reached the head of the fjord, and then sailed outwards again. At 5 a.m. TEICHERT was set ashore on Strindbergs Land about eight miles from the head of the fjord. From 10 a.m. to 2 p.m. the ship rode at anchors in Eleonores Bugt for zoologic-hydrographical work, moving subsequently to the middle part of Kejser Franz Josephs Fjord, constantly doing zoologic-hydrographical work, and in the evening passed out through Antarctics Sund. Fourteen stations (Sts. 33—45). Eight bottom samples $^1/_5$ and $^1/_{10}$ sq.m. from depths 32—740 m. Six dredge hauls. Vertical plankton hauls 0—10, 0—50, 0—100 m. Hydrography, various depths.

Aug. 6th.—At 6.40 a.m. the ship cast anchor at Ella Ø. The weather in the fjords was fine and calm.

Zoologic-hydrographical work in Kejser Franz Josephs Fjord.

Aug. 6th.—At 9.10 a.m. the ship left Ella Ø and by midnight reached the head of Kejser Franz Josephs Fjord. Stations 46—49. Bottom samples $^1/_5$ sq.m. from depths 230—760 m. Hydrography different depths from 0—8 to 0—650 m. Vertical plankton hauls, 0—10, 0—25, 0—50, 0—100 m. Haul with stramin bag 600 m wire, 15 minutes.

Aug. 7th.—The ship rode at anchor at the head of Kejser Franz Josephs Fjord, while the zoologists were working from a jolly-boat. Seven dredge hauls from 3—55 m. The ship started out of the fjord and went into Renbugten and Isfjord, where the zoologists worked from a jolly-boat at depths ranging from 2.5 to 59 m. Bottom samples $^1/_5$ sq.m. from depths 240—780 m. Sigsbee trawl 15 minutes, 700 m wire. Stramin haul 15 minutes, 700 m wire. Hydrography 0—350, 150—450, 0—30 m.

Aug. 8th.—In the morning the ship left the interior of Isfjord and in the afternoon zoologic-hydrographical work was carried out between Kap Ovibos and Kap Graah. Stations 67—73. Bottom samples $^1/_5$ sq.m. from depths 210, 160, 410, 55, 390, 180, 445 m. Hydrography 0—375, 0—350, 0—425 m. Sigsbee trawl 400 m wire. Stramin haul 15 minutes. In the evening it grew foggy, so the ship headed towards Kap Graah.

Aug. 9th.—Stopped from 2 to 3 a.m. off SÄVE-SÖDERBERGH's camp to provide the party with various articles of outfit. Subsequently the ship proceeded into Duséns Fjord and at 10.20 a.m. cast anchor at the head of the fjord. Stations 74—80. Dredging from a jolly-boat, depths 1—30 m.

Aug. 10th—11th.—Stay at the head of the fjord. The ship cleaned the boilers, took in fresh water, etc., while the zoologists were working from the jolly-boat. At 8 p.m. of August 11th the ship started out of the fjord, zoological and hydrographic work being done along the way. Stations 81—84. Bottom samples $^1/_{10}$ sq.m. depths 35, 130, 240 m. Hydrography 0—30, 0—200 m. Botanical dredge 150 m wire. Haul with stramin bag 200, 400 m wire, haul with Sigsbee trawl 500 m wire.

Aug. 12th.—Stopped at 5 a.m. some distance from the mouth of the fjord and took on board JOHANSEN's party and boat. Stopped off SÄVE-SÖDERBERGH's camp from 10.30 a.m. till noon, the whole party being taken on board, and sailed to Gauss Halvø, where the party was set ashore about 12 miles from Kap Franklin from 2 to 4 p.m.

Aug. 13th.—Hydrographic work was carried out in Kejser Franz Josephs Fjord in the evening of August 12th and during the whole night.—Zool. stations 85—96. Bottom samples $^1/_5$ sq.m. depths 370, 440 m, $^1/_{10}$ sq.m. depths 150, 65 m. Vertical plankton hauls 50—0 m. With stramin bag 200, 300, 700 m wire, with Hensen net 100—0 m. Sigsbee trawl 300, 700 m wire. Hydrography 0—350, 0—140, 0—10, 0—100, 0—400 m. Botanical dredging from jolly-boat, depths 40—26 m, 20—16 m. Water sample for determination of organic matter, 400 m.

At 8.50 a.m. the ship cast anchor off the house in Nordfjord, where JOHANSEN's boat was lowered. At 10.10 a.m. the ship weighed anchor and sailed southward, and during the rest of the day zoologic-hydrographical work was carried out between Kap Mohn and Renbugten. Stations 97—98. Hauls with Sigsbee trawl 800 m wire, plankton

hauls with Hensen net 100—0, and with stramin bag 700, 300, 800, 300 m wire. Hydrography 0—400, 0—800 m wire. Water sample for determination of organic matter 800 m.

Aug. 14th.—In the night zoologic-hydrographical investigations in Antarctics Sund. Stations 99—100. Haul with Sigsbee trawl 600 m wire, plankton haul with stramin bag 800 m wire. Hydrography 0—400 m.

At 8.45 a.m. the ship cast anchor at Ella Ø. Took the day off.

During the whole period the weather had been fine, mostly clear and calm, though there were some few cloudy days with local winds, which, however, meant no great obstacles to the zoologic-hydrographical work.

The voyage from Ella Ø to Kempes Fjord and round Geographical Society Ø and Traill Ø.

Aug. 15th.—Shifting of coal on the ship all day.

Aug. 16th.—The ship took in 50 tons of ballast.

Aug. 17th.—The cargo was stoved in the hold, as a strong north-westerly gale prevented the taking in of ballast.

Aug. 18th.—The wind had decreased somewhat, and the ship took in 9 tons of ballast and some goods and collections from the shore.

Aug. 19th.—At 12.20 p.m. the ship weighed anchor and sailed into Kempes Fjord, zoologic-hydrographical work being done all the while. At 10.20 p.m. the ship reached the head of Dicksons Fjord, when it turned and sailed out of the fjord to go into Rhedin Fjord for zoologic-hydrographical work. Stations 101—104. Bottom samples $^1/_5$ sq.m. from depths 380, 640, 250 m, $^1/_{10}$ sq.m. depth 150 m. Plankton hauls with stramin bag 50, 700, 300, 700, 300, 100 m wire, vertical hauls with Hensen net 100—0 m. Hydrography 0—350, 0—600 m. Determination of calcium 0—600 m.

Aug. 20th.—In the night zoologic-hydrographical work off Kap Hedlund and subsequently in Narhvalsund and Sofia Sund. Passed Kap Humboldt at midnight. Stations 105—112. Bottom samples $^1/_5$ sq.m. from depths 500, 270 m, $^1/_{10}$ sq.m. from 230, 210, 310 m. Plankton hauls with stramin bag 700, 300, 700, 300, 400 m wire, vertical hauls with Hensen net 100—0 m. Hydrography 0—500, 0—450, 0—250, 0—200 m. Determination of calcium 0—500 m. Botanic dredging 500 m wire. Sigsbee Trawl.

Aug. 21st.—In the morning the ship stopped for three hours near Bontekoe Ø to take in fresh water from an ice floe, and by noon she proceeded southwards along the coast without meeting any ice. Passed Kap Moorsom at 7.40 p.m. and then sailed towards Kap Wardlaw. Zoologic-hydrographical work during the voyage. Stations 113—115.

Bottom samples $^1/_5$ sq.m., depths 240, 245, 210 m. Plankton hauls with stramin bag 400, 150 m wire, vertical hauls with Hensen net 100—0 m. Sigsbee trawl 50 m wire. Hydrography 0—225, 0—175 m.

Aug. 22nd.—In the forenoon zoologic-hydrographical work in Davy Sund. By noon the ship sent a boat to Kap Simpson, and at about 2 p.m. NOE-NYGAARD and PÜRSCHEL and their boat were taken on board. Passed Archers Øer at 6.30 p.m. and Haslums Øer at 8.30 p.m.; constant zoologic-hydrographical work, which was continued during the night. Stations 116—120. Bottom samples $^1/_5$ sq.m. at depths of 360, 250, 280, 225 m. Plankton hauls with stramin bag 400, 300, 100, 500, 100, 300, 100 m wire, vertical hauls with Hensen net 100—0 m. Sigsbee trawl 600 m. Hydrography 0—225, 0—325, 0—300, 0—250, 0—200 m.

Aug. 23rd.—Cast anchor at Ella Ø at 8.07 a.m. Zoologic-hydrographic station 121. Bottom sample $^1/_5$ sq.m., depth 225 m. Plankton hauls with stramin bag 300, 100 m wire, vertical haul with Hensen net 100—0 m. Hydrography 0—200 m.

The stay at Ella Ø and the voyage to Reykjavik.

Aug. 24th.—At 6 a.m. the ship weighed anchor. Zoologic-hydrographical work near Kap Oswald north of Ella Ø until 3.20 p.m. Stations 122—128. Bottom samples $^1/_{10}$ sq.m., depths 45, 240, 310, 200, 410, 230, 60 m. Hydrography 0—30, 0—300, 0—400 m. Sigsbee trawl 600 m wire. Plankton hauls with stramin bag 50, 100, 300, 500, 200, 650 m wire.

Aug. 25th.—Zoologic-hydrographical work off Kap Elisabeth from 7 a.m. to 1.15 p.m. Stations 129—132. Bottom sample $^1/_{10}$ sq.m., depth 310 m. Plankton hauls with stramin bag 200, 300, 500 m wire. Vertical haul with Hensen net 100—0 m. Sigsbee trawl 500 m wire. Hydrography 0—300 m.

Aug. 26th.—Spare parts and tools from the aviation camp were taken on board.

Aug. 27th.—Various work on the ship.

Aug. 28th.—The weather was changing; in the forenoon it rained, and in the afternoon came a strong wind from the north-northeast with haze. At midnight the ship weighed anchor and left Ella Ø, passing Kap Biot at 12.50 p.m., Murray Ø at 16.50 p.m., and Storefjord at 8 p.m. Scattered ice floes were encountered along Liverpool Land, but the ice presented no obstacles to navigation.

Aug. 29th.—Calm and overcast, in the evening fog. From 6 to 8 a.m. zoological investigations were made off Kap Tobin (Stations 133—134. Depth 185 m. Hauls with stramin bag 300 and 700 m wire). At 12.30 p.m. the ship cast anchor off Scoresbysund.

Aug. 30th.—ENE. wind, force 9, sky overcast. From 3.30 p.m. the ship lay with the engines reduced to dead slow during the rest of the day in order to support the anchor.

Aug. 31st.—The storm decreased somewhat, it rained, and the ship had to lie all day with the engines going at reduced speed. In the evening the engines were working full speed to support the anchors.

Sept. 1st.—The wind blew with the force of a hurricane most of the day, and the ship had to lie with the engines working full speed and both anchors dropped.

Sept. 2nd.—The wind decreased, and at 1.15 p.m. the engines were stopped.

Sept. 3rd.—The wind had almost died down, but it was still overcast. At midnight the ship left the colony, and at 7.15 a.m. passed Kap Brewster, off which some few icebergs were observed, but no ice floes.

Sept. 6th.—At 4.30 a.m. the ship cast anchor in the roads of Reykjavik.

After coaling at Reykjavik in the evening of September 8th both ships left for Copenhagen, arriving there on September 18th.

Summary of the Summer Expedition 1932.

The expedition numbered 95 members.

S.s. "Gustav Holm": passage through the ice ten days, stay near the coast forty-two days, and voyage out through the ice one day.

S.s. "Godthaab": passage through the ice belt seventeen days, stay near the coast thirty-seven days, no ice encountered on the return voyage.

One of the most important objects this summer was the re-arrangement of the cartographic work, viz. from mapping executed exclusively from the ground to mapping carried out on the basis of air photograhpy in connection with trigonometric surveys on the ground.

The personnel of the two seaplanes numbered fourteen men. Cartographic parties with four motorboats were at work in addition to the two parties that had wintered in East Greenland. On the basis of reconnaissance flights the leader of the expedition sketched a working chart of the area between 70° and 77° N. lat., notably of the western, partially unknown nunatak areas. As the ice conditions were favourable, a wintering station was built near the coal mine on Hochstetters Forland of the material deposited on Ella Ø the previous summer, from which station a trigonometric survey was to be made north of Clavering Ø.

Geological Investigations. 1) Practical-geological investigations. BACKLUND continued his investigations commenced in 1929



Fig. 47. Scattered ice near the coast. 1932

and 1930 and in company with MALMQVIST carried out electric ore-prospecting. A party consisting of four members, with three Icelandic ponies at its disposal, was at work in the southern part of Clavering Ø. Subsequently the party, with a motorboat, made a geological reconnaissance of the area between Clavering Ø and Hochstetters Forland.

2) Collection of vertebrates. a) G. SÄVE-SÖDERBERGH with four assistants continued the collecting of Devonian vertebrate fossils in the outer part of Kejser Franz Josephs Fjord. b) EIGIL NIELSEN with two assistants commenced the collection of vertebrate fossils in the Permian and Triassic beds between Kap Stosch and Finsch Øer.

3) Other geological objets. TEICHERT, who had spent the winter in East Greenland, continued, accompanied by a trapper, his tectonical investigations, chiefly between Waltershausen Gl. and Ella Ø. A. NOE-NYGAARD, with one assistant and a rowing boat, continued his work commenced in the winter, investigating Drømmebugten and the regions around Kap Simpson. E. WEGMANN, who was to remain in East Greenland during the winter, commenced a tectonical investigation of the area west of Ella Ø.

Biological Investigations. The s.s. "Godthaab" was placed at the disposal of a zoologic-hydrographical investigation conducted by Dr. R. SPÄRCK, who had two zoologists and a hydrographer as assistants.



Fig. 48. Greenlanders setting out for narwhal hunting. 1932

By means of an echo sounding apparatus the depths of the fjords around Ella Ø were measured.

ALWIN PEDERSEN, who had studied the higher animal life around Clavering Ø during the winter, moved to the Kulhus station to continue his work there during a second wintering. HOLGER MADSEN, who was to spend the winter at the Eskimonæs station, commenced investigations of the lower marine animals along the coasts of Clavering Ø and of the parasites of the higher animals.

The two botanists who had spent the winter in East Greenland, TH. SØRENSEN and P. GELTING, continued their work during the summer, each in his district.

Archæological Investigations. With P. GLOB as assistant, HELGE LARSEN completed the excavation of the large former Eskimo settlement on Clavering Ø. On September 1st GLOB commenced an archæological excavation in the Ella Ø district, wintering at the station there. A. SCHWARCK, who spent the winter at the station on Hochstetters For-

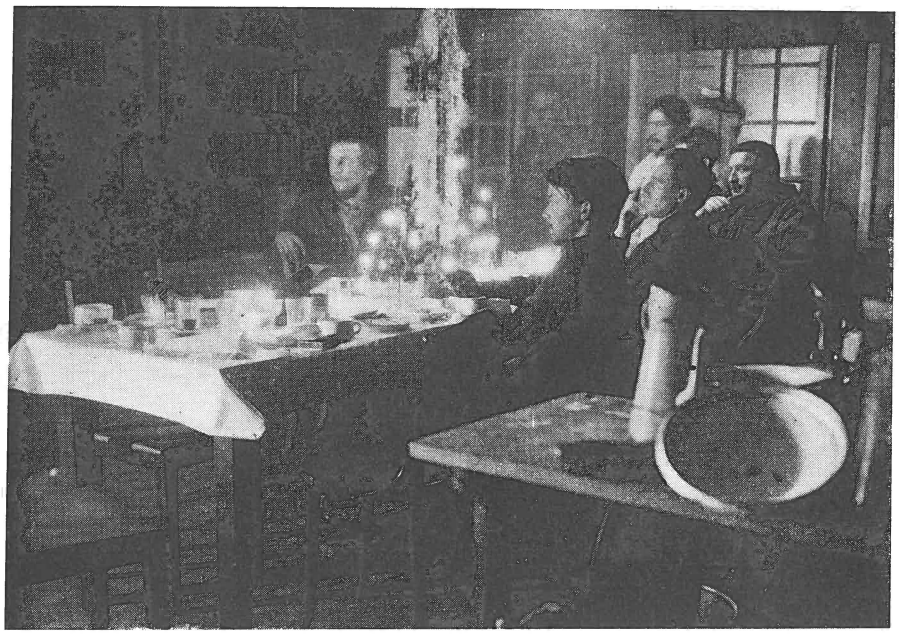


Fig. 49. Christmas Eve at Eskimonæs.

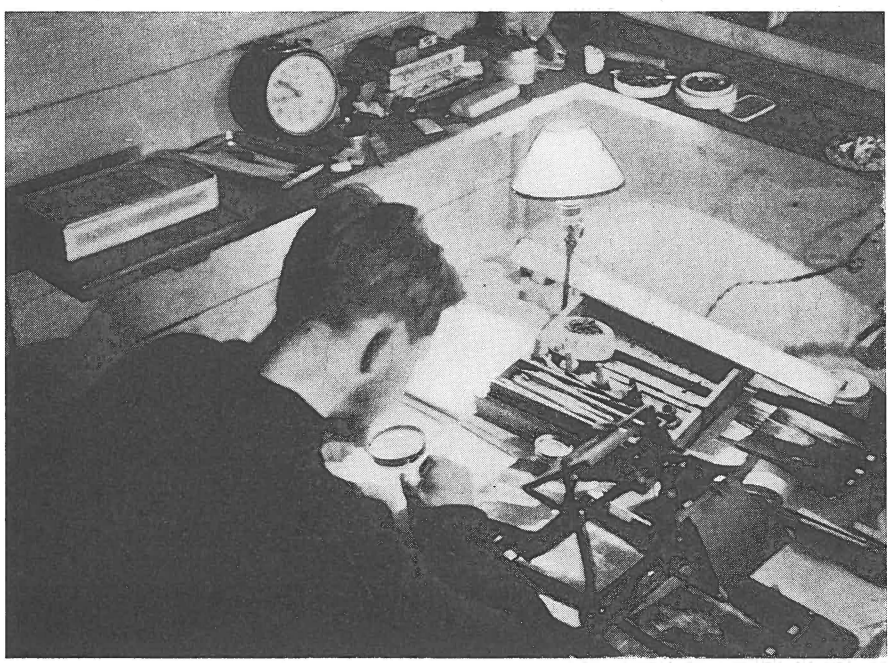


Fig. 50. Winter work at Eskimonæs. 1932



Fig. 51. The Ella Ø station in the early spring.

land, commenced an archæological reconnaissance and mapping of this district.

The weather conditions were favourable all summer, especially in the fjords. The ice conditions, also, were more favourable than the previous year.

Owing to the considerable increase of the summer work and the large number of new tasks some few working days were now and then lost for some of the members of the expedition.

After reaching the coast, the seaplanes were very servicable. The films brought home were not satisfactory, as they had not been sufficiently sensitive for photography from great distances, and to begin with the aircraft cameras gave some trouble.

The reconnaissance flights were carried out to plan and without mishap. The seaplanes were of great help in the daily work, thus in regard to ice reconnaissance, sanitary help and other help to the camping parties, and personal contact between these and the leader.

The motorboats were not equally satisfactory. Some of them were too small, and not all types of motorboats were reliable, but no serious mishaps took place. It proved desirable that in the future a greater number of the camping parties should be equipped with wireless stations.

The attempt to use Icelandic ponies for transport inland turned out a success. However, the ponies should only be used in suitable terrain and only on routes known beforehand.

It proved desirable 1) that the ships should in the future keep company on the voyage in through the ice belt, 2) that a fixed programme for the work of each camping party should be laid, and 3) that before the departure of the expedition the leader should be informed of the plans and desires of the wintering personnel, so that this personnel might be able to start their work under the most favourable conditions immediately on arrival of the ships.

Owing to the experience made by the wintering personnel as well as the fact that nearly all the leaders of the different parties had previously been at work in East-Greenland and most of the ship's officers were familiar with the regions in which the expedition was to have its working field, the fine summer could be utilised to a very great extent.

Wintering Parties 1932—33.

Kulhus.
A. B. C. Madsen, cartographer.
P. Halfdaner, topographer.
A. Pedersen, vertebrate zoologist.
A. Schwarck, assistant.

Eskimonæs.
Th. Johansen, cartographer.
V. Devantier, cartographer.
Eigil Nielsen, palæontologist.
Alexander Jensen, assistant.
Holger Madsen, zoologist.
Axel Nielsen, wireless operator.
Johan Davidsen, Greenlander, dog driver.

Ella Ø.
O. Simonsen, geodesist.
S. O. Stenør, cartographer.
E. Wegmann, geologist.
P. V. Glob, archæologist.
Aa. de Lemos, wireless operator.
Jørgen Petersen, Greenlander, dog driver.
Benjamin Samuelsen, Greenlander, dog driver.
Jørgen Barnabas, Greenlander, dog driver.

THE EXPEDITION 1933

Personnel.

	LAUGE KOCH, leader.
	E. TULINIUS, surgeon.
	G. SEIDENFADEN, in charge of the equipment.
s.s. "Gustav Holm".	N. C. VESTMAR, captain.
	T. M. JØRGENSEN, first mate.
	O. MØLLER, second mate.
	R. E. NIELSEN, first engineer.
	A. MØLLER, second engineer.
	S. G. D. CHRISTENSEN, wireless operator.
	Crew: 14 men.
s.s. "Godthaab".	H. L. ROSFELDT, captain.
	P. M. J. HANSEN, first mate.
	P. L. RASMUSSEN, second mate and wireless operator.
	S. L. BAUMBACH, first engineer.
	H. LINDAHL-HOLST, second engineer.
	Crew: 13 men.
Topographical mapping.	1st party:
	A. B. C. MADSEN, cartographer.
	P. HALFDANER, cartographer.
	A. SCHWARCK, assistant.
	2nd party:
	L. BRUHN, cartographer.
	S. KOFOED, cartographer.
	IB POULSEN, assistant.
	3rd party:
	TH. JOHANSEN, cartographer.
	V. DEVANTIER, cartographer.
	E. DRASTRUP, assistant.
	4th party:
	O. SIMONSEN, geodesist.
	S. O. STENØR, cartographer.
Aviation and air photography.	1st party:
	N. V. PETERSEN, chief pilot.
	E. OVERBYE, pilot.
	V. KRAMME, wireless operator, mechanic.

A. HATTING, mechanic.
H. G. NIELSEN, chief photographer.
H. V. JENSEN, photographer.

2nd party:
THORKILD PETERSEN, chief pilot.
FRODE HANSEN, wireless operator, mechanic.
H. BONDE-HANSEN, mechanic.
J. TOVDAHL, chief photographer.
K. V. PALSKJOLD, photographer.

Practical geology.

1st party:
H. G. BACKLUND, leading geologist.
E. H. KRANCK, geologist.
TH. SAHLSTEIN, geologist.
A. NOE-NYGAARD, scientific assistant.
S. H. HASSELBALCH, motorman and wireless operator.

2nd party:
D. MALMQVIST, geologist.
S. KAMMAN, assistant.
H. SCHOURUP SØRENSEN, in charge of the ponies.

3rd party:
O. EKLUND, leader of the mining party.
B. MALMBERG, assistant in the laboratory.
J. GUSTAVSSON, miner.
A. POULIN, miner.
A. DAHL, miner.
BØRGE PETERSEN, miner.
E. S. PETERSEN, miner.

Vertebrate palæontology.

Devonian party:
G. SÄVE-SÖDERBERGH, palæontologist.
T. SÄVE-SÖDERBERGH, scientific assistant.
G. OHLSSON, scientific assistant.
B. GRANSTRÖM, scientific assistant.
G. WÄNGSJÖ, scientific assistant.

Permian-Triassic party:
EIGIL NIELSEN, palæontologist.
ALEXANDER JENSEN, assistant.
J. TROELSEN, assistant.

Stratigraphy and geological mapping.

1st party:
E. WEGMANN, geologist.
H. BÜTLER, geologist.
C. BÜRGI, scientific assistant.
V. KANN-RASMUSSEN, motorman and wireless operator.

2nd party:
H. ALDINGER, palæontologist.
A. E. POULSEN, assistant.

Zoology.

1st party:
A. PEDERSEN, vertebrate zoologist.

	2nd party: F. SØGAARD ANDERSEN, zoologist.
	3rd party (on board the "Godthaab"): G. THORSON, leading zoologist. H. USSING, zoologist. HOLGER MADSEN, zoologist. E. MØLLER, assistant.
Botany.	1st party: P. GELTING, botanist.
	2nd party: TH. SØRENSEN, botanist.
	3rd party: SØREN LUND, algologist, on board the "Godthaab".
Archæology.	P. V. GLOB, archæologist. H. NORLING-CHRISTENSEN, assistant.
Personel at the station Eskimonæs.	AXEL NIELSEN, wireless operator. JOHAN DAVIDSEN, Greenlander, dog driver. JØRGEN BARNABAS, Greenlander, dog driver.
Personnel at the station Ella Ø.	AA. DE LEMOS, wireless operator. JØRGEN PETERSEN, Greenlander, dog driver. BENJAMIN SAMUELSEN, Greenlander, dog driver.

In the summer various Greenlanders were temporarily engaged as assistants and motormen.

Introduction.

The summer of 1933 was the culmination of the Three-Year-Expedition. The work was not impeded by house-building, the three wintering stations, Hochstetter, Eskimonæs, and Ella Ø, having been built in the previous summers. Although one motorboat was lost the first year, and another was considered unsuitable, nine motorboats were left in Greenland. Furthermore, one large and one small motorboat were sent up that summer, and as the ships, as usual, had three motorboats, altogether fourteen motorboats were at the disposal of the expedition.

On the basis of our experiences gained in the previous years, the seaplanes were placed one on each ship. Both the cameras and the films proved satisfactory.

The personnel consisted to a great extent of persons who had previously taken part in the expedition; thus the ship's officers, a number of the crews, and the personnel of the seaplanes were the same as in the previous years. The scientific staff was increased in various respects, but practically all the party-leaders were familiar with the conditions

in East Greenland from earlier expeditions. Great care had been taken in selecting the wireless equipment; thus several of the parties were equipped with wireless stations, both while at work ashore and in the motorboats. Altogether twelve wireless stations were in use that summer, by the aid of which it was possible to follow the movements of the whole personnel almost every day. The personnel this year numbered 109 men.

The expedition started earlier than the previous years, and thanks to exceptionally favourable ice conditions, both ships arrived at Scoresbysund as early as the day after midsummer. The greater number of the personnel at once set to work. Thanks to intensive ice reconnaissance in connection with favourable ice conditions, one of the ships was not obstructed by ice all summer, while the other reported only six hours of ice navigation.

The expedition stayed in East Greenland for sixty-six days. It was my hope that we might have continued our work till some time in September, but this was prevented by a period of bad weather occuring on the first days of September.

This summer a mining party, conducted by O. Eklund, was at work on Clavering Ø. The party was somewhat delayed in the start, because after its very large equipment had been carried ashore, a more suitable working field was discovered in another place, so the camp had to be removed.

Icelandic ponies were used to a greater extent than before, thus eleven ponies were at the disposal of the geologist parties. Owing to the extraordinarily favourable ice conditions the working field of the expedition could be extended northward to Peary Land and southward to Kangerdlugssuaq, a stretch of more than fourteen degrees of latitude. There was no mishap of any kind during the summer.

The two ships of the expedition left Copenhagen on June 8th, and arrived at Akureyri on June 17th, whence they started towards East Greenland on June 22nd.

Ss. "Gustav Holm"'s voyage from Akureyri to Scoresbysund and the stay there.

June 22nd.—Started from Akureyri at 7 a.m. However, the ship was headed by a strong north wind, and in the afternoon she had to drop anchor off Hrisey.

June 23rd.—In the night the wind decreased somewhat, and at 0.45 a.m. the ship weighed anchor and proceeded northward. The wind was NW. force 2, with rain. Later the wind changed, blowing from the

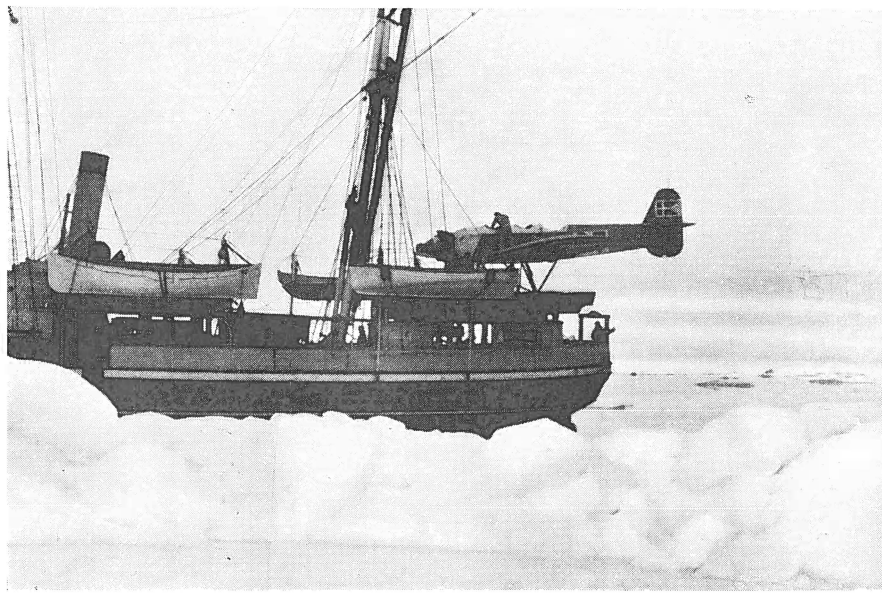


Fig. 52. The "Gustav Holm" in the pack-ice. 1933

N. and NNW. to NE., force 4. In the evening some ice was encountered, and at 11 p.m. the ship had to heave the log.

June 24th.—In the night the temperature fell rather suddenly from 10° to 0° C. It was clear, and the wind blew from the northwest, changing subsequently to a light southwesterly wind. From 8 p.m. the ship made its way among scattered drift ice. By midnight good bearings were taken to Kap Brewster and the mountains on Liverpool Land. It was almost calm.

June 25th.—Clear weather. The ship proceeded among large, but fairly scattered ice fields. Kap Brewster was passed at 9 a.m., but from this point towards the colony the ice-fields were more close-packed. In the forenoon the ship was jammed between two very large floes, which prevented all advance for more than one hour, but at 1.26 the ship moored at the ice edge in Rosenvinges Bugt off Scoresbysund. The "Godthaab" had already arrived there a few hours before and was visited by the Danes from the colony, who had gone out to meet the ship on sledges. After an hour's stay at the ice edge, both ships left for Kap Hope, where they dropped anchors at 3.30 p.m. The seaplane on the "Gustav Holm" was at once lowered, and two trial flights were made in the evening.

June 26th.—In the morning the motorboats "Polypen" and "P. 1" were lowered. KOCH, OVERBYE, and HANSEN made an ice reconnaissance in the seaplane northward along Liverpool Land and onwards to Kap Wardlaw, Kap Biot, and back to Kap Hope along the west coast of



Fig. 53. Unloading of ponies. 1933

Jameson Land. The edge of the fast ice was observed to extend from Kap Hodgson to the easternmost point of Rathbone Ø and onwards in a narrow belt along the coast to Murray Ø and thence in a straight line to Bontekoe Ø. In most places northward from Kap Greg the drift ice lay close against the ice edge, so it might be possible for the ships to make their way northward.

After our return from the flight a council was held on board the "Gustav Holm", at which the leaders of the various working parties were present. They were informed of the unfavourable ice conditions northward, and it was decided that all the parties were immediately to start work in Scoresby Sund. The date of departure was provisionally fixed at July 15th.

The barometer was falling slightly, and in the afternoon came wind from the southwest, of force 4, and the ship had to move to a more westerly anchorage owing to the ice drift.

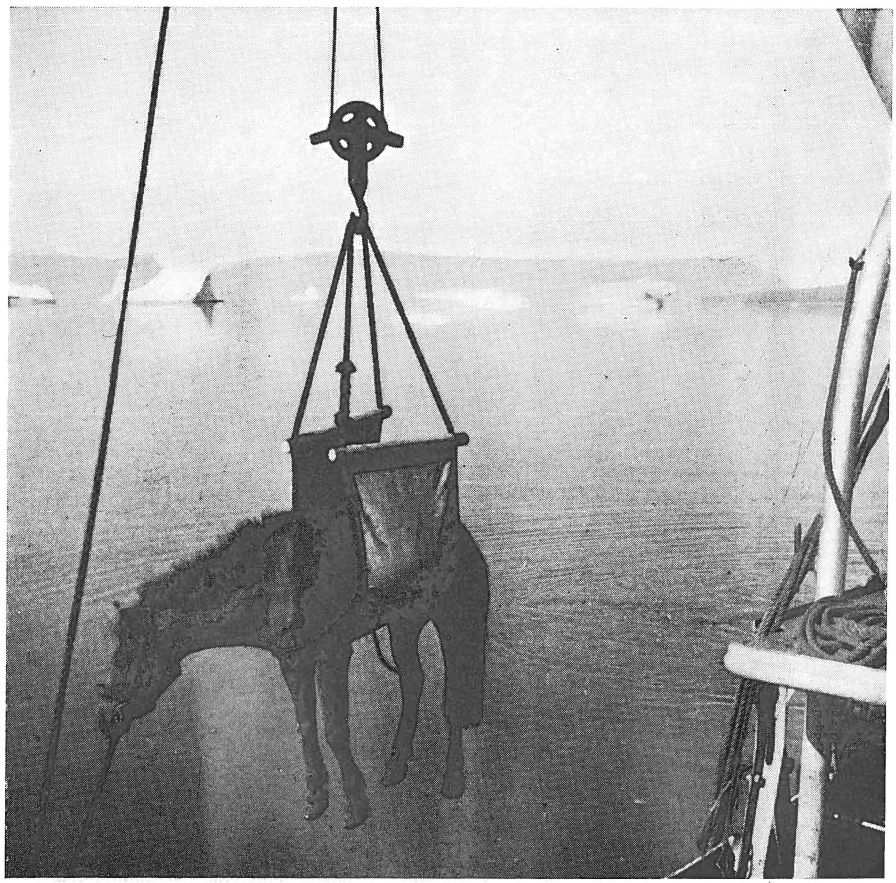


Fig. 54. Unloading of ponies. 1933

The other seaplane had been transported with the liner to Reykjavik, where it was made ready for a flight from Reykjavik to Scoresbysund. As the weather conditions were favourable both around Iceland and in Scoresby Sund, the seaplane started in the forenoon from Reykjavik with PETERSEN and KRAMME and after a short landing at Isafjord to take in petrol, it landed about 5 p.m. near the "Gustav Holm" and was immediately hoisted.

At 5.30 p.m. the motorboat P.1 started from the "Gustav Holm" with BÜTLER, BÜRGI, and KANN RASMUSSEN. The party first went to the "Godthaab", which lay nearby, to fetch some further articles of equipment, and then joined BACKLUND's party. At 7 p.m. the "Polypen" with BACKLUND, KRANCK, SAHLSTEIN, NOE-NYGAARD, and HASSELBALCH, sailed to the "Godthaab" to fetch provisions, and in the evening both parties erected a camp at Kap Tobin. At 8 p.m. the MALMQVIST-party (nine men) were landed by motorboat east of

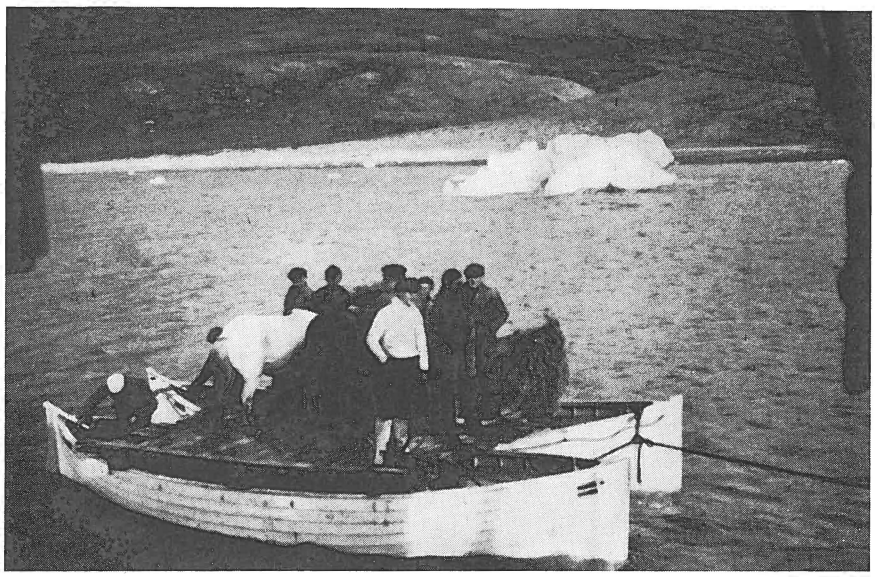


Fig. 55. Landing of ponies and hay.

Kap Hope. The seaplane H. 87 was stationed on the "Godthaab", chief pilot N. V. PETERSEN. At the same time various passengers were removed to the "Godthaab".

Since the arrival of the expedition to Scoresbysund, the barometer had been falling slightly. As a rule the wind was easterly with banks of fog, and at Kap Hope there was a rather rapid drift of ice, owing to which both ships had now and then to change their anchorage.

June 27th.—The motorboat "Ford" was placed at the disposal of a party which was building a dark-room at Kap Hope. In the forenoon the ships made ready for start. The day before they had taken the camping outfit on board, now the life-boats were hoisted, and at 11 a.m. both ships started towards Jameson Land. At 3 p.m. BRUHN's party (three men) was set ashore on the south coast of Jameson Land to make geodetic observations. The ship continued westward, where she stopped to land SÄVE-SÖDERBERGH's party and three ponies. Strong currents and falling tide prevented the landing of more goods that day, and in the evening the ship had to change its anchorage for some time owing to drifting ice. THORVALD SØRENSEN, GELTING, and NORLING CHRISTENSEN were landed near the edge of the fast-ice to the west. Owing to fog no flights were made that day.

June 28th.—Slightly overcast, but rising barometer and south-westerly wind, increasing to force 5 in the evening. The easterly wind carried large ice masses into the fjord, and the ship had repeatedly to change her place and moor at an ice floe. In the course of the day the

remaining eight ponies as well as hay, saddles, etc., were landed, and SÄVE-SÖDERBERGH's large camp was thus fully supplied. In the evening the life-boats were moored in a lagoon with so shallow water at the entrance that no ice floes could drift in. Later in the evening the ship dropped anchor a little west of Kap Stewart. At 10 G.M.T the following telegram was received from the BACKLUND and BÜTLER parties, which had camped in a much exposed place on the outer coast and consequently were in constant wireless communication with the ships: "Both boats lie at Rathbone Ø. For the present no fog, but the ice conditions are so bad that we cannot proceed northward for the time being. Fast ice occurs northward from Rathbone Ø as far as the eye can reach. Southwards no ice of importance. All well." No flights that day on account of thick weather.

June 29th.—Sky overcast, barometer falling slightly. In the forenoon the wind was SE. force 5, later it turned to NE. force 1; light snowfall. Very early in the morning all hands were on the deck to hoist the boats. The ice drifted rapidly westward round Kap Stewart and the ship was carried so far shorewards by the ice that she touched the bottom a couple of times, but she managed to get through and at 11 a.m. dropped anchor off Kap Hope, where the wind was lighter and the ice drift less severe. By noon the party that had built the dark-room at the cape came on board. In the evening the motorboat "Ford" made an attempt to call at MALMQVIST's camp (which had moved some distance inland), but the attempt had to be given up owing to ice. No flights that day owing to the unsettled weather.

June 30th.—Light easterly wind with clouds and falling barometer. In the morning SEIDENFADEN started on an inspection trip to the three camps (BRUHN, SÄVE-SÖDERBERGH, and the botanists) on Jameson Land to see whether they wanted any articles of equipment; however, everything was all right in the three camps. In the afternoon the ship weighed anchor and moored at a large drifting ice floe, from which she took in 15 tons of fresh water. At 5.15 p.m. the seaplane was lowered, and KOCH, PETERSEN, and KRAMME made a reconnaissance flight (2 hours 10 min.) to observe the ice conditions at the mouth of Scoresby Sund. The route was laid along the coast to the head of Hurry Fjord and thence to Kap Stewart. The inner third of Hurry Fjord was entirely free of ice, in the middle third the ice was thawing rapidly, while in the outermost third the ice still lay close to the shore, but conditions had improved somewhat during the last few days. The seaplane continued from Kap Stewart to Kap Hooker, across the fjord, and onwards to Kap Brewster. The fast ice still lay to some distance west of Kap Hooker, but the whole outer part of the fjord was free of ice except for a few large floes. The south coast of Scoresby Sund as far as the pass



Fig. 56. Landing of hay. 1933

west of Kap Brewster presented one continuous ice front; the wind must have deposited large quantities of snow here, which had been sheltered from the sun by the basalt cliffs. The basalt cliffs along this stretch of the coast are covered by a vigorous vegetation, and numerous little auks breed everywhere along the coast. Over Kap Brewster the seaplane flew at a height of 800 m. From a little north of Kap Dalton as far as Rathbone Ø only a few large floes were observed. Southeast of the fjord no ice was visible right out to the horizon. The seaplane then proceeded at a low height down to Dunholm; on one of these islets a bear was seen to ramble about among the numerous eiderducks breeding there. The seaplane frightened the bear so that it disappeared into the water. Some distance south of Dunholm the seaplane landed on the water, and owing to lack of petrol it was decided not to go to Rathbone Ø. After passing the large auk cliff at Kap Brewster the

course was laid towards Kap Tobin for observation of the ice from a height of 1000 m. However, owing to fog not very much was seen of the ice conditions northward along Liverpool Kyst; but as far as could be seen, no great changes had taken place since the reconnaissance flight on June 26th. In Rosenvinges Bugt open water was forming in a few places along the coast. After landing, the seaplane was immediately hoisted on to the ship. During the flight the wind had increased in force, and shortly after our return the weather grew thick and foggy.

July 1st.—In the forenoon easterly wind of force 5, decreasing in the afternoon to force 2. It was overcast and hazy with banks of fog, and the barometer was low. It was impossible to fly. In the afternoon Captain VESTMAR made a motorboat trip into Hurry Fjord to inspect the ice conditions, as we were to avail ourselves of the first opportunity to move the ship to Fame Øer, where there was a much better anchorage than at Kap Hope. In Hurry Fjord the weather was better than at Kap Hope, and there was no fog, but for the present the ice masses were too heavy for the ship to go to Fame Øer. In the evening two motorboats visited BACKLUND's and BÜTLER's camps, which owing to the constant easterly winds and the ice drift had moved back to Kap Tobin. There was a thick fog, but the motorboat followed the ice edge in Rosenvinges Bugt. No flights owing to bad weather.

July 2nd.—Southeasterly wind, force 2. Sky overcast and banks of fog, but the barometer was rising. The ship changed its anchorage a couple of times in the course of the day owing to the ice drift. At 2.30 p.m. BACKLUND's and BÜTLER's parties arrived at the "Gustav Holm". After a short stay at the ship, both boats accompanied by the motorboat P. 2 went into Hurry Fjord, as the continuous easterly winds with fog presented too great hindrances to the work along the outer coast. Later in the evening SEIDENFADEN with the motorboat "Ford" joined BACKLUND's party in Hurry Fjord.

July 3rd.—In the night it grew calm and clear, and the barometer rose. However, in the afternoon the barometer fell again, and in the evening the east wind returned, blowing with a force of 5; clouds and fog. At 7 a.m. the ship went westward as far as the ice edge, where THORVALD SØRENSEN's party was taken on board and removed to Kap Stewart. A short halt was made off SÄVE-SÖDERBERGH's camp and food for the ponies and provisions were set ashore. After THORV. SØRENSEN's party had been landed at Kap Stewart, the ship attempted to return to Kap Hope, but was stopped by the ice and had to drop anchor near the ancient Eskimo house ruins on the east side of Hurry Fjord; this was possible because the large ice floe which spanned the mouth of Hurry Fjord, in the course of the day had moved farther into the fjord. However, there was no good anchorage here, and in the evening

the ship had to drop both anchors owing to the increasing wind. SEIDENFADEN made an attempt to reach BACKLUND's camp in motorboat P. 2, but failed. The camps in Hurry Fjord now had a very exposed position, since the ice plug, which had hitherto been pressed tightly against both shores, had now thawed so much that it could move in and out of the fjord. KRANCK and SAHLSTEIN of the BACKLUND party were at work on the east side of the fjord, while the others had gone farther up the fjord and had camped on the east coast some distance south of Fame Øer.

July 4th.—Calm and slightly overcast. In the early morning the "Godthaab" dropped anchor alongside the "Gustav Holm" off the Eskimo house ruins. Some members of the flying personnel and photographers were transported in a boat to the "Godthaab", and a camp with NORLING CHRISTENSEN, DRASTRUP, and ERIK MØLLER was set ashore to excavate the house ruins. At 8 a.m. the ship went to Kap Stewart with hay and provisions for SÄVE-SÖDERBERGH's party, which was on the way to that place, and from there the motorboat P. 2 was sent with provisions to BRUHN's camp. On its return voyage the motorboat was to tug the life-boat float, which lay at anchor in the lagoon off Kap Stewart, into the head of Hurry Fjord, the ice plug having by now thawed so much that we thought it safe to move the headquarters of the expedition to Fame Øer. The ship then sailed northward into Hurry Fjord, but soon encountered more ice than expected, and the motorboat of the ship was therefore sent to assist in the towing of the life-boat float. Subsequently the ship succeeded in penetrating the ice and sailed into Hurry Fjord. A man of the crew was transported by the seaplane to the boat for assistance. The boats were unable to reach Fame Øer, and on account of the movements of the ice both the motorboats and the life-boat float had to be hauled ashore near KRANCK's camp on the east side of the fjord. In the afternoon the seaplane on the "Gustav Holm" started the photo-flights.

July 5th.—Rising barometer, slightly overcast, and calm. At 4 a.m. both seaplanes commenced their photo flights. In the early morning the two motorboats at KRANCK's camp reached the ship a little south of Constable Pynt. At 7.30 a.m. the ship weighed anchor and headed towards Fame Øer. At 9.45 a.m. both ships received a wireless message about a motorstop in seaplane H. 86. The "Godthaab", which rode at anchors off the Eskimo house ruins, at once started at full speed towards the interior of the fjord, and the other seaplane interrupted its work and flew towards the place where the motorstop had occurred. The damaged seaplane reported that it hoped it would be able to glide down into a clearing of open water west of the ice edge that extended across Scoresby Sund from Kap Hooker. The "Gustav Holm" awaited a report from Seaplane 87, and shortly after it was reported that Seaplane

86 had landed safely in the open water. Seaplane 87 landed alongside, the cause of the motorstop was found, and the ships were informed that no further assistance would be necessary. Shortly after the damaged seaplane landed at the "Gustav Holm" and was immediately hoisted for repairs. At 11.20 a.m. the "Gustav Holm" dropped anchor off Fame Øer, and shortly after SEIDENFADEN arrived from BACKLUND's camp. Later BACKLUND himself arrived, and in the evening a geological investigation was made of Fame Øer.

July 6th.—Clear and calm, rising barometer. At 4 a.m. the seaplane was lowered for photo-flights. At 8 a.m. the "Polypen" started to fetch KRANCK's camp. When the party and the outfit had got on board the motorboat, the ice packed around the boat and forced it partly up on to the shore, and things looked very critical. The "Gustav Holm" communicated with the boat over the wireless every half hour. A motorboat was sent to rescue it, but could do nothing. The "Polypen" was ice-bound until midnight, when both boats got free at high tide and sailed back to the ship.—At 1 p.m. SEIDENFADEN made a trip in the P. 2 to BRUHN's camp. At first BÜTLER and BÜRGI were landed at Nathorsts Fjeld, then the motorboat went to the "Godthaab", which rode at anchor in the neighbourhood south of the river debouching south of Nathorsts Fjeld. Here H. H. NIELSEN came on board with several air photo films which he was to develop at Kap Hope. Off Constable Pynt the boat met the large ice floe that had been aground at the mouth of the fjord, but which still moved to and fro with the currents. The boat was pressed on to the shore, but got free at high tide, and continued to Kap Stewart, where THORV. SØRENSEN's camp was visited, and onwards to BRUHN's camp west of the cape. Seaplane 87 utilised the fine weather in the forenoon for photo-flights. The repairs of Seaplane 86 continued all day.

July 7th.—Slightly rising barometer, clear and almost calm. The ship took in fresh water from a river and set the motorboat "Ford" and the ship's jolly-boat ashore in view of a possible ice drift. At 2 a.m. SEIDENFADEN in motorboat P. 2 reached BRUHN's camp, which was taken on board; the boat then went to Kap Hope with H. H. NIELSEN and afterwards some distance up Hurry Fjord, where BRUHN's party and camp were landed for observations. The motorboat then returned to Kap Hope to fetch H. H. NIELSEN, who, however, had not developed the films on account of a leak in the dark room. The boat then sailed to THORV. SØRENSEN's camp at Kap Stewart, the camp was taken on board, and after a short visit on the "Godthaab", which lay south of Nathorst Fjeld, the boat returned to the ship at 1 p.m. The repairs of Seaplane 86 were finished in the forenoon, and it made some long photo-flights in the afternoon. In the evening a visit

was paid by motorboat to the different camps in the interior of Hurry Fjord.

July 8th.—Calm and slightly overcast, the barometer was still rising. The propeller of Seaplane 86 had to be exchanged, so part of the cargo in the ship had to be removed to get hold of the spare propeller. A platform of thin boards was erected on the after deck of the "Gustav Holm" to secure an easy passage from the ship down into the seaplane when moored to the stern of the ship. In order to find the most suitable anchorage, the ship's motorboat made a surveying of the waterway around Fame Øer in cooperation with SEIDENFADEN, who from the top of Nathorsts Fjeld determined the position of the boat every time it gave a signal, and thus by means of a vertical base determined the position of the casts of the lead. The botanists erected a camp on Vargudden. The mail for the Ella Ø station, which was in the "Godthaab", was fetched by motorboat, and at 6.20 p.m. KOCH, PETERSEN, and KRAMME started for Ella Ø. The route was laid from Fame Øer to Kap Stewart, thence along the west coast of Jameson Land to Sydkap, along Schucherts Flod to its sources, thence to Archer Øer and onwards along the west coast of Kong Oscars Fjord to Ella Ø. A sketch map was drawn during the flight across Scoresby Land.

July 9th.—The barometer was falling, and the wind again blew from the NNE., force 3. All day the sky was overcast, and in the evening it rained. At 8 a.m. KOCH, PETERSEN, and KRAMME started from Ella Ø, followed Vega Sund to the outer coast, and thence flew to Murray Ø and onwards along Liverpool Land to Storefjord, which was provisionally mapped; this map was to serve as a basis for the later work of BACKLUND's party in this fjord. The seaplane then returned to the ship at Fame Øer. During the flight a good view had been obtained of the ice conditions, which had improved considerably. At noon the wind increased in force, the seaplane was hoisted, and some smaller boats set ashore. In the forenoon all the air photographers had been transferred to the "Godthaab", which started towards Kap Hope in order to have the dark room repaired and the films of the last few days developed. The P.1 sailed to BRUHN's camp, but along the way experienced a damage to the engines, and was taken in tow by the "Godthaab". BACKLUND made various investigations on Fame Øer.

July 10th.—Rising barometer, the northeast wind decreased, and the weather cleared. The small boats hauled ashore were taken on board. In the forenoon SEIDENFADEN started in Seaplane 86 to visit the various camps. Since owing to the ice it was impossible to land near the place where MALMQVIST's party had been landed, and as moreover the camp had been moved some distance inland, the seaplane flew over the camp and throw down a message requesting the party to

make ready to go on board the ship on July 13th at the latest. The seaplane then returned to Kap Stewart, where a visit was paid to SÄVE-SÖDERBERGH's camp, which was to be broken next day. BRUHN's camp was removed by the "Godthaab" to the west side of the fjord and was ordered via the "Godthaab" to be prepared for a hasty breaking up of the camp. In the afternoon SEIDENFADEN made observations from Nathorsts Fjeld in connection with the survey of the sea. Late in the evening the botanists' camp on Vargudden was taken on board.

July 11th.—Clear and calm, later southeast wind, force 3, and overcast; barometer falling. In the morning the ship made ready to start, hoisted her boats, and left Fame Øer at 9.20 a.m. heading towards Kap Stewart, where she arrived at 3.10 p.m. Shortly before the arrival there a mishap occurred, which, however, had no serious consequences. A sailor was to go in the motorboat P. 2 to the lagoon to fetch the life-boat float and take on board the camp. The ship went on with the engines working at reduced speed. KOCH and the sailor went on to the platform that had been built a few days before above the rudder, to descend into the motorboat. Although six men had been standing on the platform the day before, now one of the beams broke, the platform with KOCH fell into the water, while the sailor fell down into the motorboat and was so much hurt that he lost consciousness. Nobody on the ship had observed the incident, so the ship proceeded on her route. When shortly after the sailor regained consciousness, he started the motor, but confused owing to the shock, he at first set the engine full speed astern and then full speed ahead with the result that the gear burst. The rather strong current soon removed KOCH from the ship, though he tried to reach it by swimming. Only after some time the mishap was discovered, a life-buoy was thrown out, and a boat was lowered. In the meantime KOCH had got hold of the buoy, but was now unable to swim any longer in the cold water. Shortly after the boat reached the buoy, and he was taken on board, uninjured by the cold bath. The damaged motorboat with the sailor was tugged to the ship, and was soon repaired. The ship anchored off Kap Stewart at 1.10 p.m. The life-boat float was fetched in the lagoon, all the ponies and SÄVE-SÖDERBERGH's party and camp were taken on board, and at 6.45 p.m. the ship sailed to Vardekløft, where BRUHN's camp was taken on board, and ALDINGER and one assistant were set ashore. The ship then went to the archæologist's camp at the old Eskimo houses, and after the camp had been taken on board, the ship anchored off Kap Hope at 11.25 p.m.

July 12th.—Clear weather, southeasterly wind of force 1, slightly falling barometer. In the early morning the ship left Kap Hope and went to the outpost at Igterajivit to set ashore various empty cases, which were to be transported home by the "Gertrud Rask" later in the

summer. A motorboat sailed to Kap Tobin with geodesists and botanists. S.s. "Gustav Holm" then returned to the Eskimo house ruins in Hurry Fjord, where the "Godthaab" had dropped anchor. Fifteen barrels of petrol were transferred from the "Godthaab" to the "Gustav Holm", as the French ship the "Pollux" had been unable to transport petrol for the seaplane to Scoresbysund, so a fresh supply of petrol would not be received till the arrival of the "Gertrud Rask" later in the summer. Finally, passengers were exchanged with the "Godthaab", which was to remain in Scoresby Sund for some time, and the "Gustav Holm" was made ready to go northward.

Calling at the stations Eskimonæs and Ella Ø.

July 13th.—Clear, almost calm, occasional fog. Passed Kap Hope in the morning, where the archæologists were set ashore. At 10.35 a.m. the ship dropped anchor off MALMQVIST's camp, which was taken on board in the forenoon. Subsequently the ship took on board the geodesists and botanists at Kap Tobin, and at 1.10 p.m. went northward along Liverpool Land. In the morning BACKLUND had started in the motorboat "Polypen". The ship encountered the edge of the fast ice off Kap Greg, and sailed along it. At 10 p.m. an attempt was made to go into Storefjord, but the way was barred by ice, so the ship proceeded northward.

July 14th.—Calm, overcast, occasional rain. The ship sailed in ice-free land water till 2 p.m., when she was stopped by ice off Franklins Ø. This ice was pressed against the edge of the fast ice, and no passable leads were visible from the ship. Seaplane 86 was therefore lowered for an ice reconnaissance, which was made by KOCH, PETERSEN, and KRAMME, who subsequently continued to Myggbukta, where the Norwegian ship the "Vesle Kari" with LOUISE A. BOYD's expedition on board had arrived in the forenoon. It was still impossible for the ship to go into Kejser Franz Josephs Fjord, the fast ice extending as far as Kap Bennet. After a visit for a couple of hours on board the "Vesle Kari", the seaplane returned to the ship at 6 p.m. In the meantime the ship had taken in fresh water from an ice floe. At 7.35 p.m. she went into the ice and tried to make her way through, but by midnight she had proceeded only five or six miles in a northerly direction through close-packed fjord ice and several heavy ice-floes.

July 15th.—Calm, with occasional fog. In the morning and forenoon the ship made various attempts to make her way through the ice, but for periods she was incapable of moving. However, at 1 p.m. she encountered large spaces with open water, and could proceed at full speed northward. Passed the "Vesle Kari" at the southernmost point of Bontekoe Ø.

July 16th.—Light southerly wind with occasional fog. Passed the sound between Jackson Ø and Hold with Hope at 2.15 p.m., where fairly large ice masses were met with. An attempt was made to approach Sandodden in scattered ice with large floes. However, Young Sund inside of Kap Mary was packed with ice, and the "Gustav Holm" therefore laid her course towards Eskimonæs and dropped anchors in the West Harbour at 2.35 p.m. JOHANSEN, DEVANTIER, and MADSEN immediately came on board; the other wintering members were at work at Kap Stosch, but arrived later in the day. In the afternoon SEIDENFADEN, MALMQVIST, EKLUND, and MALMBERG went in the motorboat P. 2 to the rust-coloured zone at Breivik for reconnaissance. In the evening the "Polypen" reported a motor stop in Storefjord. A telegram was immediately dispatched to Copenhagen, ordering spare parts for the motor to be sent up with the "Gertrud Rask", and a request was sent to the "Godthaab" to go to Storefjord for assistance.

July 17th.—Sky overcast, southeast wind, force 2. As Kejser Franz Josephs Fjord was still barred by ice, a council was held on board the "Gustav Holm" in order to arrange for the landing of the large mining parties so that they might start work as soon as possible. Various tasks were given to the other parties. In the early morning a boat tugged by a motorboat and loaded with piece-goods started from the West Harbour to the station, and at 10 a.m. the ship started for the Mining Camp, where props, boards, camping outfit, dynamite, hay, provisions, and eleven ponies were unloaded. At 8.30 p.m. the ship left the Mining Camp, and one hour afterwards dropped anchor in the West Harbour. The motorboat and the other boats arrived later. By noon KAMMAN took SÄVE-SÖDERBERGH's party in the motorboat "Asut" to the mouth of Loch Fyne.

July 18th.—In the morning southeast wind of force 2, later calm. Banks of fog and occasional rain. In the early morning a boat loaded with goods was sent around the naze to the station, but as the ice conditions in the East Harbour improved, the ship moved to that harbour and unloaded coal for the station. At 3.45 p.m. the ship started for the Mining Camp, where goods were unloaded till 9.30 p.m., when she returned to the West Harbour. At 11 a.m. the "Asut" started for Hirdhavn with EIGIL NIELSEN's party and GELTING.

July 19th.—Calm, and the weather clearing. In the forenoon a boat with timber was sent to the Mining Camp. As EKLUND was not satisfied with the conditions there, he was fetched in the "Asut" early in the morning and removed to Auspiciedalen after a short visit at EIGIL NIELSEN's camp at Brinkley Bjerg. MALMQVIST, KAMMAN, and SØRENSEN went with the ponies over land behind Eskimonæs to Dødemandsbugten. At 1.55 p.m. the "Gustav Holm" left Eskimonæs to go to Sandodden,

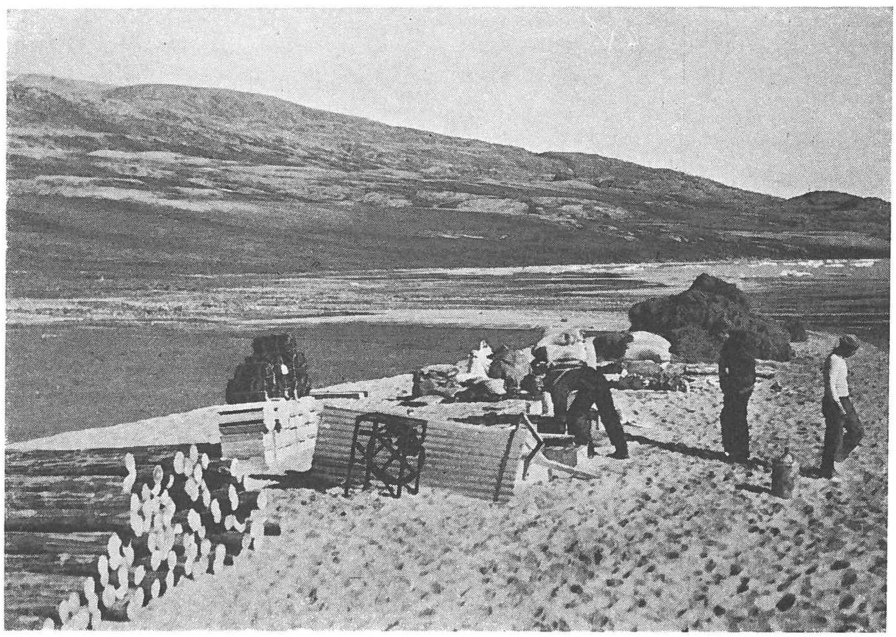


Fig. 57. Equipment for the gold-mine. 1933

where BRUHN, KOEFOED, and IB POULSEN were set ashore in the P. 2 at 7.10 p.m. At 9 p.m. the ship started back from Sandodden, where Seaplane 86 was taken on board after both MALMQVIST and EKLUND having made reconnaissance flights in order to fix the position of the rust-coloured zones on Clavering Ø. A couple of photo routes were also covered that day.

July 20th.—Clear and calm. At 2 a.m. the ship arrived at the West Harbour, and in the course of the day unloaded coal and provisions for the station. The unloading of goods for Eskimonæs was finished at 5.30 p.m. The ship then went to Auspiciedalen, to which EKLUND wished to remove his camp. After unloading one and a half boats full of timber, the ship returned to the West Harbour, where she cast anchor at 9.30 p.m. Seaplane 86 was lowered and moored at a buoy.

July 21st.—Southeast wind, force 2, cloudy and banks of fog. Coal were removed from the hold to the bunkers all day. The available motor-boats were used for transporting camping outfit from the Mining Camp to Auspiciedalen.

July 22nd.—Southwest wind, force 2, the weather was clearing. The stowing of coal was continued till 2.40 p.m., and in the afternoon 10 tons of ballast were taken in. The motorboats transported goods from the Mining Camp to Auspiciedalen all day. The fine weather made it possible to photograph several routes.

July 23rd.—Southeast wind of force 2, cloudy. It was Sunday, and the ship's company took a day off. In the forenoon KOCH, PETERSEN, and KRAMME made an ice reconnaissance to the mouth of Kejser Franz Josephs Fjord, which now proved to be passable for ships. Near Bontekoe Ø the Norwegian ship the "Polarbjørn" was passed. After returning to the ship the seaplane made a search along the coasts of Gael Hamkes Bugt at the request of a Norwegian trapper, whose son had disappeared on the ice in spring. We did not succeed in finding the dead body of the Norwegian



Fig. 58. Transport to the gold-mine. 1933

trapper, nor was he found in the hut on Jackson Ø. During these flights a visit was paid to JOHANSEN's camp on Store Finsch Ø. In the forenoon SEIDENFADEN fetched EIGIL NIELSEN's camp at Hirdhavn and by midnight started from Eskimonæs in the "Asut" to fetch SÄVE-SÖDERBERGH's camp.

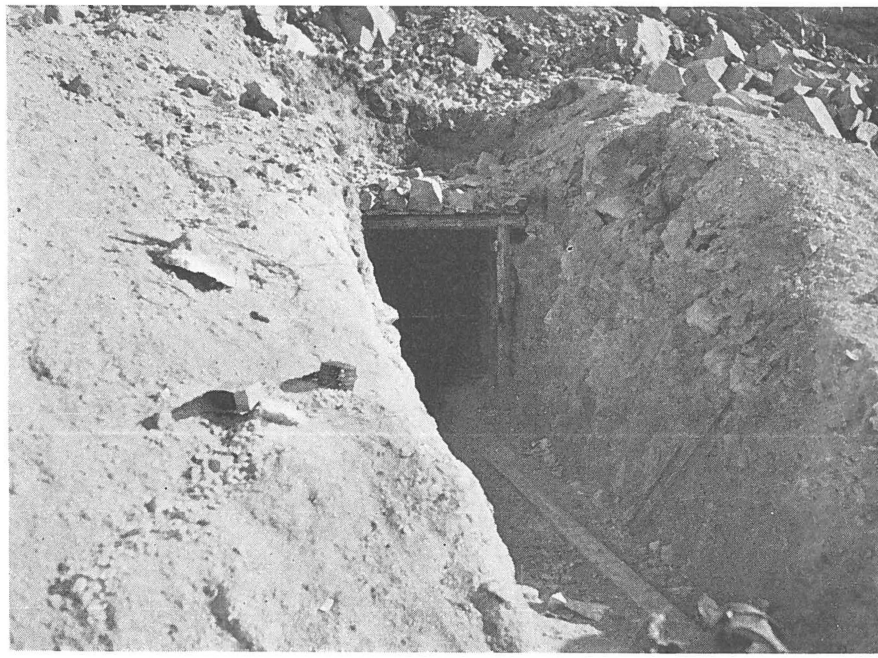
July 24th.—South-southeasterly wind of force 2, later calm, slightly overcast. Both in the forenoon and in the afternoon the fine weather was utilised for air photography in altogether 9 hours 20 minutes. The ship took in 32 tons of ballast. In the forenoon, after taking SÄVE-SÖDERBERGH's camp on board at Passagehøje, SEIDENFADEN continued to Grantafjord, where GELTING was set ashore, and then returned to the ship. In the evening he sailed to the Mining Camp, where EKLUND had now finished his analyses, and he and the laboratory were removed to Auspiciedalen. MALMQVIST's party was still at work inland, but was expected to return in a couple of days.



Fig. 59. The camp at the gold-bearing pyrites on Clavering Ø. 1933

July 25th.—Northwest wind, slightly overcast. In the forenoon the ship took in 11 tons of ballast, and thus had a total ballast of 53 tons. Subsequently several cases with fossils from the station were taken on board, and at 1 p.m. the ship started for the Mining Camp in order to remove the remaining articles there to Auspiciedalen. After finishing this work, the ship returned to the West Harbour at 10 p.m. In the evening KOCH, PETERSEN, and CHRISTENSEN (the wireless operator of the "Gustav Holm") made a flight around Clavering Ø. A landing was made at Sandodden to deliver a message to the trappers, and another visit to BRUHN's camp in the interior of Tyrolerfjord. During the flight a foehn wind was coming on, and when the seaplane returned at midnight, the swell in the West Harbour was so high that the ship had to move to the East Harbour, where the seaplane was hoisted in the morning.

July 26th.—Northwest wind of force 3, cloudy. The heavy swell from the west in connection with the sudden foehn wind had set the float ashore, and one of the boats was full of water. In the forenoon this was put into order, various goods and three ponies were taken on board, and at 4 p.m. the ship left Eskimonæs southward bound. In the early morning SEIDENFADEN started in the "Asut" with EIGIL NIELSEN's party, which was set ashore at Rødeelv, and THORVALD SØRENSEN, who was set ashore on Terneskær. After a reconnaissance



1933

Fig. 60. Entrance of the gold-mine.

farther eastward with SÄVE-SÖDERBERGH and EIGIL NIELSEN, the boat returned to Terneskær, where THORVALD SØRENSEN went on board, EIGIL NIELSEN was set ashore at Rødeelv, and according to a wireless instruction the boat then went to Jackson Ø, where it arrived at 6 p.m. At 7 p.m. the ship arrived, the boat was towed astern, and the ship went southward. The ice was fairly close-packed near Arundel Ø, but was otherwise scattered.

July 27th.—Clear and almost calm. From 8.50 to 10.15 a.m. the ship kept going at reduced speed while SÄVE-SÖDERBERGH's camp with the three ponies was set ashore. Seaplane 86 started on a photo-flight, after which it was to land at Ella Ø. The ship continued through Sofia Sund and cast anchor at Ella Ø at 7.15 p.m. Immediately after, KOCH, PETERSEN, and KRAMME started towards Scoresby Sund via Alpefjord to make a reconnaissance mapping of the lakes west of Staunings Alper. From a great height a stranded ship, considerably heeled over, was observed off Gully Gl. The seaplane landed near the ship, which proved to be the Norwegian expedition ship the "Polarbjørn" with Mr. HOEL on board. We offered assistance from the "Gustav Holm", but it was rejected. However, the "Gustav Holm" kept ready to start at short notice in case the "Polarbjørn" should get into a critical position.



Fig. 61. Entrance of the gold mine. 1933

July 28th.—Clear and calm, with some local wind. The ship unloaded goods for the station. In the early morning the "Imara" arrived from Alpefjord with the WEGMANN party. According to a telegram from the "Pourquoi-Pas?", this ship was approaching Scoresbysund at a rapid rate, and KOCH, PETERSEN, and KRAMME therefore started in Seaplane 86 to Scoresbysund. The route went via Alpefjord to get a view of the position of the stranded ship, thence along to coast to Murray Ø and along Liverpool Land to Storefjord, where a landing was made at BACKLUND's camp. After a stay there for about two hours, the seaplane continued to Scoresbysund to fetch the mail of the expedition. However, it had grown foggy out at sea, so the "Pourquoi-Pas?" had not yet arrived at Scoresbysund.

July 29th.—Calm, slightly overcast, with local fjord winds. The ship stowed her deck cargo. Seaplane 87, piloted by OVERBYE, arrived

in the afternoon to Ella Ø after photographing the routes 401-A, 402-H, and 408-H. This seaplane was for the present to be used for photo-flights with Ella Ø as a base. A couple of hours later KOCH, PETERSEN, and KRAMME arrived with the mail.

July 30th.—Northeast wind force 4, clouds decreasing, heavy swell in the harbour. The "Gustav Holm" rode at two anchors and the ship's company took the Sunday off. No flights owing to the bad weather.

July 31st.—Easterly wind force 2—4 with occasional gusts of wind and fog, and sky overcast. No flying. The deck cargo was stowed. GLOB and MADSEN were fetched in a motorboat from their camp.

Aug. 1st.—Calm, slightly overcast. A float was made of the boats, and ponies and hay for further transport with the "Godthaab" were set ashore. In the evening both seaplanes with SIMONSEN and STENØR as passengers started for the lake situated in the continuation of Alpefjord. They were landed there with provisions for a couple of days to do cartographic work in this place, which was difficult of access.

Aug. 2nd.—Calm, slightly overcast. At 9 a.m. the "Godthaab" arrived, and the spare engine, which had been placed in the hold of the "Godthaab", was exchanged for the engine in Seaplane 86, which had not acted satisfactorily lately. The "Gustav Holm" received from the "Godthaab" 10 tons of coal and 10 tons of petrol. KANN RASMUSSEN took charge of two motorboats for WEGMANN's party, and BACKLUND's party, which had been towed by the "Godthaab" from Storefjord, conferred with WEGMANN. In the forenoon Seaplane 87 made two long photo-flights, photographing the routes 334, 334-H, 336-C, and 325 E. In the afternoon Seaplane 87, pilot OVERBYE, made two flights to the lake behind Alpefjord, fetching at first STENØR and then SIMONSEN. Late in the afternoon the "Gustav Holm" hoisted Seaplane 86, the motorboat "Asut", and her lifeboats, and left Ella Ø at 7.50 p.m.

Aug. 3rd.—Light easterly wind or calm, and clear. The ship sailed in water almost free of ice as far as Jackson Ø, where, at 8 p.m., the "Asut" was lowered to fetch EIGIL NIELSEN's party at Rødeelv and carry them to Eskimonæs. At the same time Seaplane 86 started towards Eskimonæs. In the night the ship moored at an ice-floe to fill her fresh water tanks.

Aug. 4th.—In the morning calm, later northeasterly wind of force 4, cloudy. At 11 a.m. the ship cast anchor in the West Harbour. The "Asut" had arrived shortly after midnight. A depot of 10 barrels of petrol for the seaplanes were set ashore. The ship further unloaded timber for the station and took on board various goods and camping outfit. In the forenoon SEIDENFADEN went in Seaplane 86 to Grantafjord to fetch GELTING, but he wished to remain there. The ship was now ready to go northward. However, late in the afternoon a wireless communication

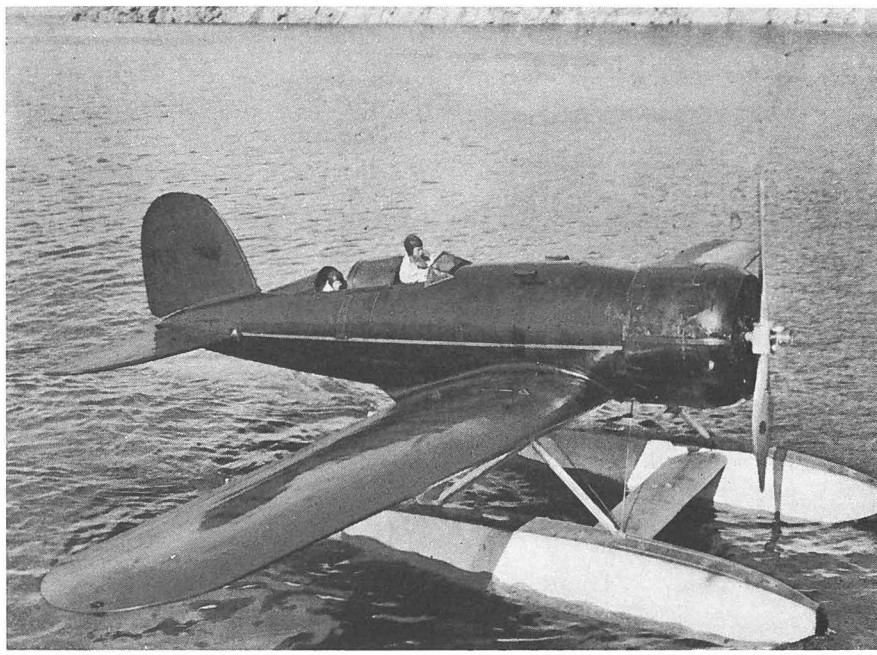


Fig. 62. Colonel LINDBERGH in his seaplane. 1933

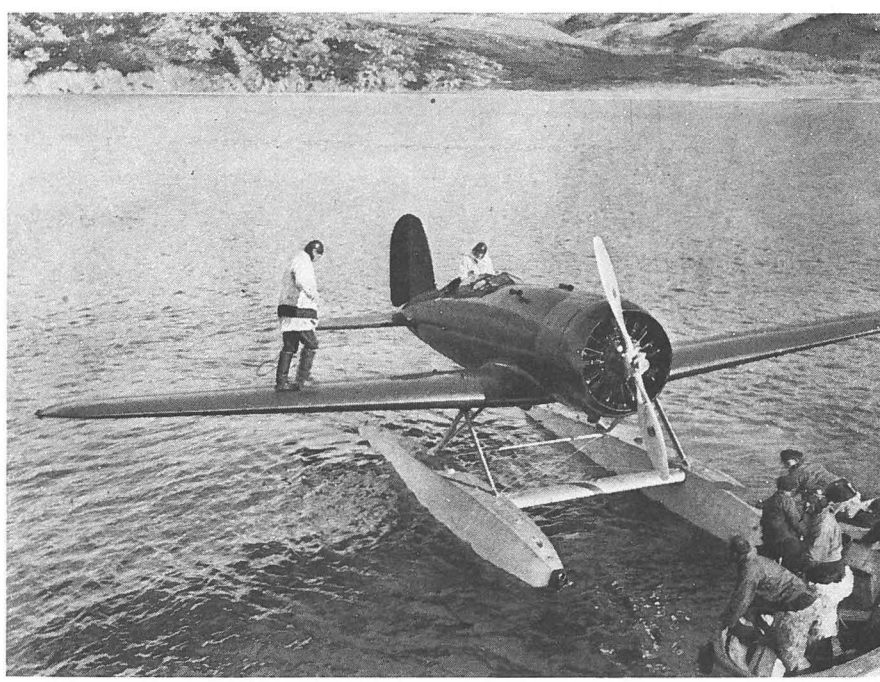


Fig. 63. Colonel LINDBERGH coming on board the "Gustav Holm". 1933

was established with Colonel C. LINDBERGH, who was on the way from West Greenland across the inland ice. LINDBERGH was informed that a landing at Scoresbysund was impossible for the present owing to the ice and he was advised to go to Ella Ø, where he landed in the evening. Seaplane 86 was immediately lowered, and at 7.55 p.m. started from Eskimonæs with KOCH, PETERSEN, and KRAMME, arriving at Ella Ø shortly after LINDBERGH had landed there.

Aug. 5th.—Clear and calm. In the morning LINDBERGH's plane and Seaplane 86 started via Kap Franklin and Loch Fyne to Eskimonæs. Along the way LINDBERGH and Mrs. LINDBERGH had the opportunity to see several herds of musk-oxen and a bear. The seaplanes landed at Eskimonæs at 10.30 a.m. Mr. and Mrs. LINDBERGH visited the station, and various discussions about climatological conditions in East Greenland, ice conditions, landing places, etc., took place. A motorboat with accompanying boats transported camping outfit from the Mining Camp to Auspiciedalen.

The Voyage northward.

Aug. 6th.—After receiving various weather reports, Mr. and Mrs. LINDBERGH started for Angmagssalik at 10.50 a.m. local time. KOCH advised LINDBERGH to turn inland south of Scoresby Sund in order that he might get an opportunity of observing the very high mountains, no doubt the highest mountains in Greenland, which WATKINS thought he had observed there. In the forenoon buoys and boats were taken on board, and the ship left the West Harbour at 11.35 a.m., heading northward. In the afternoon it grew foggy, which caused some delay. To begin with the ice was scattered, but later, near Bass Rock, it grew more close-packed.

Aug. 7th.—Almost calm, north of Bass Rock clear. Passed Bass Rock at 5.40 a.m. At 8.15 a.m. the "Asut" was lowered off Kuhn Ø with MALMQVIST, THORVALD SØRENSEN, and EIGIL NIELSEN's party; this party and TH. SØRENSEN were set ashore at Kap Maurer, while MALMQVIST continued with the boat to Kap Hamburg. In the evening EIGIL NIELSEN's party was removed to a more northerly place, and the boat went to the head of Bastians Bugt. Off the Nanok station a motorboat was lowered, after which the ship continued to Kulhus, where she cast anchor at 12.30 p.m. In the afternoon the goods for the Kulhus station were unloaded, and photo-flights and ice reconnaissance were made.

Aug. 8th.—Calm, slightly overcast. The unloading was continued, and the ship took on board various goods from the station, which was to be shut for the winter. A letter was forwarded with Seaplane 87 to a Norwegian trapper in Peters Bugt; the plane was hoisted at 6.30 p.m.



Fig. 64. Mrs. LINDBERGH and the radio operator of the "Gustav Holm". 1933

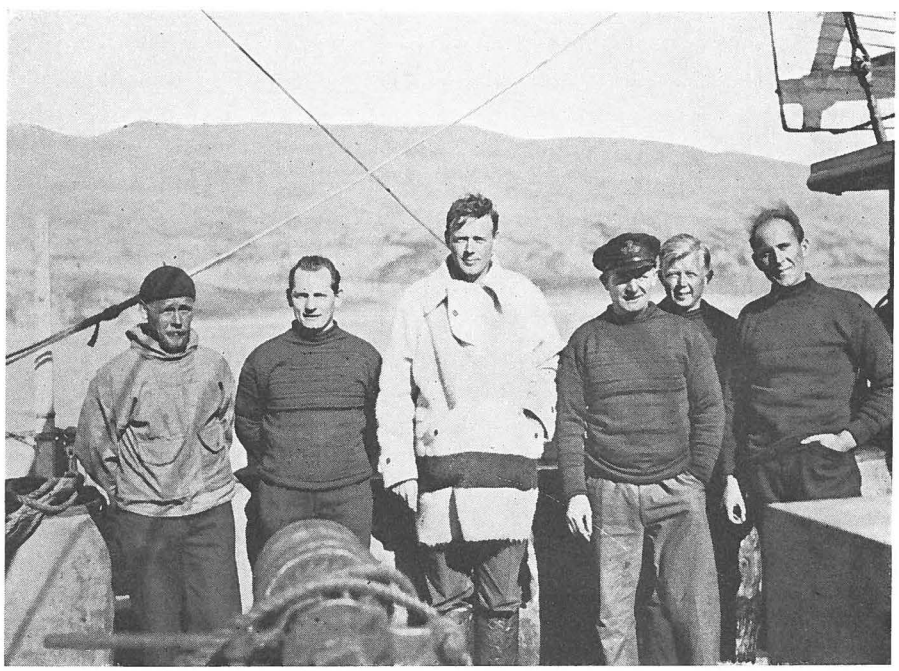


Fig. 65. Colonel LINDBERGH and the flying personnel of the expedition. 1933

At 7 p.m. the ship left Kulhus, and from 8.05 to 11.45 p.m. goods were unloaded for the Nanok trappers' station. The "Asut" with a scientific staff on board had been ordered over the wireless to this place; it arrived at midnight and was hoisted, and at 0.30 a.m. the ship left the station. According to the plan the geodesists from the Kulhus station were to continue their work and meet the ship at Germania Havn on August 20th at the latest. Photo-flights had been made in the fine weather and on these Shannon Sund had been observed to be blocked by ice, so the course was shaped south of Shannon.

Aug. 9th.—Clear and calm. The ship sailed in open ice most of the day. In the early morning the seaplane was lowered to make a photo-flight, which lasted for 4 hours 20 minutes. Northeast of Shannon the ship encountered close-packed ice, but still was able to proceed all the while.

Aug. 10th.—Northwest wind of force 2, overcast and hazy. By midnight the ship reached a space of open water, which extended far seawards east of Store Koldewey. At 0.30 a.m. the ship stopped off Trækpasset. The "Asut" was lowered, and SEIDENFADEN, MALMQVIST, TH. SØRENSEN, and EIGIL NIELSEN's party started for Trækpasset, where the latter party erected a camp; the Penta motorboat was placed at its disposal. The "Asut" continued northward along the coast, landings being made at several places, and passing through Lille Bælt it arrived at Danmarks Havn at noon. The ship had to give a wide berth to several ice masses, but cast anchor at Danmarks Havn at 8.30 a.m. Here various goods for the trappers were unloaded, and a depot of five barrels of petrol and a case of oil was erected on the shore. At 3 p.m. the ship started towards Hvalrosodden, but was stopped by fast ice already off Stormnæs, the fjord ice being unbroken in practically the whole of Dove Bugt. The goods for the Hvalrosodden station were set ashore at Stormnæs; the unloading was finished a little past midnight. SEIDENFADEN, MALMQVIST, and TH. SØRENSEN were at work near Danmarks Havn. A flight for mapping purposes across Dronning Louises Land had unfortunately to be given up owing to thick weather.

Aug. 11th.—Northwest wind of force 2, slightly overcast and hazy. Shortly after midnight the ship left Stormnæs and arrived at Danmarks Havn at 2.20 a.m. No ice was found in the harbour. An attempt was made to take in fresh water, but it had to be given up owing to low-water. The ship therefore weighed anchor at 9.20 a.m. and at 11 a.m. anchored at Kap Bismarck, whence KOCH, PETERSEN, and KRAMME started on an ice reconnaissance northward. A little north of Île de France they met fog, which grew thicker as they flew northward. Still it was possible to proceed as far as Pariser Øerne and ascertain that although the fast ice lay along the shore, there was open water outside the ice at any



Fig. 66. Take off of Colonel LINDBERGH's seaplane after visiting the expedition. 1933

rate as far as Norske Øer. The fog extended far inland. The return route went across the innermost ramifications of Skærfjorden and onwards across Germania Land to Kap Bismarck. A provisional map was drawn of Skærfjorden, which showed considerable deviations from the existing map; it was to serve as a working map for MALMQVIST, who was to make geological investigations in this fjord. At 2.50 p.m. the ship started northward. A northeasterly wind of force 3 came up in the afternoon with occasional fog. The ice was very open. At 10 p.m. the ship stopped off Maroussia, the "Asut" was lowered, and KAMMAN as motorman and MALMQVIST and TH. SØRENSEN as passengers went towards Skærfjorden to make investigations there.

Aug. 12th.—Fog and light northerly winds, later on calm. The ship proceeded northward at full speed practically without encountering any ice. At 3 p.m. she met a very large floe, and moored at it in dense fog. Took in fresh water in the evening.

Aug. 13th.—In the forenoon south wind, force 3, later the wind changed to northeast, force 1. Frosty fog all day. At 5.15 a.m. the ship had to leave the ice edge owing to the heavy sea. By noon the weather cleared somewhat, and it turned out that the ship lay about two miles from Kap Bergendahl, where she had moored at the ice edge shortly before. At 1.40 p.m. the ship went eastward and it was decided to pro-



1933

Fig. 67. Approaching the seaplane in a rubber-boat.

ceed as far northward as possible in spite of the fog. At 10.40 p.m. the ship again encountered the ice edge and moored at it. The fog continued all the afternoon and night.

Aug. 14th.—Southwest wind of force 1—2. Continuous fog all day. The ship remained moored at the ice edge.

Aug. 15th.—Till 3 p.m. the wind blew from the south with a force of 1—4, and there was a thick fog. Later it grew calm, and in the evening the wind shifted to north, force 3. Shortly after noon it suddenly cleared. The ship started at once northward and at 4.10 p.m. cast anchor 200 m from the shore off the northeastern point of Norske Øer, position 79°05′ N., 17°49′ W. A motorboat was lowered, and in the evening a large party visitied the island. The ship had pushed farther northward along the east coast of Greenland than ever done by any other ship.



1933

Fig. 68. From left to right: VICTOR PETERSEN, LAUGE KOCH, and V. KRAMME after one of the inland ice flights.

Aug. 16th.—In the forenoon north wind of force 3, in the evening calm. At 8.10 a.m. KOCH, PETERSEN, and KRAMME started in Seaplane 86 to the regions west of Danmarks Fjord, returning at 12.30 p.m. Many clouds over land. At 3 p.m. they started towards Peary Land, whence they returned at 8 p.m. The ship lay at a large ice floe off Nioghalvfjerdsfjorden, but open water entirely free of ice was observed northward as far as Nordostrundingen. Bad weather with heavy clouds was observed over northern Peary Land, and in the evening fog came down from the north. However, the party reached the ship immediately before the fog, and the seaplane was immediately hoisted. At 8.50 p.m. the ship started southward.

Aug. 17th.—In the night the wind shifted, now blowing from the east with increasing force, and it was foggy. In the afternoon more northerly wind, force 5, and rain. Some ice was passed on the way south, but it presented no obstacles to navigation, and at 10.20 p.m. the ship cast anchor at Danmarks Havn, where, according to appointment, the motorboat "Asut" had arrived shortly before.

Aug. 18th.—In the night rain and sleet, but decreasing northerly wind. In the afternoon clear and calm. In the early morning the "Asut" was sent to Hvalrosodden to fetch ALWIN PEDERSEN and a trapper. At 10.20 a.m. the "Gustav Holm" left Danmarks Havn and proceeded southward along the east coast of Store Koldewey to take EIGIL NIELSEN's

party on board; this was done at 4 p.m. As the "Asut" had been delayed by the trappers, the ship went northward again and cast anchor off Lille Koldewey to await the arrival of the boat. It arrived at 10.50 p.m., and shortly after the ship went southward.

Aug. 19th.—In the night and forenoon clear and calm, later north-easterly wind of force 3 and sleet. The ship at first sailed in scattered ice, but about 3 a.m. the ice grew more close-packed, and at 4.30 a.m. Seaplane 86 was lowered to make an ice reconnaissance. At 7 a.m. the ship went eastward to avoid the ice, and for the rest of the day proceeded among heavy, but mostly scattered, ice floes. Large scattered ice fields were encountered right down to Bass Rock.

Aug. 20th.—Northerly wind of force 3—5 along the outer coast. In Gael Hamkes Bugt it was clear and calm. The ship anchored in Germania Havn from 7 to 9.30 a.m., loading some goods, and the geodesists and some trappers came on board. At 6.15 p.m. the ship dropped anchor in the West Harbour at Eskimonæs.

From Eskimonæs to Scoresby Sund.

Aug. 21st.—Calm, but local fjord winds. The ship took in 10 tons of ballast. At 1 p.m. KOCH, PETERSEN, and KRAMME started in Seaplane 86 via Ella Ø to the "Godthaab", which lay at Danmarks Ø in Scoresby Sund. The "Asut" made two trips to the Mining Camp to fetch goods to Eskimonæs. A third trip had to be given up owing to the heavy sea.

Aug. 22nd.—The ship took in ballast. In the forenoon the "Asut" visited BRUHN's camp, and on two trips in the night transported timber from the Mining Camp to Eskimonæs. The motorboat P. 2 was taken on board.

Aug. 23rd.—Calm, cloudy, foggy over the sea. While the ship had been northward, Seaplane 87 had been stationed at Eskimonæs and had photographed several routes. Now it flew via Ella Ø to Scoresby Sund. KOCH arrived at 4.30 p.m. from Scoresby Sund. In the evening the "Asut" started to Auspiciedalen to fetch EKLUND, who delivered a report on his work and in the evening returned to the camp. The ship loaded various goods.

Aug. 24th.—Calm, slightly overcast. The motorboat P. 1 was hoisted, the geodesists' camp and the last goods from Eskimonæs were taken on board.

Aug. 25th.—South wind of force 3, fog. In the morning a petrol depot was erected on the shore, and the ship left the West Harbour. A motorboat with the last passengers left Eskimonæs at noon, and subsequently the ship sailed southward among scattered heavy floes, passing Hold with Hope at midnight.



Fig. 69. Removal of ponies from one camp to another. 1933

Aug. 26th.—Light southerly wind, fog both night and day. At 9.50 a.m. the ship stopped east of Margrethedal, where 40 cases of fossils were taken on board. From 10.50 a.m. to 1 p.m. the ship stopped off Paralleldal, where three boats with camping outfit and three ponies were taken on board. It was surprising to meet SÄVE-SÖDERBERGH here, since according to the plan he was to be in Moskusoksefjord. The ship then turned into Kejser Franz Josephs Fjord. In the night she had to stop for some time off Blomsterbugten owing to thick fog.

Aug. 27th.—Almost calm, in the forenoon fog, later cloudy. At 8.15 a.m. the ship cast anchor off Ella Ø, unloaded various goods, took some goods on board and hoisted the motorboat "Polypen". The ponies and SÄVE-SÖDERBERGH's boat were set ashore, and at 2.40 p.m. the ship left Ella Ø with 51 passengers on board. In Davy Sund it was quite calm; a large ice field was passed here.

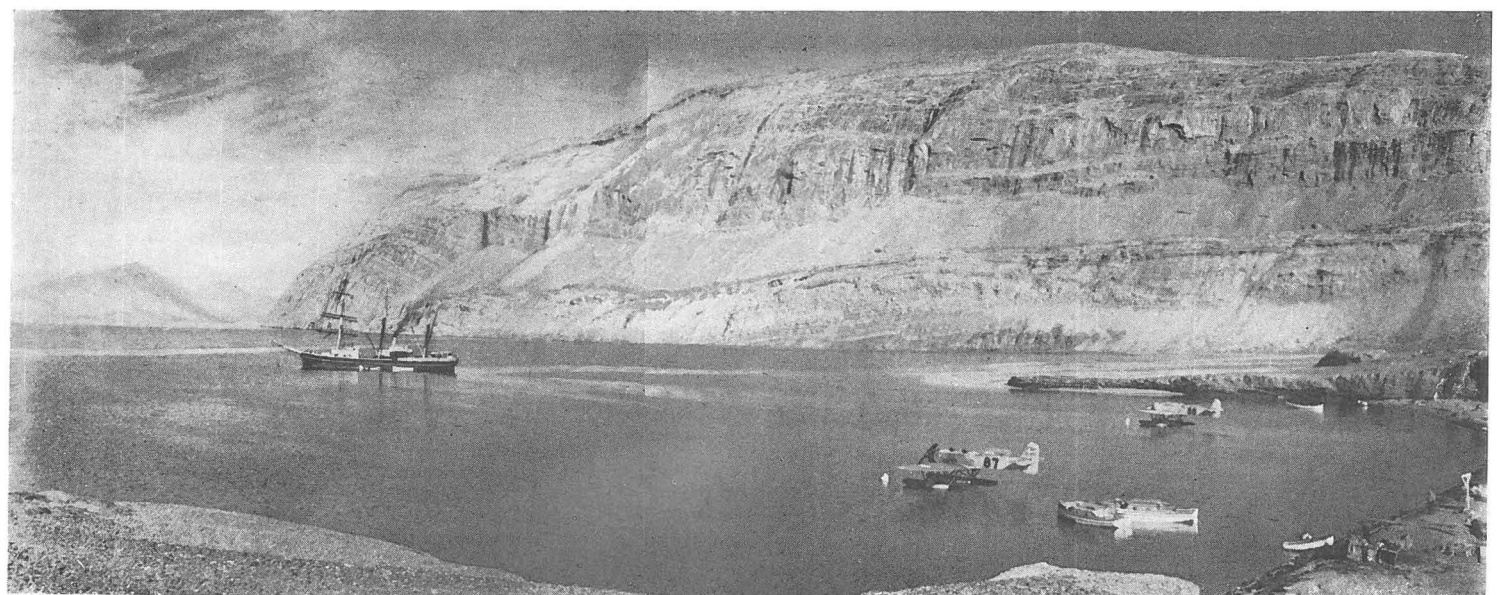


Fig. 70. The "Gustav Holm", seaplanes, and motorboats in the harbour at Ella Ø in late summer. 1933

Aug. 28th.—Light northeast wind, cloudy. Passed Kap Wardlaw at 7 a.m. A heavy easterly swell was encountered off Liverpool Land in the afternoon, but the weather was calm, and the water was practically free of ice. Passed, in the forenoon, a small ice floe on which a bear and two cubs were seen, and in the afternoon another floe with a bear. Between Kap Greg and Rathbone Ø the velocity of the current along the coast was 2—3 miles an hour. Off Kap Tobin rather heavy ice was encountered, and in increasing darkness the ship made its way among the ice floes to the colony, which she reached at midnight, and here met the "Godthaab" and the "Gertrud Rask".

From Scoresbysund via Reykjavik to Copenhagen.

Aug. 29th.—Calm, cloudy, and foggy. The expedition had had sixty-six working days in East Greenland, but it had contemplated lately that if weather permitted, various parties should continue their work in Scoresby Sund commenced in the days about July 1st. However, the weather forecasts showed that unsettled weather might be expected to set in, since a depression south of Greenland was moving northward. It was difficult to decide for an interruption of the work, for the depression south of Greenland might possibly follow a more easterly course, and be succeeded by a period with clear and calm weather in Scoresby Sund. Furthermore, there was not very much ice north of Scoresby Sund, so it would not seem very risky to let the ships remain near the coast of Greenland for another week or two. However, owing to the long working period, the parties were less well equipped than earlier in the summer, and considering, also, the unfavourable weather forecasts, it was decided to iuterrupt the work. This proved a lucky decision, for a protracted period of bad weather now set in. In the night the ship had to change its anchorage owing to the ice. In the forenoon the "Polypen" was hauled ashore, coal was taken on board from the "Gertrud Rask", the fresh water tanks were filled, and various goods were taken on board. On the voyage to Reykjavik the "Godthaab" had nineteen passengers, from there to Copenhagen eighteen, while the "Gustav Holm" had forty-four and thirty-five respectively.

Aug. 30th.—Light southeasterly wind with fog, later rain. At 2 a.m. the last boats were hoisted, and at 3 a.m. the ship left the colony. At the mouth of the fjord a strip of scattered drift ice was passed.

Aug. 31st.—Calm, cloudy, and occasional fog. Iceland was sighted at 6 p.m.

Sept. 1st.—In the forenoon southeasterly wind of force 3—5 with passing showers, in the afternoon east-southeasterly wind of force 6—9

with rain, and at the same time there was a rapid fall of the barometer. At 7 p.m. the wind and sea were so high that the ship had to heave to off Snefjældsjökul.

Sept. 2nd.—Passing showers all day. In the morning the force of the wind was 8, but it decreased somewhat in the course of the day, increasing again in the evening. The ship lay to the wind off Snefjældsjökul all day. At 8.40 p.m. she started to Patricksfjórður to await better weather. The "Godthaab" lay in the neighbourhood, and both ships then headed towards the coast.

Sept. 3rd—8th.—At 7.20 a.m. the ship cast anchor near Patricksfjórður. There was a very high wind, and the ships had to ride by two anchors. The rain was pouring down, with occasional thunderstorms. The strong wind and the rain continued until September 8th, when the wind was southwest of force 4. At 9 a.m. the ships weighed anchor and sailed southward.

Sept. 9th.—Rain in the forenoon, but in the evening it was almost clear, and the ship cast anchor in the roads of Reykjavik at 11.30 p.m.

Sept. 10th.—In the forenoon, when the weather grew calm, the ship went into the harbour of Reykjavik.

The ships left Reykjavik on September 15th and arrived at Copenhagen on September 25th.

s. s. Godthaab.
From Iceland to Scoresby Sund and zoological work in the fjords.

At 7 a.m. on June 22nd the "Godthaab" left Akureyri in company with s.s. "Gustav Holm", and like the latter had to cast anchor in the lee of Hrisey owing to a strong northerly wind.

June 23rd.—Shortly after midnight both ships weighed anchor and sailed out of the fjord, but they soon lost sight of each other owing to the thick weather. They sailed towards Scoresby Sund, but the "Godthaab" shaped a more easterly course than the "Gustav Holm".

June 24th.—The position at noon was 69°09′ N., 19°05′ W. The northerly wind changed to a light southwesterly wind, and it was slightly overcast. At 4.20 p.m. the ship sailed through a belt of scattered ice and at 10.40 p.m. she struck open water with very open ice and occasional large ice fields, through which it was possible to advance all the night.

June 25th.—In the morning the ship reached the coast a little south of Kap Tobin, and at 10.45 a.m. she moored at the fast ice edge off the colony. The manager and other persons from the colony arrived by sledge to pay a visit on board. Shortly after the arrival of the "Gustav



1933

Fig. 71. Zoologists at work.

Holm", a little past noon, both ships weighed anchor and sailed to Kap Hope, where they dropped anchor at 3.45 p.m. A motorboat was immediately lowered, and the tanks of the seaplane were filled with petrol.

June 26th.—East-southeastly wind, force 2, clear. In the course of the day the ship had to change its anchorage owing to the ice. One more motorboat was lowered, and goods were exchanged with the "Gustav Holm"; in the evening Seaplane H.86 was taken on board.

June 27th.—Clear and calm. Various goods were carried on to the deck, materials for the dark room were set ashore, and the ship made ready to commence the zoological work. Late in the afternoon this work was commenced with station 1 near Kap Hope. Sts. 1—8, $^1/_{10}$ sq.m. bottom samples, depths 3—5.5 m. Dredge hauls 7—12 m.

June 28th.—Calm, later easterly wind, slightly overcast. At 3.25 a.m. the ship, which had anchored off Kap Hope at midnight, had to weigh anchor owing to the ice, and sailed in scattered ice towards Kap Brewster to make zoologic-hydrographical investigations at the mouth of Scoresby Sund. Cast anchor off Kap Hope at 8.05 p.m. Sts. 9—12 midway between Hurry Fjord and the south coast of Scoresby Sund. Two bottom samples $^1/_5$ sq.m., depths 245—250 m. Two hauls with stramin bag, 15 minutes, with 75 and 200 m wire, depth 200—270 m. St. 13, c. 1 mile from south side of mouth of Scoresby Sund, depth 215 m, two bottom samples $^1/_5$ sq.m.

June 29th.—Clear and calm, light easterly wind, slightly overcast. At 1 a.m. the ship changed its anchorage owing to ice. Zoological work all day. Sts. 14—25. 10 bottom samples $^1/_5$, 1 sample $^1/_{10}$ sq.m., depths 9—20 m, dredge hauls depths 10—13 and 10—11 m.

June 30th.—Calm, in the afternoon easterly wind and overcast. The ship sailed to and fro in the neighbourhood of Kap Hope from 8.20 a.m. to 12.50 p.m. for zoological investigations. Sts. 26—45, off the mouth of Hurry Fjord; 18 bottom samples $^1/_{10}$ sq.m., depths 14—57 m, dredging from boat depths 20—28 and 30 m. In the afternoon the ship had to lie at short notice to the engine room owing to the ice.

July 1st.—Southeast wind of force 2—3, overcast. Sailed in the neighbourhood of Kap Hope, mostly off the mouth of Hurry Fjord, for zoological work from 8.10 a.m. to 13.30 p.m. Sts. 46—61. Depths 88—153 m, 15 bottom samples $^1/_5$ sq.m., depths 72—84 m, two bottom samples $^1/_{10}$ sq.m.

July 2nd.—Southeast wind of force 2, fog. The ship rode at anchor off Kap Hope all day. St. 62. Experiments at 6—9 m depth with Dr. MORTENSEN's detritus sampler. Dredgings were made at the same depth, mostly of common sandy bottom mussels.

July 3rd.—Southeast wind of force 1, slightly overcast. The ship weighed anchor at 6.10 a.m. and sailed westward past Kap Stewart. Took in fresh water from an ice floe from 11 a.m. to 1.20 p.m. The zoologists were at work all day. The ship continued eastward till 8 p.m., when she turned near the fast ice edge in Scoresby Sund and headed towards the anchorage off Kap Hope.

Sts. 63—82, off Kap Hooker. Depths 57—220 m, bottom samples $^1/_5$ sq.m.

July 4th.—Calm, slightly overcast. At 0.30 a.m. the ship cast anchor at the mouth of Hurry Fjord. Owing to the ice the engines were ready to start at short notice.

Sts. 83—85, Hurry Fjord, c. $^1/_4$ mile inside the mouth. Depths 3.5—38 m, dredge hauls from boat.

July 5th.—Southerly wind of force 3, slightly overcast. At 6 a.m. the seaplane was lowered. At 9 a.m. a wireless message was received from the seaplane about a motorstop, so the ship started at once towards Kap Stewart at a forced speed. At 9.15 a.m. the seaplane reported a forced landing, and at 11.30 a.m. it was taken on board the ship, which returned to the anchorage of the previous day at the mouth of Hurry Fjord, where she anchored at 2.50 p.m., when the zoological work was commenced.

Sts. 86—97. Depths 13—16 m, 10 bottom samples $^1/_5$ sq.m., dredge hauls from boat 6—9 m.



Fig. 72. A seaplane visiting a tent camp. 1933

July 6th.—Southerly wind of force 1, clear. At 5 a.m. the seaplane was lowered, it took in petrol, and started on some photo-flights. At 6.10 a.m. the ship weighed anchor and went into Hurry Fjord. At 8.35 a.m. she cast anchor off a river bed, where the boats were lowered for unloading of goods. At 11.10 a.m. the seaplane was taken on board. Additional flights were made from 7 to 8 p.m. In the afternoon zoological work.

Sts. 98—107, off Constable Pynt. Depth 21—24 m, 10 bottom samples $^1/_5$ sq.m.

July 7th.—South wind of force 1, clear. At 1.10 p.m. the ship left Constable Pynt and went farther towards the interior of the fjord, anchoring at 6.35 p.m. off Fame Øer. The seaplane was lowered at 3.20 p.m. and hoisted at 7.45 p.m. Zoological work in the middle of Hurry Fjord off Constable Pynt.

Sts. 108—112, depths 89—92 m, four bottom samples $^1/_{10}$ sq.m., one sample $^1/_5$ sq.m., depth 91 m. Sts. 113—122, east side of the fjord off Constable Pynt, depths 31—46 m, five bottom samples $^1/_{10}$ sq.m. and five samples $^1/_5$ sq.m. Sts. 123—125, west side of Hurry Fjord off Constable Pynt, depth 1 m, bottom sample $^1/_{10}$ sq.m., dredge hauls 7—10 and 18—22 m.

July 8th.—Clear and calm. Cast anchor off Fame Øer. At 8.30 a.m. the seaplane was lowered, and was hoisted at 1 p.m. Zoological work all day.

Sts. 126—128, Hurry Fjord off Fame Øer. Three dredge hauls 6—25 m, sample with MORTENSEN's detritus sampler depth 12 m.

July 9th.—NNE. wind of force 2, overcast, some rain. At 9 a.m. the ship started out of the fjord. Stopped outside the geodesists' camp from 2 to 3 p.m., and cast anchor off Kap Hope at 5.20 p.m. In the evening the air photographers were set ashore to work in the dark room.

Zool. Sts. 129—141, Hurry Fjord near Fame Øer. Ten bottom samples $^1/_{10}$ sq.m., depths 15—27 m. Haul with dredge 8—12 m. Several hauls with MORTENSEN's detritus sampler 10—20 m. Haul with stramin bag 100 m wire, vertical haul 15 minutes with Hensen net 100—0 m. Depth of bottom 120 m. St. 142, mouth of Hurry Fjord. Haul with stramin bag 100 m wire, 15 minutes, vertical haul with Hensen net, 90—0 m. Depth of bottom 100 m.

July 10th.—Light wind, cloudy, later clear. The ship started from Kap Hope at 5.50 a.m., and at 7.40 stopped off BRUHN's camp, which was taken on board and subsequently landed on the opposite shore. At 1.20 p.m. the "P. 2" was hoisted for repairs, and at 3 p.m. the ship again cast anchor off Kap Hope. Zoological work (investigations of living plankton).

July 11th.—Clear and calm. At 7 a.m. the ship started from Kap Hope towards Kap Swainson. At 9 a.m. a jolly-boat was lowered off Kap Tobin for the zoologists and the botanists. The seaplane was at work from 12.45 to 5.55 p.m. From Kap Tobin the ship sailed towards Kap Brewster and then back to Kap Hope after doing zoological work.

Sts. 143—151, near Kap Tobin. Nine bottom samples $^1/_5$ sq.m., depths 123—530 m. St. 148b, off Kap Tobin. Botanical dredge hauls from jolly-boat 30—40 m.

July 12th.—Clear and calm. At 1.25 a.m. the ship cast anchor off Kap Hope. At 8 a.m. the motorboat "P. 2" was lowered after repairs. In the forenoon the engine for the seaplane was carried on to the deck. Zoological investigations from motorboat from 3—6 p.m.

Sts. 152—154, east side of Hurry Fjord, dredge hauls from motorboat, depth 20—40 m.

July 13th.—Clear and calm. Zoological work from a jolly-boat in the forenoon. The ship started at 1.15 p.m. and anchored at 4.40 p.m. off Fame Øer.

St. 155, east side of Hurry Fjord. Three vertical hauls, 40—0 m, with hand plankton net, two hauls with MORTENSEN's detritus sampler.

July 14th.—In the night rain. Light southwesterly wind, weather clearing. The ship started at 10.10 a.m. and at 11 a.m. took on board BÜTLER's camp south of Constable Pynt. Rode at anchors off Fame Øer from 3.25 to 11 p.m. Sailed out of the fjord at midnight.

July 15th.—Southeasterly wind of force 4, fog in the afternoon. Stopped from 2 to 3 a.m. off ALDINGER's camp in Vardekløft, but he wished to remain in the camp for the time being. Sailed then towards the interior of the fjord and at 10.30 a.m. met the edge of the winter ice 30 miles west of Kap Stewart. Anchored near the shore at 11.30 a.m. Left the anchorage at 7.15 p.m. and sailed out of the fjord, as the ice pressed towards the shore. Rather much ice in the fjord. At 8.30 p.m. the fog lifted, and the ship approached the shore to get through the drift ice belt. At 9.45 p.m. the ship was free of the ice and sailed into Hurry Fjord.

Zool. Sts. 158—167, 8 miles inside Kap Hooker. Ten bottom samples $^1/_{10}$ sq.m., depths 12—14 m.

July 16th.—Southeasterly wind, cloudy. At 3.40 a.m. the ship cast anchor off Kap Hope. At 3.40 p.m. she had to weigh anchor owing to increasing wind, and anchored at 7.20 p.m. off Fame Øer.

July 17th.—Northeast wind of force 2, overcast after rain. The ship riding at anchors off Fame Øer.

Zool. St. 168, depth 18—22 m, dredge hauls from a jolly-boat.

July 18th.—Calm, and foggy. The ship started at 4 a.m. and at 9.20 a.m. cast anchor off Scoresbysund. At 2 p.m. she received a wireless message reporting a damage to BACKLUND's motorboat, and at once started towards Storefjord. Passed Kap Greg at 11.40 p.m.

St. 169. Plankton haul with hand net from the ship midway between Kap Hope and the colony, depth 15 m.

July 19th.—Calm and foggy. At 2.30 a.m. the ship reached BACKLUND's camp in Storefjord, having sailed in scattered drift ice along Liverpool Land. The motorboat and the camp were taken on board, but BACKLUND and his party were at work in the mountains and did not return till 8 a.m.; shortly after the ship left the fjord. Passed Kap Greg at 10.40 a.m. Stopped at 7.30 p.m. off Kap Hope, where the motorboat was lowered, and the party set ashore. At 9 p.m. the ship headed towards Hurry Fjord and moored at an ice floe to fill its fresh water tanks.

July 20th.—Calm and overcast. The ship left the ice floe at midnight and turned into Hurry Fjord. Stopped from 8.20 to 11.20 a.m. off BÜTLER's camp at Constable Pynt, and at 1.20 p.m. set the party ashore on the east side of the fjord. Anchored at 3 p.m. off NORLING CHRISTENSEN's camp.

Zool. Sts. 170—172, Hurry Fjord, two miles from the mouth. Depth 14—15 and 60—75 m, dredge hauls from a jolly-boat. Two horizontal hauls with plankton net at depths 40—60 m.

July 21st.—Clear and calm. Weighed anchor at 8 a.m. and stopped at 9 a.m. off Igterajivit to ship empty goods, which were afterwards landed near Scoresbysund from noon till 2 p.m. Anchored off Kap Hope

at 4.50 p.m. The seaplane was at work from 6.50 to 6.15 p.m. At 9 p.m. the ship weighed anchor and went into Hurry Fjord to ALDINGER's camp, which was taken on board at 11 p.m., when the ship sailed out of Hurry Fjord.

Zool. St. 173, Hurry Fjord, 2 miles inside the mouth. Dredge, depth 7—10 m.

July 22nd.—Clear and calm. Passed Kap Stewart at 1.40 p.m., sailing towards the interior of the fjord. The seaplane was lowered at 7.30 a.m. and hoisted at 2.30 p.m. Passed occasional very rotten floes of fjord ice south of Jameson Land. At 2 p.m. ALDINGER's party was set ashore at Kap Leslie. At 5 p.m. the ship headed towards Bjørneøer, whence she proceeded northeastward.

Zool. Sts. 174—189. Sts. 174—186 off Kap Leslie. Eleven $^1/_{10}$ sq.m. bottom samples depths 54—126 m, two $^1/_5$ sq.m. bottom samples depths 240—260 m. Sts. 187—188 off Charcots Havn, depth 496—500 m, two $^1/_5$ sq.m. bottom samples. St. 189, Hall Bredning between Milne Land and Bjørneøer, depth 550 m, $^1/_5$ sq.m. bottom sample.

July 23rd.—Calm, slightly overcast. At 3.20 a.m. the ship dropped anchor at the mouth of Schucherts Flod. Flights from 6.25 to 9 a.m. At 11.15 a.m. the ship left the place and sailed towards Nordvestfjord. Stopped at 3.30 p.m. for zoological work. Proceeded intoNordvestfjord in the afternoon.

Sts. 190—206. Sts. 190—200, Nordostbugt four miles from the mouth of Schucherts Flod. Eleven $^1/_{10}$ sq.m. bottom samples from depths 29—46 m. Sts. 201—203, Nordostbugt between Schucherts Flod and the southernmost island, three $^1/_{10}$ sq.m. bottom samples depths 80—100 m. Sts. 204—205, Nordostbugt three miles from the southernmost island, $^1/_{10}$ sq.m. bottom samples depths 123—160 m. St. 206, four miles from mouth of Schucherts Flod, depth 30 m, two vertical hauls with Hensen net 100—0 m.

July 24th.—Clear and calm. At 4.15 a.m. the ship turned and sailed eastward out of the fjord, the interior of which was filled with close-packed icebergs and calf ice. Stopped at 10 a.m., a boat was lowered to take soundings, and an anchorage was found at the north side of Nordvestfjord, where the zoologists were at work all day. Left the anchorage at 6.30 p.m. owing to the ice that drifted into the fjord, and during the night kept going with the engines reduced to dead slow in the middle of Nordvestfjord.

Zool. Sts. 208—243. Sts. 208—242, Godthaabs Golf, 29 $^1/_{10}$ sq.m. bottom samples depths 25—332 m, two $^1/_5$ sq.m. bottom samples depths 330—339 m. Sts. 239—242, dredge hauls from a jolly-boat depths 2—41 m. St. 243, Nordvestfjord off the mouth of Nordbugten, depth 800—1000 m, a) vertical haul with Hensen net 100—0 m, b) haul

with stramin bag 600 m 15 minutes, c) haul with stramin bag 200 m 15 minutes.

July 25th.—Clear and calm. At 3.40 a.m. the seaplane was lowered, but landed at 5.30 a.m. owing to a motorstop. Started again at 6.30 a.m. and returned at 7 a.m., when it was hoisted for repairs of its wireless. At 8.10 a.m. the ship started out of Nordvestfjord, heading towards Bjørneøer. At 2.15 p.m. the seaplane was lowered, returning at 5.20 p.m. In the afternoon the ship kept going with the engines reduced to dead slow off the largest island of Bjørneøer till 10 p.m., when she headed towards Jameson Land.

Zool. Sts. 244—247 + 266—268. Near Bjørneøer, three $^1/_{10}$ sq.m. bottom samples and one $^1/_5$ sq.m. bottom sample, depth 270—337 m. Dredge hauls from a jolly-boat 6—40 m.

July 26th.—Calm and slightly overcast. At 1.20 a.m. the ship cast anchor at the west side of Jameson Land opposite Bjørneøer for zoological work. At 1 p.m. she went southward along Jameson Land. About 6 p.m. she stopped in shallow water for about an hour for various zoological work.

Sts. 248—281. Sts. 248—272, west coast of Jameson Land opposite Bjørneøer, 18 $^1/_{10}$ sq.m. bottom samples, depth 29—148 m. Dredge hauls from a jolly-boat 10—40 m. Sts. 272—281, west side of Jameson Land opposite Kap Leslie. Ten $^1/_{10}$ sq.m. bottom samples, depths 20—22 m.

July 27th.—In the night the ship sailed southeastward along the coast of Jameson Land. Stopped at 4 a.m. off the dark-room at Kap Hope, where H. H. Nielsen went ashore, and then continued into Hurry Fjord. Stopped from 6 to 7 a.m., when a boat was sent to Bütler's camp, and subsequently returned to Kap Hope. At 8 a.m. the seaplane was lowered. Stopped at 9 a.m. and took on board Norling Christensen's camp at Kap Hope, and at 10 a.m. Nielsen. Anchored at noon off the colony of Scoresbysund. At 0.30 p.m. the seaplane returned and was hoisted. Various empty barrels were set ashore. Owing to the strong ice drift the ship had to lie with the engines reduced to dead slow all the afternoon and night.

July 28th.—Clear and calm. The ship rode at anchors off the colony all day. The zoologists worked from a jolly-boat.

Sts. 282—286, Amdrups Havn. Dredge hauls from a jolly-boat, depths 3—33 m.

July 29th.—Clear and calm. At 9 a.m. the seaplane was lowered. In the course of the day the ship loaded petrol from the "Pourquoi-Pas?". At 6 p.m. the ship had to change its place owing to the drifting ice.

St. 287, Amdrups Havn, horizontal haul with plankton net.

July 30th.—Southeasterly wind of force 3, foggy and overcast. The ship rode at anchors all day. Took a day off. Shipped a propeller from the "Pollux".

The Voyage to Ella Ø and back.

July 31st.—Light easterly wind, sky overcast; fog and some snow. At 9 a.m. the ship weighed anchor and headed towards Kap Tobin. Stopped at 2.30 p.m. off Kap Topham owing to fog, and took in fresh water from an ice floe till 11.45 p.m.

Aug. 1st.—South-southwesterly wind of force 3, fog. After some time's search the ship discovered BACKLUND's motorboat near Kap Topham and took it in tow and then proceeded northward among scattered floes of drift ice with occasional large unbroken fields. Passed Franklins Ø at a distance of 6 miles at 5.30 p.m. Passed Kap Mackenzie at 8 p.m.

Aug. 2nd.—Easterly wind of force 3, clear. The ship proceeded through Sofia Sund and anchored there at 9.30 a.m. Various goods were transferred to the "Gustav Holm", and goods for the Ella Ø station were unloaded.

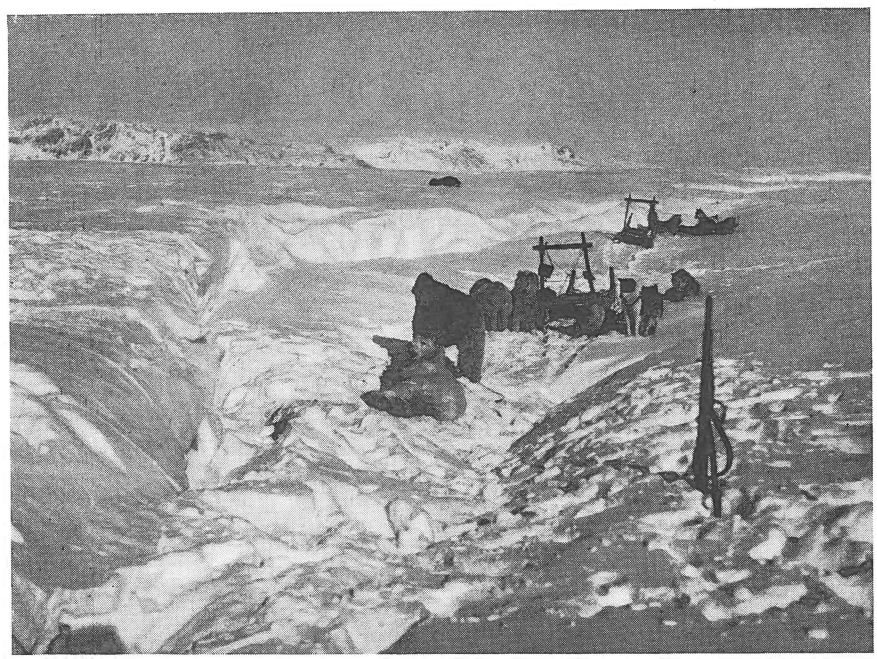
Aug. 3rd.—Southeasterly wind of force 4, slightly overcast. Until 3 p.m. the goods for Ella Ø were unloaded, when all hands were ashore to carry them to the house.

Aug. 4th.—Southeasterly wind of force 2. The seaplane was lowered at 3 a.m. Various goods were unloaded, and a boat was set ashore. At 8.10 a.m. arrived LINDBERGH's seaplane, and at 8.45 a.m. the seaplane with KOCH arrived from Eskimonæs. Buoys were laid out for both planes.

Aug. 5th.—Southeasterly wind of force 1, slightly overcast. In the early morning both seaplanes started from Ella Ø. In the forenoon goods were carried from the house to the shore to be shipped. Furthermore three Icelandic ponies and the goods for SÄVE-SÖDERBERGH's camp were taken on board. At 7 p.m. the seaplane was hoisted.

Aug. 6th.—Clear, calm, or local winds. At 8.30 a.m. the seaplane was lowered, and both life-boats and the jolly-boat were hoisted. At 9.30 a.m. the ship left Ella Ø and went northward through Antarctics Sund. Passed Kap Mohn at 4.45 p.m. At 8.20 p.m. the seaplane landed near the ship and was hoisted. Passed Kap Weber at 9.20 p.m., and Kap Ovibos at 10.55 p.m. A boat that had been hauled on to the shore was fetched. Subsequently the ship proceeded into Nordfjord.

Aug. 7th.—Calm, slightly overcast. From 0.40 to 1.30 a.m. a motorboat (Solo) was set ashore in Nordfjord, and subsequently the ship proceeded into Moskusoksefjord. Stopped at 6.30 a.m. near a delta on the south side of the fjord to find an anchorage. From 8.30 to 11.30 a.m. the horse camp was set ashore with great difficulty owing to local wind and high sea. Subsequently the ship returned to Nordfjord and anchored



1933

Fig. 73. Successful bear-hunting.

there at 3.25 p.m. Both the boats lying at the Nordfjord station were taken onboard and the motorboats for SÄVE-SÖDERBERGH's party were repaired. At 11 p.m. the ship had to change its anchorage owing to drifting ice.

Aug. 8th.—Light southerly wind, slightly overcast. From 1.30 to 2.30 a.m. dredging of algæ was made from a jolly-boat. After receiving a telegram from Eskimonæs, the seaplane started at 11.30 a.m. to assist BRUHN's motorboat in Tyrolerfjord. The ship started at noon, sailing along the south coast of Gauss Halvø. From 4 to 4.45 p.m. a depot for SÄVE-SÖDERBERGH was set ashore, another depot was landed from 6.30 to 7.15 p.m. Stopped at 8 p.m. off SÄVE-SÖDERBERGH's camp, and a boat and various outfit were landed. Stopped at 10.15 p.m. off Vinterøer. A jolly-boat was lowered for collection of algæ.

Aug. 9th.—Calm, slightly overcast. At 1.15 a.m. the seaplane returned and was hoisted. At 2 a.m. the ship turned into Duséns Fjord, where she cast anchor at 7.40 a.m. An anchor and a buoy for the seaplane were laid out, and the seaplane was lowered at 9 a.m. The ship made preparations for cleaning the boilers.

Aug. 10th.—Northwesterly wind of force 2, clear. Cleaning of boilers all day.

Aug. 11th.—Northwesterly wind of force 2, slightly overcast. The

cleaning of the boilers was continued. The seaplane was hoisted at 6.30 p.m.

Aug. 12th.—Light southerly wind, slightly overcast. The seaplane was lowered at 7.15 a.m. At 6 a.m. bottom samples were collected with the Petersen grab. At 8.40 a.m. the ship weighed anchor, and for about an hour zoological investigations were made. Subsequently she sailed out of the fjord towards Vinterøer, working now and then for the zoologists. Waited half an hour off Vinterøer for BACKLUND's boat, but after being informed over the wireless that the boat was not to come, the ship headed towards the outer coast and passed Kap Wijkander at 3 p.m. Passed Kap Mackenzie at 6.55 p.m. 5 miles off. Not hindered by the ice.

Aug. 13th.—Northerly wind of force 1—2, clear with occasional banks of fog. At 2.30 a.m. the ship moored at an ice-floe owing to the fog and took in fresh water till 5 a.m., when she proceeded among scattered drift ice floes, sometimes at a reduced speed owing to fog. Passed Murray Ø at 10.55 a.m., and at 2.55 p.m. turned into Storefjord, where echo soundings were taken. Sailed out of the fjord at 4.15 p.m. and passed Kap Greg at 7 p.m. Large masses of scattered drift ice were encountered along Liverpool Land but they presented no obstacles to navigation Worked with the bottom sampler south of Rathbone Ø and Raffles Ø from 10 p.m. till midnight

Zool. Sts. 288—292, off Raffles Ø. Four $^1/_5$ sq.m. bottom samples depth 234—235 m, one sample $^1/_{10}$ sq.m., depth 170 m.

Stay at Scoresbysund.

Aug. 14th.—Calm and slightly overcast. The ship proceeded southward, passing Kap Hodgson at 0.30 a.m. Various zoological work was carried out off Kap Swainson, and at 4.30 a.m. the ship cast anchor off the colony of Scoresbysund. In the forenoon 8 barrels of petrol were taken on board. At noon the ship weighed anchor, and zoological investigations from a jolly-boat were made off Kap Tobin from 1.15 to 3.45 p.m. The ship then went up Hurry Fjord and anchored off Fame Øer at 20.50 p.m.

Zool. Sts. 293a—295. Sts. 293a—b, off Scoresbysund, dredge hauls depth 7—11 m, two horizontal plankton hauls depth c. 5 m, bottom c. 10 m, with hand net. Sts. 294—295, dredge off Kap Tobin, 6—10 and 17—31 m.

Aug. 15th.— Southwesterly wind of force 2, slightly overcast. From 6 a.m. to 3 p.m. coal were shifted from the after hold to the bunkers. In the afternoon 7 tons of ballast were taken in.

Zool. Sts. 296—297, near Fame Øer. Dredge hauls, depths 15—18 and 22—24 m. Horizontal plankton hauls with hand net.

Aug. 16th.—East-northeasterly wind of force 3, cloudy. In the forenoon 37 tons of ballast were taken in, and in the afternoon various goods were taken on to the deck.

Aug. 17th.—North-northeasterly wind of force 7, rain. Coal were trimmed in the main hold in the forenoon.

Aug. 18th.—North-northeasterly wind of force 5, sky overcast. Various work was done on the ship. Bad weather prevented the ship from taking in ballast.

Aug. 19th.—North-northeasterly wind of force 5, overcast. About 20 tons of ballast were taken in.

Aug. 20th.— Calm, slightly overcast. Started from Fame Øer at 9 a.m. and at the request of the French expedition took on board a French boat and its personnel near Constable Pynt at 10 a.m. At 1.25 p.m. this party was set ashore at Kap Hope, when the ship headed towards Kap Leslie, where ALDINGER's party was taken on board at 11.20 p.m.

Aug. 21st.— Calm, slightly overcast. At midnight the ship started towards Jameson Land, where zoological investigations were made. From 9.30 to 10.20 a.m. ALDINGER's camp was landed in the bay behind Sandstensfjeldene. After the zoological work had been finished, the ship proceeded towards Danmarks Ø, arriving there at 4 p.m., and after soundings from a motorboat, the ship cast anchor in a bay on the east side of the island. At 5 p.m. KOCH, PETERSEN, and KRAMME arrived from Eskimonæs, and the seaplane was immediately hoisted. Zoological work from 5 to 9 p.m. At 10 p.m. the ship left Danmarks Ø and turned into Gaasefjord.

Zool. Sts. 298—306, sections between Kap Leslie and Jameson Land, nine $^1/_5$ sq.m. bottom samples, depth 179—397. Sts. 307—318, southeast side of Danmarks Ø, twelve $^1/_{10}$ sq.m. bottom samples, depths 18—22 m.

Aug. 22nd.—Clear and calm. At 1.30 a.m. the ship had to turn and sail out of Gaasefjord owing to close-packed ice and bergs. Passed the cape at the entrance to Fønfjord at 3 a.m. and here met local wind from the west of force 5—3. Zoological work during the voyage. Stopped at 10.45 a.m., when the seaplane was lowered and started, and subsequently went towards the west side of the fjord near Rødeø to find an anchorage. Anchored near the shore at 1.45 p.m., and various zoological investigations were made. At 3.35 p.m. the seaplane returned from a flight to Kangerdlugssuaq, and at 8 p.m. the ship sailed out of Fønfjord.

Zool. Sts. 319—326b, bay opposite Rødeø, three $^1/_5$ and one $^1/_{10}$ sq.m. bottom samples, depths 37—40 m, dredge hauls 4—5 to 30—35 m.

St. 327, north of Rødeø in Rødefjord, stramin bag 15 minutes, 200 m wire, depths 500 m. Further two horizontal plankton hauls with hand net at 5 and 10 m depth.

Aug. 23rd.—East-southeasterly wind of force 1, clear. After various zoological work the ship cast anchor off Danmarks Ø at 6.20 a.m. KOCH, PETERSEN, and KRAMME made a flight across Knud Rasmussens Land from 8.30 to 11.10 a.m., and at 12.15 p.m. they started for Eskimonæs. At 2 p.m. Seaplane H. 87 arrived from Eskimonæs and was hoisted.

Zool. St. 328, Fønfjord midway between Rødeø and Danmarks Ø, depth c. 1 m; a) surface haul with stramin bag 50 m wire 15 minutes, b) vertical haul with Hensen net 200—0 m, c) vertical haul with Hensen net 100—0 m. Sts. 329—330, southeast side of Danmarks Ø, 10—17 and 27—30 m, dredge hauls.

Aug. 24th.—Clear and nearly calm. At 6 a.m. the ship weighed anchor and sailed towards Kap Stevenson, but at 9.30 a.m. she changed her course, heading towards Kap Leslie. Anchored at 4.30 p.m. in a cove 10 miles north of Kap Leslie.

Zool. Sts. 331—339, sections between Kap Stevenson and Kap Leslie, nine $^1/_5$ sq.m. bottom samples, depths 106—550 m.

Aug. 25th.—Southerly wind of force 1, clear. At 6 a.m. the ship weighed anchor and headed towards Bjørneøer. Sailed among them into Øfjord after lowering the seaplane at 9.05 a.m. The seaplane returned at 2 p.m. and was hoisted. At 2.40 p.m. the ship turned and sailed out of Øfjord, reaching the mouth at 9.40 p.m., and at 11.20 p.m. anchored in the cove north of Sandstensfjeldene at Kap Leslie.

Aug. 26th.— Calm and foggy. The ship rode at anchors all day. At 1 p.m. ALDINGER's camp was fetched, and from 1—5 p.m. ALDINGER made an excursion to the northwest side of the cove.

Zool. St. 340, Charcots Havn in Milne Land. Depth 10—15 m, dredge hauls.

Aug. 27th.—In the night calm and foggy, in the morning northerly wind of force 4 and rain. At 7.20 a.m. the ship started out of the fjord, making zoological investigations along the route. Passed Kap Stewart at 7.35 p.m. and Kap Hope at 8.20 p.m., but was here headed by a north-northwesterly wind of force 6, and as there was a strong ice drift, the ship turned and cast anchor in the lee of Kap Hope at 9.25 p.m.

Zool. St. 341, off Kap Hooker, 150 m, Sigsbee Trawl for 15 minutes.

Aug. 28th.—Calm, cloudy. The ship weighed anchor at 5.10 a.m. and sailed among packed drift ice floes towards Scoresbysund, where she anchored at 8 a.m. Took in 9 tons of water, and the zoological equipment was stowed into the hold.

Aug. 29th.—Southeasterly wind of force 3, fog. In the forenoon the ship exchanged passengers with the "Gustav Holm", and weighed anchor

at 4.30 p.m. From 6.15 to 7.30 p.m. geological collections were taken on board at Kap Hope, and at 9.30 p.m. the ship cast anchor off Kap Tobin.

Aug. 30th.—Southerly wind of force 2, fog. At 3.20 a.m. the ship weighed anchor and sailed among fairly much ice till 7 a.m., when she encountered a high easterly swell with scattered drift ice floes and sailed among them till noon, when there was no more ice, and the ship proceeded at full speed towards Reykjavik, where she stayed from September 9th to 15th.

Arrived at Copenhagen on September 25th.

Summary of the Summer Expedition 1933.

The expedition numbered 109 members.

s.s. "Gustav Holm" passed through the ice belt in the course of one night and stayed near the coast for 66 days. No ice during the return voyage.

s.s. "Godthaab" sailed through the ice belt in the course of one night and stayed for 66 days near the coast. No ice during the outward voyage.

Cartography.—As in the previous summer, two seaplanes were at the disposal of the cartographers. One was transported to East Greenland by the "Gustav Holm", the other was flewn from Iceland to its base, s. s. "Godthaab" in Scoresby Sund. Owing to the experience gained the previous summer the flying personnel was reduced to eleven persons, which proved to be sufficient. All the necessary photo routes within 72 and 76° N. lat. were covered in the course of the summer, and in addition several routes within the Scoresby Sund area were photographed. A cartographic party had been at work at each of the three main stations during the winter, one party arrived with the ships, and each of the four parties, under the same leadership as the previous year, was equipped with a motorboat. The trigonometric survey of the area between 72° and 76° N. lat. was completed in the course of the summer with the exception of some few minor areas, which were surveyed by two wintering cartographers next year. Some reconnaissance flights for the preparation of working maps were made within the working area of the expedition as well as northward to Peary Land and southward to Kangerdlugssuaq, that is to say, within an area of fourteen degrees of latitude.

Ice reconnaissance from the air was now made regularly with a view to the planning of the movements of the ships. Many geological reconnaissance flights were likewise made, i. a. a number of mineral-

bearing rust-coloured zones were mapped. In a addition to the planned work, trigonometric survey and flights were made at the mouth of Scoresby Sund, which made it possible to publish map No. 70.0.1.

Practical Geology.—1) BACKLUND with four assistants, equipped with the largest motorboat with wireless, continued his practical-geological reconnoitring work. The programme comprised an investigation of Liverpool Land, but since the winter ice remained in Davy Sund and the fjords north of Liverpool Land till late in August, the investigation of the northern part of the area could not be made. An investigation was, however, made of the south coast of Traill Ø, the motorboat having been transported by the ship to Ella Ø.

2) MALMQVIST continued his practical-geological investigations on Clavering Ø, with two assistants and three ponies. Later on he continued, with three assistants, the geological reconnoitring northward in motorboat, visiting Kuhn Ø, the region round Danmarks Havn, and the rather unknown Skærfjorden north of Germania Land; the area round Skærfjorden was topographically mapped.

3) EKLUND with six assistants continued the work commenced by BACKLUND and MALMQVIST in the southern part of Clavering Ø. A large equipment including five (later seven) ponies was at his disposal. A pit was made by means of dynamite down to a mineral-bearing dyke. EKLUND stayed in East Greenland during the winter and continued the work next spring, i. a. making a number of mineral analyses. A small laboratory was therefore erected near the Eskimonæs station, and a stable, in which some of the ponies wintered, was likewise built.

Collecting of vertebrates.—1) G. SÄVE-SÖDERBERGH with four assistants continued the collecting of Devonian vertebrates. Owing to the circumstances he was able, together with ALDINGER and five assistants, to make a two weeks' geologic-topographical investigation of the Mesozoic sediments in the southeastern part of Jameson Land. In addition he made a topographic-geological mapping of the Carboniferous beds in Passagehøje at the mouth of Loch Fyne (six days) with four assistants, and finally he spent 30 days, with four assistants, 3 ponies, and a motorboat, on the south coast of Gauss Halvø, making several trips up the valleys, where large collections of Devonian fossils were secured.

2) EIGIL NIELSEN finished his investigations of the Triassic beds south of Clavering Ø and subsequently made stratigraphical studies of the Jurassic beds on Kuhn Ø and Store Koldewey.

Other geological work.—WEGMANN, who had spent the winter on Ella Ø, with three assistants (motorboat with wireless) finished his

petrographic and tectonic investigation of the inner fjord ramifications in the Ella Ø district. ALDINGER, with one assistant, made collections and investigations in the Mesozoic beds in Hurry Fjord and on Kap Leslie, principally to examine whether these beds contained vertebrate fossils. However, the result was negative, but large and stratigraphically important collections of invertebrates were made.

Biology.—As in the previous summer, the "Godthaab" was placed at the disposal of the zoologists for a zoologic-hydrographical investi-



Fig. 74. The laboratory at Eskimonæs. 1933

gation and mapping, by means of an echo sounding apparatus, of the Scoresby Sund district. The party comprised THORSON (leader) and four assistants, one of whom was to collect algæ. ALWIN PEDERSEN finished his investigations of the higher animal life on Hochstetters Forland, and SØGAARD ANDERSEN commenced an investigation of the lower fresh water fauna around Ella Ø.

The two botanists TH. SØRENSEN and GELTING, who had previously wintered at the Ella Ø and Eskimonæs stations respectively, made supplementary investigations in these districts and in addition made botanical collections in the outer part of Scoresby Sund; SØRENSEN was also at work north of Eskimonæs and was able to investigate the flora in the area around Skærfjorden.

Archæology.—The archæologist NORLING CHRISTENSEN excavated various Eskimo house ruins in the outer part of the Scoresby Sund district in the early summer. Later on he assisted GLOB, who finished

his archæological investigation of the Ella Ø district. SCHWARCK completed his archæological mapping of the area around Hochstetters Forland and Shannon.

On the whole the weather was very fine in East Greenland in the summer of 1933. There were many clear days in the fjords, there was less fog along the outer coast than in 1932, and the ice conditions in the early summer were somewhat better than in the previous year. The expedition started much earlier this summer, and both ships sailed directly to Scoresby Sund; the ice masses found outside the mouth of this sound were so small that the ships passed the East Greenland ice in one night, reaching the coast the day after midsummer day. Since, however, a reconnaissance from the air showed that the fjord ice still persisted in the outer part of the sound, and no land water had formed, the programme of the expedition was altered so that nearly all the members set to work for two weeks in the outer part of Scoresby Sund. The formation of land water was constantly observed from the air, and on July 13th a broad belt of land water was seen to extend northward past Hold with Hope. The "Gustav Holm" sailed northward in this land water, but off Geographical Society Ø she was delayed by ice for about twenty-four hours. The ice in the outer part of Kejser Franz Josephs Fjord had not yet disappeared, so the ship went to Eskimonæs. Here the members who were to work farther southward, notably the SÄVE-SÖDERBERGH party, had to be occupied in order that no working days should be lost, and this was done with a good result.

As soon as the ice at the mouth of Kejser Franz Josephs Fjord had disappeared, the "Gustav Holm" went to Ella Ø, so all the planned investigations here could be commenced before the end of July. When land water entirely free of ice had formed, the "Godthaab" interrupted the hydrographic investigations in Scoresby Sund to go to Ella Ø, where the goods for the station were unloaded, after which the ship returned to Scoresby Sund.

In the first days of August land water formed as far northward as Danmarks Havn. In the days August 6th—20th the "Gustav Holm" made a trip northward. Off Shannon the land water belt was narrow, but a broad belt of land water extended from Danmarks Havn northward to Nordostrundingen. The ship pushed as far as Norske Øer off Lamberts Land, the farthest north ever reached by a ship along the east coast of Greenland. From this place flights were made across Danmarks Fjord and to Peary Land, a topographic-geological mapping of Skærfjorden was made from a motorboat, and a botanical investigation of the surrounding country was carried out; finally, a party made careful stratigraphic-palæontological investigations of the Mesozoic strata on Store Koldewey.

According to agreement the ships met at the mouth of Scoresby Sund in the last days of August. Since at that time only small quantities of ice occurred outside the land water between Scoresby Sund and Eskimonæs, it was contemplated to continue the work in the outer part of the Scoresby Sund district for two weeks, but this plan was given up owing to the unsettled weather conditions, and the ships left the shore.

This summer, with a working period of more than two months, represented the culmination of the expedition. The expedition included two ships, two seaplanes, fourteen motorboats, twelve wireless stations, and eleven ponies, and it numbered 109 members, 63 of whom had previously participated in expeditions under my leadership. Owing to the experiences gained during the previous year the equipment was good in every respect, and the personnel was familiar with it, so that it could be fully utilised.

Wintering Parties 1933—34.

Eskimonæs.	TH. JOHANSEN, cartographer.
	P. HALFDANER, cartographer.
	O. EKLUND, geologist.
	B. MALMBERG, assistant in laboratory.
	E. DRASTRUP, assistant.
	AXEL NIELSEN, wireless operator.
	JOHAN DAVIDSEN, Greenlander, dog driver.
	BENJAMIN SAMUELSEN, Greenlander, dog driver.
Ella Ø.	H. BÜTLER, geologist.
	F. SØGAARD ANDERSEN, zoologist.
	AA. DE LEMOS, wireless operator.
	JØRGEN PETERSEN, Greenlander, dog driver.
	JØRGEN BARNABAS, Greenlander, dog driver.

THE EXPEDITION 1934

Personnel.

	Lauge Koch, leader.
	G. Seidenfaden, in charge of the equipment.
s.s. "Gustav Holm".	N. C. Vestmar, captain.
	T. M. Jørgensen, first mate.
	G. J. A. Hansen, second mate.
	R. E. Nielsen, first engineer.
	A. Møller, second engineer.
	S. G. D. Christensen, wireless operator.
	Crew: 16 men.
Cartography.	Th. Johansen, cartographer.
	P. Halfdaner, cartographer.
Aviation.	E. Overbye, chief pilot.
	Greve Rasmussen, wireless operator, mechanic.
	H. Bonde-Hansen, mechanic.
Practical geology.	1st party:
	D. Malmqvist, geologist.
	S. Kamman, assistant.
	2nd party:
	O. Eklund, mining geologist.
	B. Malmberg, assistant.
	3rd party:
	H. G. Backlund, leading geologist.
	E. Wenk, geologist.
	K. Lupander, scientific assistant.
	V. Backlund, assistant.
	S. H. Hasselbalch, motorman and wireless operator.
Vertebrate palæontology.	Devonian party. 1.:
	G. Säve-Söderbergh, palæontologist.
	S. Arnell, scientific assistant.
	B. Granström, scientific assistant.
	Devonian party. 2.:
	E. Jarvik, palæontologist.
	G. Wängsiö, scientific assistant.
	S. Hansson, in charge of the ponies.



Fig. 75. Captain and first mate inspecting the ship after heavy work in the ice. 1934

O. Harder Jensen, in charge of the ponies.
Richard Nielsen, in charge of the ponies.

Stratigraphy and geological mapping.

1st party:
H. Bütler, geologist.
Allan Lind, motorman.
E. Drastrup, assistant.

2nd party:
E. Wegmann, geologist.
A. Gansser, scientific assistant.
R. Masson, scientific assistant.
Ib Poulsen, motorman, wireless operator.

3rd party:
A. Noe-Nygaard, geologist.
H. Schweitzer, motorman and wireless operator.
O. Seidenfaden, assistant.

Zoology.

F. Søgaard Andersen, zoologist.

Botany.	TH. SØRENSEN, botanist.
Personnel at the station Eskimonæs.	AXEL NIELSEN, wireless operator. S. K. ESPENSEN, wireless operator. JOHAN DAVIDSEN, Greenlander, dog driver. JØRGEN BARNABAS, Greenlander, dog driver.
Station Ella Ø.	AA. DE LEMOS, wireless operator. JØRGEN PETERSEN, Greenlander, dog driver. BENJAMIN SAMUELSEN, Greenlander, dog driver.

s.s. Gustav Holm.
Voyage from Copenhagen to Scoresby Sund.

July 5th.—The expedition left Copenhagen at 10 a.m.

July 13th.—Arrived at Akureyri at 22.15 p.m.

July 15th.—Left Akureyri at noon, after loading coal, 2000 kg hay, and five ponies.

July 16th.—Position of ship at noon: 67°27′ N. lat., 18°25′ W. long.

July 17th.—At 2.25—3 a.m. in touch with the ice edge. Dead reckoning at noon 68°58′ N. lat., 19°17′ W. long. Passed some ice-floes at 2 p.m. Passed a large ice-floe at 11 p.m. The wind was NNE., force 7—5. Drizzling rain and haze. Slow speed in the night.

July 18th.—Wind NNE. Haze, later fog. Force of wind 6 in the morning, decreasing in the course of the day to N.1. Just before noon we passed several small floes. Shortly after we reached the ice edge and continued in fog along it to find an opening in the ice. Found a place which was regarded as suitable, and pushed into the ice. The edge consisted of small, but very thick floes, and the ship was jammed in the ice for some time. Suddenly a heavy swell came up. While the engines were run astern, the rudder turned against an ice floe and was pressed so hard towards the port side that all the teeth of one cog-wheel and six teeth of the other were broken off; the rudder itself had suffered no damage. Shifted to the hand winch astern. Owing to the close-packed ice the ship had to turn and make its way out of the ice. During the work in the ice the cheek block of the port side got loose and a board of the ice-sheathing on the starboard side was crushed. At 7 p.m. the ship was free of the ice. A heavy southeasterly swell impeded navigation. Went southwestward along the ice edge, and found a place where the ship was sheltered from the ice; at 10.30 p.m. she entered the ice again, and proceeded in scattered ice.

July 19th.—Sailed all night in more or less open ice. In the forenoon the ice packed closely around the ship, and we had to stop to await an improvement of the ice conditions. The steering chain was repaired. The ship continued her course, though she had to get round

several large ice fields. At 8.30 p.m. the ice again packed around the ship, so all advance was impossible.

July 20th.—Was jammed in the ice all night. At 3 a.m. the ice began to scatter. At 3.40 a.m. we went on, at 5.30 the ice packed again, and we had to stop. Later in the morning we started again, but had to stop at 10.45 a.m. During the voyage a large ice floe turned against the foremost davit on the starboard side, which was bent, and at the same time the gunwale was damaged. From 1.30 to 3.30 p.m. the ship advanced about two miles. The fog had continued since we entered the ice. All the afternoon and evening the ship was jammed in the ice.

July 21st.—Jammed in the ice all night. In the forenoon an attempt was made to push through the ice, but without success. In the afternoon slight advance. The fog continued.

July 22nd.—In the night jammed in the ice, which consisted of large ice fields of very thick drift ice. In the forenoon we advanced about seven miles. The ice was difficult to negotiate, and we had to get around large ice fields. The fog was replaced by fog banks, and some mountain peaks emerged through the fog. In the afternoon the ship was repeatedly stopped by closely packed ice. Total advance about ten miles.

July 23rd.—No advance in the night, though the ship laboured in the ice. In the forenoon we advanced seven miles, but the voyage was impeded by large ice fields, and though the ship was labouring hard, we had to stop for half an hour owing to packing of the ice. In the afternoon the ice began to move, and we advanced fairly well. At 4 p.m. the ice grew more and more scattered. The fjord ice became predominant, at 6 p.m. we sailed in open ice. Shortly before midnight we passed Kap Brewster within a distance of eight miles. For the last thirty-six hours there had been almost no fog, but now the fog returned and we had to moor for the night at an ice floe in Rosenvinges Bugt.

The log-book contains the following passage: On the voyage to Scoresby Sund the ship has been labouring hard in the heavy sea, and the bottom, propeller, stern, and rudder have been much affected by the above-mentioned conditions.

Voyage in Scoresby Sund and northward to Eskimonæs.

July 24th.—In the morning the ship had to change its place owing to a high wind and a heavy sea. The whole of Rosenvinges Bugt was filled with large ice fields with smaller ice floes between. At 9 a.m. the land emerged through the fog. We headed towards the colony, but had to give up and to drop anchor. The motorboat was lowered, in which a party went in land-water to the colony to make the motorboat

of the expedition stationed there ready. In the afternoon the ship approached the colony and anchored off the colony at 7 p.m. The goods for the colony were unloaded and a family of eleven Greenlanders who were to go to Sydkap were taken on board. ROSENKRANTZ went ashore. A heavy rain was falling. At 22.30 p.m. the ship left the colony. We were at first much troubled by the ice, but at midnight we succeeded in reaching the open ice in the middle of the fjord.

July 25th.—The weather was clearing. Sailed at first in leads in the pack ice and had to get round several large ice fields. In the morning the seaplane was lowered to make an ice reconnaissance, which showed that the ice was very open along the south side of the fjord, whereas it was rather close-packed near the coast of Jameson Land. Sailed then towards the interior of the fjord in scattered ice, reaching Kap Leslie at 8 p.m., where a depot of ten cases of camping outfit and a barrel of kerosene was landed for BACKLUND's party. Afterwards the ship continued in almost clear water towards Sydkap.

July 26th.—Arrived at Sydkap at 3.50 a.m. The seaplane was lowered, and BACKLUND made a reconnaissance flight through Nordvestfjord to Rypefjord and onwards through Rødefjord, Fønfjord, across Danmarks Ø and Kap Leslie, back to Sydkap. Meanwhile the Greenlanders and their goods had been landed. BACKLUND's party went ashore with twenty cases of camping outfit and 1 barrel of kerosene. At 20.45 the ship weighed anchor to go southwards along Bjørneøer, sailing in open water with numerous large ice fields. At the same time the seaplane started with KOCH as observer to make an ice reconnaissance around Jameson Land and northward along Liverpool Land. The weather was clear and calm in the interior of the fjord, but out to sea there were fog and clouds.

When the seaplane approached Hurry Fjord, the wind increased in force, blowing from the northwest over Jameson Land and from the north, force 6, out of Hurry Fjord. As a heavy rain was falling south of Liverpool Land and the colony, and there was a high wind, we tried to fly across Hurry Fjord towards Storefjord, but at an altitude of 1500 m we had to turn about, since the wind was blowing from the northeast, force 10, so it was difficult to navigate.

On account of the bad weather no information about the ice conditions along Liverpool Land was obtained during the flight, but Carlsberg Fjord was observed to be free of ice. The plane returned to the ship and was taken on board near Bjørneøer. In the interior of the fjord the weather was still fine. In the night the ship sailed out of Scoresby Sund.

July 27th.—Sailed in open water, but had to penetrate several belts of pack-ice. The rain that set in the night before continued. In

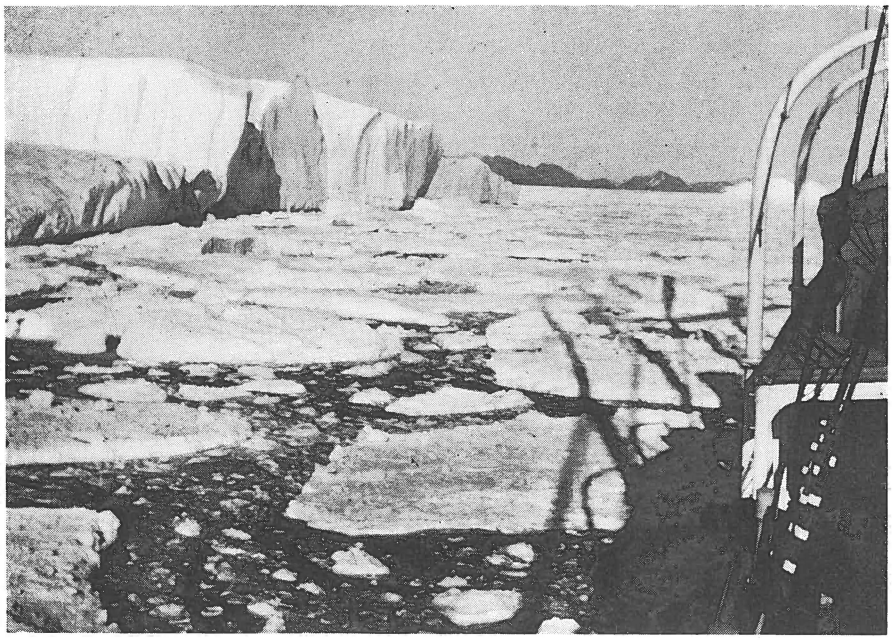


Fig. 76. Ice-bergs and pack-ice near the coast. 1934

the forenoon the ice grew more close-packed. We were now off Kap Hodgson and tried to go northward along the coast, but was stopped by a large ice-field which lay close to the shore. Turned to sail around the ice-field. During the labouring of the ship she was beset in the ice, and the rudder and the stern suffered some damage. On a provisional inspection it turned out that the stern beam of the rudder had been shifted. At 1 p.m. we moored at the ice edge owing to thick weather and ice pressure. In the afternoon we started again, advancing about ten miles in a northeasterly direction among ice-fields and large floes. The ice drifted rapidly southward. At 7 p.m. the ship moored at the ice edge, ice and fog preventing further advance, but we soon had to weigh anchor again, as the ice was packing around the ship. Found a more suitable place for mooring. At 7 p.m. it cleared somewhat, and the seaplane was lowered in the interval between two showers of fog. The plane rose to about 1000 m for ice reconnaissance, and a lead with open water, which extended northward, was discovered. The ship started at 8 p.m., and after labouring in close-packed ice till 9 p.m. it proceeded northward among scattered ice and large ice fields all night.

July 28th.—Dense fog till 3 a.m. The ice showed a tendency to scatter, but fairly strong northerly and northeasterly winds impeded the work of the ship to some extent. At 8 a.m. the seaplane was lowered for ice reconnaissance. We ascended to about 1000 m, keeping near the

ship, a d observed leads with open water near the coast. During the remainder of the forenoon the ship sailed northward in these leads, but at 2 p.m. the ice packed again, and the seaplane started for ice reconnaissance, after which the ship advanced about five miles. In the evening the ice packed again, and navigation was much impeded by fog, which set in at 5 p.m. At 7 p.m. we moored at the ice edge.

July 29th.—Shortly before midnight the ship weighed anchor and sailed for about two hours in close-packed ice, much impeded by fog-banks. Subsequently she proceeded in open water among ice floes of varying size. At 8 a.m. we struck open water between Reynolds Ø and Murray Ø. The seaplane started for ice reconnaissance. The weather conditions were favourable, and Carlsberg Fjord, Nathorsts Fjord, Fleming Fjord, and the inner parts of Davy Sund and Kong Oscars Fjord were observed to be free of ice, while the ice was close-packed along the shore from the northern part of Liverpool Land towards Traill Ø and towards Kap Franklin and Kap Broer Ruys. The seaplane then started for Ella Ø, where WEGMANN and the mail for the members at the station were landed. At 11 a.m. the ship weighed anchor and headed towards Kap Wardlaw. Arrived there about 4 p.m. Strong currents packed the ice floes together and impeded navigation. Headed towards Kap Tyrrell, but not till about 11 p.m. were camping parties set ashore in Nathorsts Fjord. NOE-NYGAARD and an assistant went ashore on Canning Land.

Although the voyage through the ice belt and northward along Liverpool Land took place at the end of July, the ice conditions, as compared with the conditions in earlier years, must be characterised as difficult; thus the ice was very heavy.

July 30th.—Shortly after midnight MALMQVIST and five assistants went ashore north of Kumait on Wegeners Halvø. At 3 a.m. the ship cast anchor in the interior of Nathorsts Fjord, where SÄVE-SÖDERBERGH with five assistants went ashore. They were at work here till 8 a.m., and subsequently on the northern slope of Nordenskiölds Bjerg, where they worked till noon, when SÄVE-SÖDERBERGH and three assistants moved to the west side of the fjord to find out the age of the Devonian sandstone present there. At 5 p.m. the two Swiss geologists MASSON and GANSSER and the Swedish geologist JOHANSSON went northwestward to collect fossils and investigate the stratigraphy in the interior of the fjord. At 6 p.m. that party and SÄVE-SÖDERBERGH's party were fetched by the ship.—In the course of the night a wind had come up, and in the afternoon it began to rain. Locally it was blowing hard from the north, and with a view to the remaining geologist parties the ship left her anchorage at 8 p.m. and sailed out of the fjord. In the course of the night the other parties were taken on board, and the ship headed



Fig. 77. Pack-ice along the coast.

into Fleming Fjord towards the station house of the expedition in Vimmelskaftet.

July 31st.—Anchored off Vimmelskaftet at 2 a.m. SÄVE-SÖDERBERGH with four assistants went ashore to investigate a Devonian locality high up the valley. The house was visited and found to be in a good condition. A canoe and various other articles were taken on board the ship. At 8 a.m. SÄVE-SØDERBERGH's party was fetched, and shortly after the ship weighed anchor and sailed out of the fjord. Light wind, but thick rainy weather. At 11 a.m. we passed Kap Biot, and continued among scattered fjord ice and large ice floes into Kong Oscars Fjord. Near Kap Syenit, in the mouth of Antarctics Havn, a depot of kerosene was set ashore. Between Antarctics Havn and Archers Øer a good deal of fjord ice and large ice floes were passed, but they caused no great trouble. Near Haslums Øer a belt of fjord ice and occasional icebergs were encountered. It was calm and cloudy.



Fig. 78. The kitchen of the Ella Ø station. 1934

Aug. 1st.—At 2 a.m. the ship cast anchor off Ella Ø. In the course of the day the goods to the Ella Ø station were unloaded and empty packing material was carried ashore to remain there till our return voyage. At 1 p.m. NOE-NYGAARD with two assistants started for Vega Sund and Kap Parry. At 1.30 p.m. the seaplane started with WEGMANN as observer, but after half an hour it had to return owing to low-lying clouds. In order to lighten the plane for petrol an attempt was made to fly the mail to Eskimonæs, but over Ymers Ø the plane was stopped by fog and had to return. WEGMANN and three assistants remained at Ella Ø, and at 3.30 p.m. the ship weighed anchor and went northward through Antarctics Sund. Light wind and rain.

Aug. 2nd.—Shortly after midnight we passed Teufelsschloss, and at 6.15 the ship cast anchor off Paralleldal on the south coast of Gauss Halvø. The rain had ceased in the course of the night. A float was made of the two life-boats, and five ponies, our whole supply of hay, and a geologist party of six men guided by JOHANSSON were landed, provided with various articles of equipment and 30 cases of provisions. At 10.35 a.m. the ship continued into Moskusoksefjord. At 4 p.m. she passed Hoelsbo

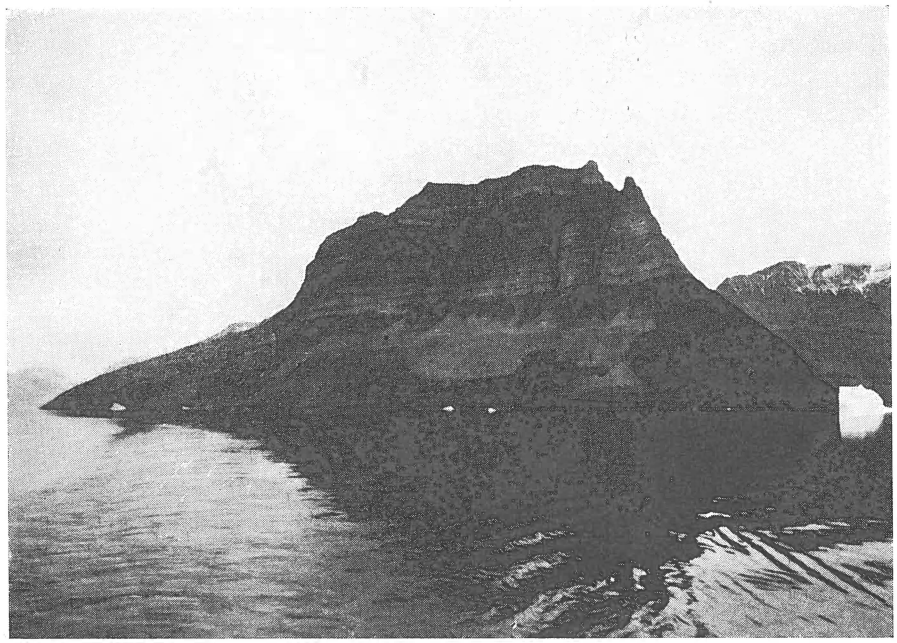


Fig. 79. Teufelsschloss in Kejser Franz Josephs Fjord.

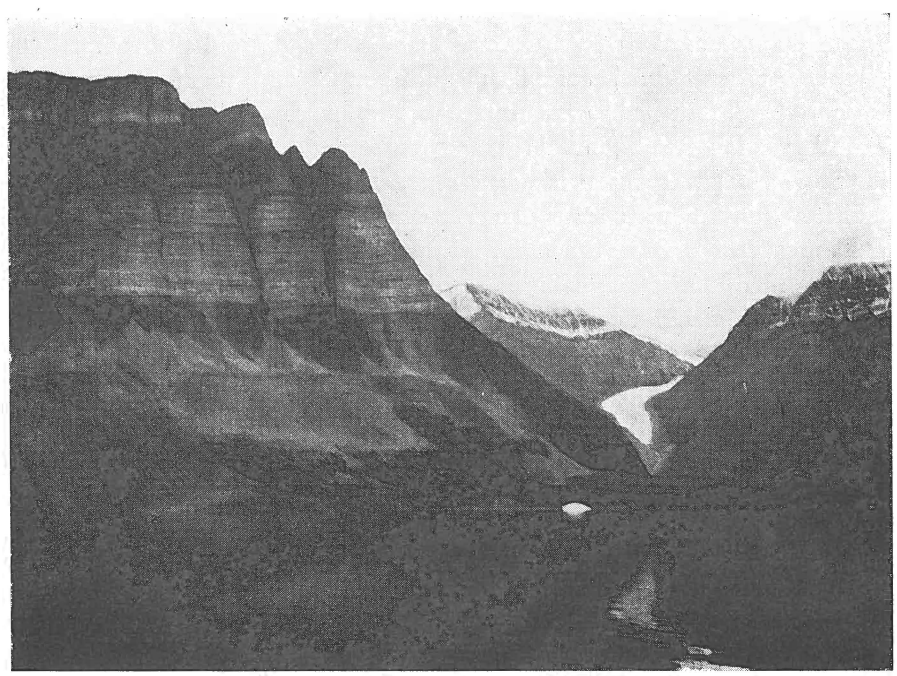


Fig. 80. Part of Teufelsschloss in Kejser Franz Josephs Fjord.

and at 8 p.m. cast anchor in the interior of Moskusoksefjord. At 3 p.m. MALMQVIST and one assistant went ashore a little west of Hoelsbo on the north side of the fjord. In the afternoon the weather cleared, and a party of the crew went ashore to hunt. In the evening SÄVE-SÖDERBERGH made a geological reconnaissance flight across Hudson Land, along Loch Fyne and onwards along Nørlunds Alper to Wordies Gl. and back to the ship. On his return he reported that Mackenzie Bugt was filled with closely packed ice from Kap Franklin to Kap Broer Ruys and farther northwards.

Aug. 3rd.—The weather continued fine. In the forenoon SÄVE-SÖDERBERGH and two assistants left the ship in the large "Ekstrablad" motorboat. At the same time EKLUND and MALMBERG, who by the middle of July had gone by boat from Eskimonæs to the head of Loch Fyne and who had now walked across the plain between that fjord and Moskusoksefjord, came on board. For a couple of weeks they had made geological investigations in the interior of Moskusoksefjord partly by the aid of a rowing boat.

In the morning the seaplane left the ship to go to Ella Ø, where it was to make a geological reconnaissance with WEGMANN as observer. After the flight it returned to the ship by noon. The pilot reported that the ice conditions in Mackenzie Bugt were unaltered. In the afternoon a geological reconnaissance flight with BÜTLER as observer was made along the whole of Moskusoksefjord and back. After the return BÜTLER and two assistants left the ship in the old police boat. In the evening SEIDENFADEN carried the mail by seaplane via Loch Fyne to Eskimonæs. Continuous fine weather.

Aug. 4th.—At 4 a.m. the ship weighed anchor and sailed to the delta off Hoelsbo, where it cast anchor. Various members of the expedition were at work ashore, and a party went out hunting to secure fresh meat for use on the ship. As the ship was troubled by drifting icebergs along the south side of the fjord, she moved to the north side in the afternoon. Clouds were gathering in the afternoon, and the Myggbukta wireless station reported dense fog over Foster Bugt.

Aug. 5th.—In the forenoon KOCH started on a reconnaissance flight to examine the ice conditions in Mackenzie Bugt and along the outer coast of Hold with Hope. A strong wind was blowing, a dense shower of rain was encountered over Mackenzie Bugt, preventing our outlook, and showers of rain and strong winds were encountered in many places over Hold with Hope. The ice reconnaissance accordingly had to be given op, and the plane flew to Eskimonæs via Loch Fyne. The weather was somewhat better northward, and much open water was observed eastward off Gael Hamkes Bugt, Jackson Ø was entirely free of ice, and the ice conditions near Herschell Bjerg seemed to be fairly good. A

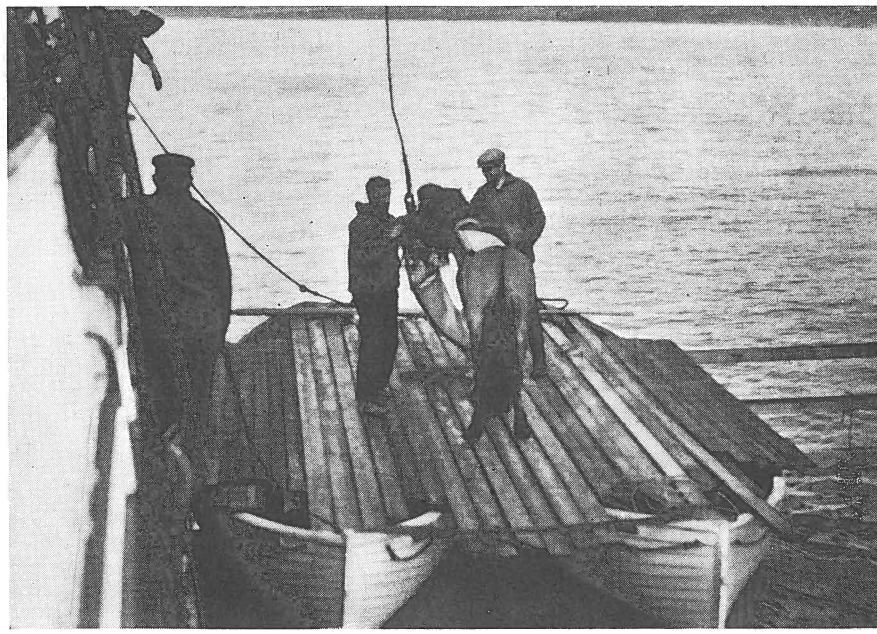


Fig. 81. Landing of ponies. 1934

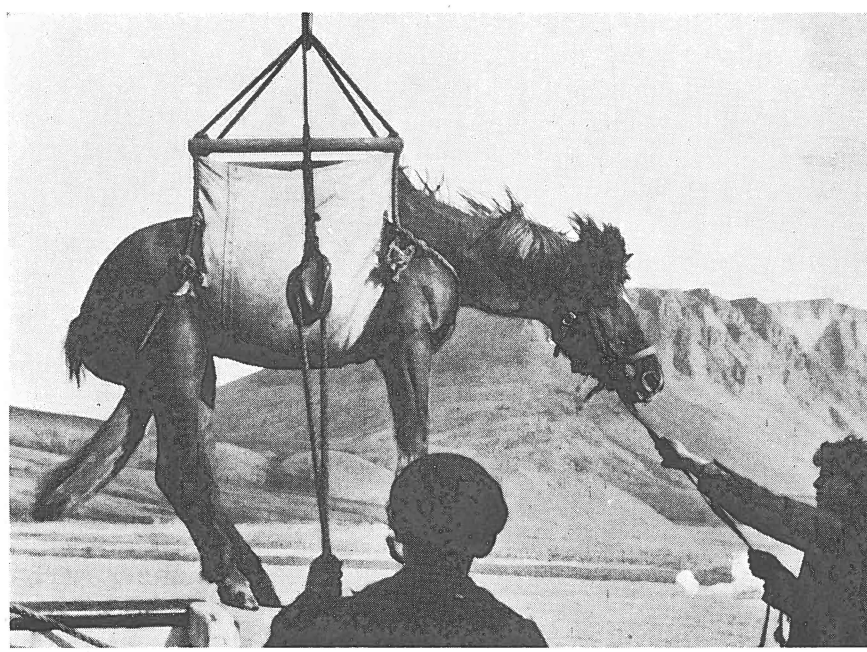


Fig. 82. Landing of a pony. 1934

number of horse saddles were fetched at Eskimonæs, which immediately after our return to the ship were flewn to the horse camp. The rainy zone encountered over Hold with Hope on our outward flight had now spread up Moskusoksefjord to the ship. At the same time the wind increased. In the evening the new police boat lost its propeller.

Aug. 6th.—Heavy rain all day, gradually low-lying clouds. A motor-boat was sent to the interior of the fjord to BÜTLER's party to fetch a spare propeller, and on its return the propeller was fitted in the police boat. The ship again moved to the south side of the fjord to take in fresh water.

Aug. 7th.—In the morning the ship went to the north side of the fjord to fetch a geologist party (MALMQVIST), and then continued to the horse camp to land some fodder which had been stowed in the hold during our upward voyage. Subsequently the ship continued, in fog and rain, towards Kap Graah. Dropped anchor south of the innermost of the Vinterøer at 11 p.m. Evidently a high wind was blowing along the outer coast, probably from the northeast.

Aug. 8th.—Gradually the weather cleared somewhat, but the fog still lingered in several places. Late in the forenoon the mountains became visible through the fog. A geologist party (EKLUND) left Kap Graah in a small Faroe boat to go via Sofia Sund and Ella Ø to Nathorsts Fjord. A depot of kerosene and provisions for BÜTLER's and SÄVE-SÖDERBERGH's parties was established at Kap Graah, and at 10.15 a.m. the ship left the Vinterøer. In Mackenzie Bugt and farther northward the wind of the previous day had evidently made the ice more open. The ship sailed all day among scattered ice floes, and had to pass several large ice fields. Near Kap Broer Ruys the ship encountered large ice masses and had to keep near the shore to pass them. North of Kap Broer Ruys the ice conditions improved somewhat. Shortly before midnight we passed Holland Ø within one mile's distance and in 9 fathoms of water.

Aug. 9th.—Light wind, generally cloudy, with occasional squalls of rain, at times it cleared somewhat. At 2.30 a.m. the ship anchored off Knudshoved in seven fathoms of water. At 10.50 the unloading of the goods for the Knudshoved station was finished, and the ship went northward in scattered ice. At the same time MALMQVIST, TH. SØRENSEN, SEIDENFADEN, and KAMMAN left the ship in the new police boat to make geological and botanical investigations around Kap Broer Ruys. By noon the ship entered the strait between Hold with Hope and Jackson Ø, a passage which had been passed the previous years also. However, she was sailing with the anchor and eight fathoms of the chain cast, and the lead was kept going. Nevertheless the anchor struck a skerry in the middle of the strait, but a cast of the lead showed a depth of 19 fathoms.

Basalt dykes are present on either side of the strait, so the bottom is no doubt very rough. When the ship had proceeded to about the middle of the strait, it turned out that the whole of Gael Hamkes Bugt was filled with close-packed ice, consisting of large ice fields with smaller floes between, carried there by the wind on August 7th. Thus the ice conditions had grown much worse since our air reconnaissance on August 5th. The ice packed closely from Finsch Øer towards Jackson Ø, and large masses of ice occurred north of this island and far seawards to near Kap Mary. The ship therefore headed towards Eskimonæs to await an improvement of the ice conditions and to make an ice reconnaissance by the seaplane. At 8.30 she anchored in the East Harbour, but being troubled by the ice there she moved to the West Harbour, where she dropped anchor at 9 p.m. It had been raining all day in Gael Hamkes Bugt, and for a short time the rain had spread to Eskimonæs, but the weather was clearing inland.

From Eskimonæs to Ella Ø.

Aug. 10th.—In the morning it was fairly clear, but fog banks still lay over the mountains at an altitude of 600—1000 m and out to sea. At 9 a.m. the seaplane started on an ice reconnaissance with KOCH as observer, flying across Kap Mary, Young Sund, and Wollaston Forland to the waterway between Kuhn Ø, Sabine Ø, and Shannon. The fog caused some trouble northward. Open water was observed from some distance south of Sabine Ø to a little south of Kap Wynn and Hvalrosø, and Claveringstrædet and Pendulumstrædet were likewise free of ice. However, the ice packed close against Lille Pendulum, Bass Rock was entirely surrounded by ice, and the pack-ice continued to Kap Philip Broke and farther northward. In the bay between Shannon, Kuhn Ø, and Sabine Ø the fjord ice was thawing. It consisted to some extent of very large floes, which the ship was unable to penetrate. A few ice floes occurred in Peters Bugt, whereas Ardencaple Fjord, Grandjeans Fjord, Fligelys Fjord, and Lindemans Fjord were free of ice. The winter ice was unbroken between Hochstetters Forland and Shannon as also north of Shannon. Open water was observed outside the southern part of Store Koldewey; possibly open water occurred off Bessels Fjord, too, but it was impossible to decide owing to the fog. The plane was flying at an altitude of 3000 m. During the return flight a short landing was made near Sandodden in order to take a view of the ice conditions there. On passing Kap Mary again I had the opportunity to observe—what was impossible on our outward flight owing to the fog—that the pack-ice lay close against the coast at Kap Borlase Warren and farther northward towards Dronning Augustadalen. By noon, shortly after the

return of the seaplane, there came wind from the east and thick fog. The remainder of the day was passed unloading goods for the Eskimonæs station and arranging and sorting the goods of the Nanok trapping company.

Aug. 11th.—In the morning it was clear inland, but the fog still lingered over Finsch Øer, and in the forenoon it spread to the whole bay. The ship loaded goods from the Eskimonæs station.

Aug. 12th.—Rain in the morning, but later it cleared somewhat, though showers of fog continued all day. In the afternoon the last goods and some dogs were taken on board. At 5.45 p.m. the seaplane was hoisted, the ship prepared to leave, and the last passengers went on board. When the ship left Eskimonæs, it was almost clear, but near Finsch Øer it grew foggy. However, after we had passed Finsch Øer it became almost clear, and near Kap Mary the seaplane was lowered at 22.45 p.m. to fetch THORVALD SØRENSEN from Kap Broer Ruys and take him to Eskimonæs, where he was to pass the winter. However, shortly after the fog set in again, and the seaplane had to return.

Aug. 13th.—Continued in dense fog to the station at Sandodden, off which the ship dropped anchor at 2.30 a.m. The unloading of goods for the station was commenced at once and was finished about noon. In Young Sund we encountered scattered ice with occasional large floes. In the forenoon the fog was more or less dense, and an easterly wind of varying force kept the fog near the shore. The motorboat of the Trapping company Nanok was hoisted again, but the fog continued, so we awaited a clearing of the weather. It was decided that if the fog did not lift before noon of the next day, we would give up pushing farther northward.

Aug. 14th.—The very dense fog continued, and a light southerly wind was blowing all day. At noon Nanok's motorboat was lowered again, and the unloading of the rest of the goods for the company was commenced.

Aug. 15th.—The fog continued all day, though a couple of times it was about to clear. The unloading of the goods for the trappers was finished at 9 p.m., and the boats were hoisted. A wireless message had been received from LEO HANSEN stating that the ship need not wait till next day, so we started southward in dense fog at 10 p.m.

Aug. 16th.—The ship sailed in scattered ice out through Young Sund with the lead going in order to pass Kap Mary. During the first part of the night we sailed among large ice fields and scattered floes. At 4 a.m. a bearing was taken to the skerries at the east point of Jackson Ø. Subsequently we sailed in more open water between large ice fields. Passed Arundel Ø at 5.45 a.m. within a distance of 1 mile. At 9.30 a.m. we passed the house of the East Greenland Company at

Kap Broer Ruys, when the weather cleared a little. At 10 a.m. the ship cast anchor near the coast to await the arrival of the police boat with MALMQVIST's party, but as it proved impossible to establish radio communication with the boat, and it could not be sighted on the coast owing to the fog, the ship weighed anchor at 12.40 p.m. and rounded Kap Broer Ruys. During the following two watches we sailed along scattered ice fields and floes in dense fog. Between 10 and 11 p.m. the ship had to sail around a large ice field. At 11.15 p.m. we sighted land, which we took to be Kap Franklin, but it turned out later to be Kap Bennet; owing to the continuous dense fog we sighted only the lower edge of the shore.

Aug. 17th.—At 1.50 the cairn at Kap Franklin was sighted ahead at a distance of 300 m. The depth of the water was 18 m, and the ice was very open. At 5.30 we sighted Kap Wijkander, when it cleared for a short time. At 6.45 the ship stopped off Kap Humboldt, and a barrel of 40 l kerosene for the police boat was deposited ashore. Continued into Sofia Sund. The fog set in again, though it was lighter than before. At 8.45 a motorboat was sighted on the shore, and I went ashore in the ship's motorboat. It turned out to be BÜTLER's camp. BÜTLER had of course been troubled by the fog, but had carried through his journey from the interior of Moskusoksefjord via Kejser Franz Josephs Fjord to Duséns Fjord and onwards to Sofia Sund; it was his plan to reach Ella Ø a few days later. Shortly after we had left the camp, the fog set in again and continued almost till we reached Ella Ø. At 2.55 p.m. the ship dropped anchor off the station. In the evening clear.

Stay at Ella Ø.

Aug. 18th.—Clouds and fog, which was exceedingly dense in the evening. Coal shifting on board the ship all day.

Aug. 19th.—Westerly wind and clear weather. In the early morning MALMQVIST's party arrived in the police boat. It had covered the distance from Kap Broer Ruys to Ella Ø in twenty-four hours, in spite of the dense fog. Almost at the same time BÜTLER's party arrived in the other police boat, and in the afternoon DE LEMOS arrived in the boat of the station from Nathorsts Fjord, where, as stated above, he had been ordered on August 12th for assistance because a motorboat had sunk. He reported large ice masses in Fleming Fjord; the two parties were at work on Canning Land; the sunken motorboat was lying so near the shore that it could be hauled out of the water, but the magnet had been partially destroyed. DE LEMOS had brought the message to the two parties that if ice conditions grew more difficult, they were to go northward within a line Antarctics Havn—Drømmebugten. Immediately after the arrival of

the police boat to Ella Ø the seaplane started towards Eskimonæs with THORV. SØRENSEN as passenger and thence continued to Sandodden to fetch the trapper PHILBERT and the fox-skins of the Hochstetter station. At 5 p.m. the ship left Ella Ø and went into Kempes Fjord to fetch WEGMANN's party at the head of Dicksons Fjord. In the first days of the month this party had gone into the fjord by motorboat to ascend some of the nunataks on the inland ice south of Petermanns Bjerg. I had been very anxious about the fate of this party owing to the continuous fog and bad weather, and since a strong westerly wind was now blowing, I decided to fetch them by ship instead of by motorboat, as originally planned, so, if we did not find the party, a search by the seaplane might at once be started.

Aug. 20th.—At 3 a.m. we reached WEGMANN's camp at the head of Dicksons Fjord. WEGMANN had returned from the mountains three hours before. He had been much troubled by fog and wind, and had been unable to penetrate so far inland as planned, but still had secured good results. The ship then returned to Ella Ø, arriving there at noon. In the afternoon the crew shifted coal. The westerly wind abated somewhat in the course of the afternoon. In the evening I flew to Canning Land, to gain an idea of the ice conditions; a visit was paid to NOE-NYGAARD's party, and then the seaplane continued to the head of Nathorsts Fjord, where a short stay was made at EKLUND's camp. The wireless communication with NOE-NYGAARD's party had been unsatisfactory all summer, because it was difficult to keep the wireless station dry in the small Faroe boat. Moreover the piston rod of the motorboat had become broken, and it was therefore agreed that EKLUND should go to NOE-NYGAARD's camp in his motorboat, in which, as stated above, the magnet had been damaged. A reliable motor for the other boat was then to be made of the best parts of the two motors. In view of the ice conditions the stay must not last more than two or three days, the two parties were to leave by noon of August 22nd and go in the boat to a point west of a line Drømmebugten—Antarctics Havn, where they were to arrive by noon of August 25th, at the latest, and await the arrival of the ship there. Large ice masses were found in Fleming Fjord somewhat less ice in Nathorsts Fjord, and some ice was present in Davy Sund. Fairly large stretches of land water were observed along the east coast of Traill Ø and Geographical Society Ø, and between the latter and Bontekoe Ø, no doubt owing to the westerly wind which blew out of Kejser Franz Josephs Fjord. But several large ice fields lay northeast of Canning Land, which, if a north wind sprang up, might in a few hours be carried shorewards and completely bar the way for the two parties. Much drift-ice was observed in the northeast. Towards Murray Ø there was open water along the shore, so if the ice conditions did not change,

the ship would be able to sail out of Davy Sund and some distance southward along the coast of Liverpool Land. It was calm and fine weather in Kong Oscars Fjord, but foehn clouds were gathering to the south and especially to the north. On our return to the ship, which took place so late that it was difficult to land owing to the darkness, OVERBYE and I discussed the possibilities of carrying provisions by seaplane to Hvalrosodden; we agreed, however, that this would require far more settled weather conditions, and that it was impossible as long as foehn winds blew in several places.

Aug. 21st.—Haze and westerly wind. The ship took in ballast. We had now had connection with all the parties except the horse camp and SÄVE-SÖDERBERGH's party, which was to go by motorboat from the interior of Moskusoksefjord out through Kejser Franz Josephs Fjord and Sofia Sund to Ella Ø, where, according to the plan, it was to arrive in the evening of August 24th. In the evening SEIDENFADEN flew to the horse camp, but the whole party was at work in the mountains. He continued then along the coast to Kap Franklin and onwards to Kap Graah, along the north coast of Ymers Ø to the westernmost point that was to be visited by SÄVE-SÖDERBERGH's party, but no trace of it was seen.

Aug. 22nd.—Fine weather at Ella Ø, but westerly, locally very strong, winds with haze and clouds blew in several places. The ship continued taking in ballast. In the evening I flew to the horse camp and found the party in camp. They were all right. On August 14th SÄVE-SÖDERBERGH had left them in order to cross Kejser Franz Josephs Fjord to Ymers Ø. They had had some trouble with the magnet, which it was difficult to keep dry owing to the humid weather. I then flew to the north coast of Ymers Ø to look for SÄVE-SÖDERBERGH's party. The plane flew at a low height over Kap Graah, where the depot, as far as we could see, was intact. Thence we continued to Kap Wijkander and onwards through Sofia Sund, the route which SÄVE-SÖDERBERGH was to follow, but saw nobody. In the evening WEGMANN's party went to Aakerbloms Ø for geological investigations until the arrival of the ship.

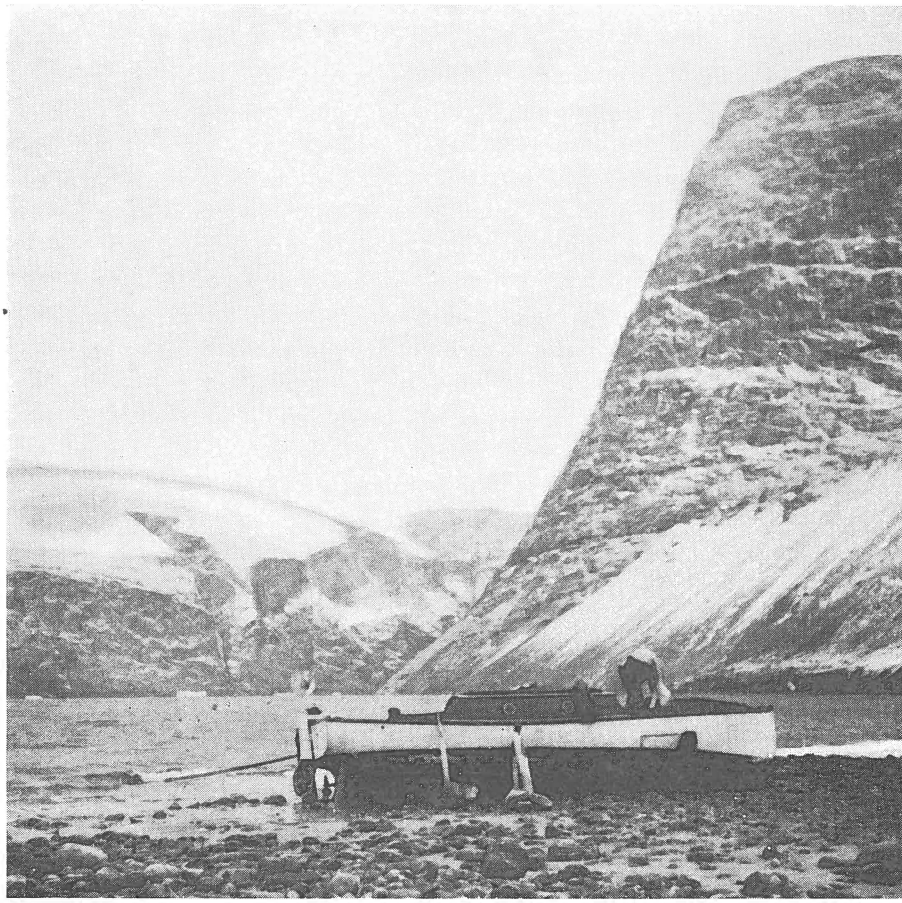
Aug. 23rd.—In the morning strong westerly winds with foehn clouds, in the afternoon increasing cloud-covering and easterly winds. The work at the Ella Ø station and the trimming of the ballast was finished, and at 10 p.m. the ship went through Antarctics Sund to the horse camp to take this camp on board on August 24th, as agreed upon.

Aug. 24th.—In the forenoon a strong easterly wind blew in Kejser Franz Josephs Fjord, it was cloudy with rain in the south and south-west. The ship arrived at the horse camp in Paralleldal at noon. A float was made of the life-boats, on which the five ponies were carried on board to be taken to Ella Ø, where large supplies of hay and fodder were still in store. Four boat-loads of goods were taken on board from

the camp. At 4 p.m. the ship continued into the mouth of Moskusoksefjord to find a start place for the seaplane, as it was impossible for it to start in Kejser Franz Josephs Fjord owing to the heavy sea. The day before LEO HANSEN had sent word that it was desirable that a sick man should go home with the ship. He had himself taken him by motorboat from Hochstetter to Sandodden. At 7 p.m. a place suitable for starting the seaplane was found in the outer part of Moskusoksefjord, and with SEIDENFADEN as observer a search flight for SÄVE-SÖDERBERGH's party was made through the whole of Moskusoksefjord. The plane flew at a low height under the low clouds, partly in snow, to the head of the fjord, but the party was not observed. For the last few days, after his route having been searched by seaplane, we had been hoping that for some reason or other he had gone into Moskusoksefjord and had had a motorstop there. Now this hope, too, failed, and actually we knew nothing about the fate of the party. There was, however, a possibility that the party might have arrived at Ella Ø by another route than that agreed upon. The ship remained in Moskusoksefjord during the night to fill its fresh water tanks.

Aug. 25th.—At 5 a.m. the ship started southward. Off Kap Ovibos the weather cleared somewhat. From LEO HANSEN we had received an urgent request to fetch the sick man at Sandodden; he was stated to be almost insane, so the trappers dared not let him remain in Greenland during the winter. Under these circumstances the pilot thought it justifiable, in spite of the low clouds, to venture a flight to Sandodden. At 2 p.m. the plane returned with the sick man, and the ship continued towards Ella Ø. The clouds were low, with occasional snowfall; the snow on the mountains almost reached the surface of the sea.

Aug. 26th.—In the course of the night it cleared. At 2 a.m. the ship anchored off Ella Ø. The ponies and their fodder were carried ashore, and the last goods from the station were taken on board. Unfortunately only BÜTLER's and MALMQVIST's parties had arrived, but not SÄVE-SÖDERBERGH's party. As the party was only provided with summer outfit and provisions until September 1st, I decided that the route of the party should be searched once more by the seaplane before a search was made by the ship. Since the depot at Kap Graah which SÄVE-SÖDERBERGH, according to the plan, was to utilise had last been visited by KAMMAN, he went by the seaplane as observer to search once more Sofia Sund, examine whether the depot was intact, search the whole of Duséns Fjord and the north side of Ymers Ø, and, if this search was unsuccessful, search the north side of Kejser Franz Josephs Fjord. At 4.30 a.m. the seaplane was lowered and took off. Shortly after it reported over the wireless that the plane had landed at Kap Graah and that the depot was untouched. Later they reported that on the north coast of



1934

Fig. 83. Stranded motorboat in the late summer.

Ymers Ø, farther westward than counted upon during the first search, they hap observed the motorboat of the missing party on the shore; a cairn built of cases was found on the shore, but neither tent nor men were visible. Owing to a heavy sea it was impossible for the plane to land. After their return the three men in the seaplane claimed that the boat had not been washed ashore, and the cairn likewise showed that the party must have gone ashore there. It was at once decided to go by the ship to the place to search for the party. As it was desirable that the ship should not have to return to Ella Ø, Ib Poulsen, who was to be in charge of the police service at the Ella Ø station during the winter, was fetched by seaplane from Aakerbloms Ø, and at 11.20 a.m. the ship left Ella Ø for good. The wind blew hard from the west out through Antarctics Sund, and there was a strong current against us. It was clear, but cold, and the mountains were entirely covered with snow in

several places right down to the water's edge. We sailed closely along the coast of Ymers Ø, for possibly the party might have walked over land to this coast to be as near Ella Ø as possible.

Aug. 27th.—About midnight we passed Teufelsschloss, and shortly after reached the place where the boat had been seen. However, owing to the darkness it was impossible to detect it, so the ship had to remain in the neighbourhood with the engines reduced to slow speed, awaiting the daybreak. At 4 a.m. the seaplane started to search the place, and it soon found the boat. The ship headed towards the coast, a motorboat was sent to the shore and there found a note stating that owing to a leakage of the boat the party had been compelled to go ashore there, and subsequently an onshore wind had crushed the bottom of the boat. The party had then moved about 15 km farther eastward, where good working conditions were found. While the boat and other equipment were taken on board, the seaplane continued along the coast and soon found the camp. At 7.30 a.m. the seaplane was hoisted, and the ship headed towards the camping site. At 9.25 the party bad arrived safely on board, and the ship went southward.

From Kejser Franz Josephs Fjord to Scoresby Sund.

Aug. 28th.—Westerly wind, clear and cold. In the course of the day the ship went southward through Antarctics Sund and into Kong Oscars Fjord. In the evening it was blowing up from the north, it grew cloudy and in the night there came some snow. At midnight we were near Aakerbloms Ø, but owing to the darkness and the many skerries we dared not approach the island. The ship kept the engines going reduced to dead slow, and the electric "sun" was placed in the rigging, and at 2 a.m. a shot was heard from the shore. Shortly after a motorboat with WEGMANN's party arrived, at 2.30 a.m. the party had boarded the ship, the boat was moored astern, and the ship continued southward. However, the north wind was increasing in force, and at 6 a.m. the ship had to turn owing to wind, snow, and large ice floes. Owing to the heavy sea and strong wind, the motorboat was hoisted. The wind had increased to force 9, and the air was thick with snow. At noon the wind abated somewhat, but the thick weather continued. The visibility was about 500 m. At 3 p.m. it cleared at the north side of Mesters Vig, and at 4 p.m. the ship anchored there to await better weather.

Aug. 29th.—The wind moderated in the course of the night, but the rain and snow continued. In the morning the large motorboat was carried to the boat deck and exchanged for the life-boat. At 1 p.m. the weather improved. The wind still blew from the north, force 3—4, and it was difficult to see the land. However, at 1 p.m. the ship started south-

ward, heading for Antarctics Havn, to look for EKLUND's and NOE-NYGAARD's parties. Both parties were sighted at 3.30 p.m. a little west of Kap Syenit. The camps were covered by snow, and a fairly broad belt of pack-ice lay along the shore, rendering it difficult to go ashore and impossible to launch the two motorboats on the shore. As the motorboat of the ship had suffered very much during the transport of the heavy float with horses and ballast, it was not considered safe to use it in the heavy sea and surf along the coast, so the jolly-boat was lowered to fetch the first goods of the parties. However, as the sea grew heavier, it was decided to use one of the unsinkable life-boats for fetching the remainder of the goods, as it was feared that the jolly-boat should be filled with water when the sea washed over it. The two motorboats were hauled farther up the shore and turned with the bottoms upward, and at 5.30 p.m. both parties with all their goods and collections came on board, the life-boat and the jolly-boat were hoisted, and the ship again went northward to seek shelter in Mesters Vig, since increasing darkness, wind, and snow made it impossible to navigate in the ice-filled sea. At 8.30 p.m. the anchor was cast. The rain and snow continued all night, but the wind ceased.

It will be seen from the above that owing to our difficulties in finding SÄVE-SÖDERBERGH's party we had been so much delayed that our departure from Ella Ø which, as in the previous years, was planned to take place on August 25th, could not take place that day. EKLUND's and NOE-NYGAARD's parties informed us that if this had been possible, we might have passed out through Davy Sund and some way southward along Liverpool Land before the gale commenced in the night of August 28th, packing the ice in Davy Sund. The two parties were taken on board at the very last moment, for as soon as the wind began to decrease, the close-packed ice in Davy Sund spread northward far into Kong Oscars Fjord. However, in spite of all difficulties, all the parties which had been at work north of Scoresby Sund were now on board.

Aug. 30th.—At 4.35 a.m. the ship weighed anchor and left Mesters Vig, going southward along the coast through a good deal of lightly packed ice. Near Kap Biot the ice was close-packed right in to the shore. We followed the ice edge towards Kap Simpson, but it was impossible to pass through the ice, which lay close-packed from Kap Biot towards Drømmebugten. The gale of the last two days had filled Davy Sund with pack-ice, which was drifting northward up Kong Oscars Fjord. We had no choice, the ship had to go northward and out through Sofia Sund and try to get out at the mouth of Kejser Franz Josephs Fjord. At noon the ship started northward. The ice was drifting rapidly into Kong Oscars Fjord and northward along the south coast of Traill Ø.

At 1.50 the ship was clear of the ice and headed northward at full speed. Near Haslums Øer we had to pass a broad belt of pack-ice with large ice floes between. This belt of ice extended across the fjord to Kap Peterséns, and Segelsällskapets Fjord was barred by pack-ice.

Aug. 31st.—By midnight we turned into Sofia Sund. In the afternoon it had grown calm and clear. At 4 a.m. we reached Robertsons Ø. As it was light enough for an ice reconnaissance, the seaplane was lowered and with myself as observer made a flight to Kap Mackenzie, returning via Brochs Øer. It was immediately evident that the ship was in a difficult position, for the ice had made its way far into Kejser Franz Josephs Fjord to near Kap Weber. The mouth of Duséns Fjord was barred by ice. From Kap Wijkander to Kap Franklin and onwards to Kap Broer Ruys the ice was close-packed with no water between the floes, which lay close to the shore. The ice also packed towards the northernmost one of Brochs Øer, while there was open water between the southernmost islands. The plane flew at a low height across the islands for, if possible, to detect a passage for the ship among these islands, which have always been il-famed among navigators. In 1930 the "Godthaab" nearly struck a skerry at the surface of the water, and no ship ever ventured in between these islands, which are made up of basalt dykes continuing below the surface of the water.

The weather was calm and clear, so we thought it possible to find a passage in spite of the many skerries; at any rate it was our only chance. From the air we had sighted large spaces of open water east of Geographical Society Ø, though farther out the ice was close-packed.

The seaplane was hoisted at 5.30 a.m., and at 7 a.m. the ship passed Robertsons Ø. Slightly east of this island the ship had to make a difficult passage, sailing among large floes on the one side and a very shallow delta on the other side. However, this difficult stretch was luckily passed, and for the rest of the forenoon we were sailing in very shallow water, 11—26 m deep, among the islands and skerries. The ice conditions had grown worse in the course of the forenoon, a number of large ice floes that had stranded at the outer skerries were now drifting rapidly in between the islands. Shortly after noon we had passed the islands and in the afternoon approached the pack-ice belt. From the crow's nest close-packed ice was sighted eastward; to the south the ice was more scattered, but was apparently growing more close-packed. At 4.30 p.m., therefore, another air reconnaissance was made. The ice-belt a little north of the ship was seen to be narrow, but so close-packed that it would be impossible to penetrate it. However, to the south the ice was at first scattered, but then grew more close-packed again, but following the edge of the close-packed belt, the ship might reach a lead

of open water extending between the close-packed belt and a close-packed ice mass around Franklins Ø. The seaplane was hoisted at 5.30 p.m., and the ship continued southward following the directions given from the seaplane.

Sept. 1st.—The weather continued clear and calm. At 2 a.m. the ship encountered close-packed ice, so we awaited the daybreak in order to make an ice reconnaissance from the air. The seaplane started at 4.30 a.m. Already at a height of 600 m we discovered that the ship lay at the southern end of a long and very close-packed belt of ice, which extended from Kap Broer Ruys to Kap Simpson. Carlsberg Fjord, Nathorsts Fjord, Fleming Fjord, Davy Sund, and the whole outer part of Kong Oscars Fjord northward to Haslums Øer were closely packed with ice, water was nowhere visible between the floes. From a little south of the place where the ship lay a blind lead extended towards Murray Ø. The result of our observations was that the ship was to go almost due east to get free of the ice. The seaplane was hoisted at 4.50 a.m., and we sailed among more or less scattered floes. The swell grew more heavy, and the floes increased in thickness. At 9.30 we were free of the ice and sailed southwards along the coast in a heavy easterly swell. The wind blew from the north-northeast, increasing in the morning to force 3, in the evening to force 6—8. In the evening it rained, and at 9 p.m. the ship had to be close-hauled owing to increasing darkness, wind, and sea.

Fetching of BACKLUND's party and voyage out of Scoresby Sund.

Sept. 2nd.—In the night it was blowing from the north and northeast, force 6—8. There was a very heavy northeasterly and southeasterly swell, which was very disagreeable. In the forenoon the wind suddenly ceased, and the ship headed towards the ice edge, which, off Kap Hodgson, lay about 10 miles from the shore. By noon the ship was near Kap Tobin, where it was stopped by a narrow, but unfortunately close-packed, belt of ice; but from the bridge open water was sighted inside the ice belt, and the wireless of Scoresbysund reported that not very much ice was found in the interior of the fjord. However, owing to the heavy swell coming from two directions it was impossible to penetrate the ice, so the ship sailed southward to find a lead by which to pass. But the ice belt grew broader as we approached Kap Brewster, so the ship headed northward again towards Kap Swainson, and in the evening went a little seawards. It rained most of the day. In the afternoon the northeast wind had increased and blew all night.

Sept. 3rd.—In the early morning the ship turned and sailed towards the ice edge. It was almost calm. Evidently large ice masses drifted

southward, and at 8 a.m. the ship was jammed in the ice. Open water was still visible beyond the ice belt, but the ice was so close-packed that it was impossible for the ship to move. By taking bearings to the houses at Kap Tobin, which were distinctly seen in the telescope, it was ascertained that the ship was drifting rapidly with the ice into the fjord. In the course of the day the ship made several attempts to labour in the ice, but in vain.

Sept. 4th.—Squalls of rain in the night. The drifting of the ice continued, and at 6 a.m. a northerly gale set in rather suddenly, blowing at times with the force of a hurricane. The ship was now so near Kap Hope that all details around the houses could be seen with the unaided eye. But the hurricane still blew out of Hurry Fjord, and for about an hour in the forenoon it seemed as if the ship should get free of the ice and drift into the open water at the mouth of Hurry Fjord; however, the gale blew with such a violence that it was impossible for the ship to get on against it. The ship was jammed in the ice all the afternoon, drifting towards the interior of the fjord.

Sept. 5th.—In the night the gale again blew with the force of a hurricane, with heavy rains over the land. In the forenoon the gale decreased somewhat, and by noon it was almost calm. The ship had evidently drifted westward, but at the same time southward past Kap Stewart. In the afternoon it was blowing up again from the north, force 4, and the rain continued. The Scoresbysund radio reported open water off the colony and swell in the harbour. The ice packed closely around the ship all night.

Sept. 6th.—Continuous rain, but decreasing wind, and by noon it was calm. Scoresbysund radio reported close-packed ice in the harbour. No scattering of the ice could be observed. The ship attempted to labour in the ice, but without success. The ice apparently carried us in a north-northeasterly direction, that is to say, nearer to Jameson Land.

Sept. 7th.—In the morning calm and sunny, but the land was concealed by haze. The ice packed very closely. However, by noon the ice began to move, but no scattering was observed. The Scoresbysund radio reported scattered ice in the harbour, but no swell. In the evening the s.s. "Njal" reported that it had got free of the ice in the neighbourhood of Kap Brewster. The ice along the shore began to scatter, and there was a strong seaward current, but the ice still packed closely around the ship.

Sept. 8th.—Shortly after midnight the ice floes began to move, but it was impossible to get on. The dense fog persisted all day except late in the evening. The ice still moved, but did not scatter very much. However, in the evening the ship moved a little. A sounding in the afternoon showed that the ship approached the shore, and at last it

was only one mile from the flat shore. In the evening it cleared. The ice grew more scattered, and the ship proceeded somewhat in different directions. Later in the evening it cleared so much that we could determine our position, which was c. 3 miles west-southwest of Kap Stewart. The ship reached a small space of open water in the direction of the cape and made some headway in fairly scattered ice. Hurry Fjord was apparently free of ice, but just west of the cape, a few ship's lengths from the open water, we had to give up every attempt at reaching it, for the ice floes which barred our way had stranded in water only 6 m deep. The ship then went westward, and at 10.30 was again jammed in the ice. Apparently the ice and the ship drifted rapidly eastward.

Sept. 9th.—In the morning it was blowing up from the north, and by noon the force of the wind had increased to 6. In the course of the night the outer part of Hurry Fjord had again been filled with ice, but in the early morning it grew scattered near Kap Stewart. The ship headed towards this scattered ice, and at 6.10 reached such a large stretch of open water that the seaplane could start in order to rescue BACKLUND's party. After a short flight it turned out that the wireless of the seaplane had got into disorder during the heavy rains of the last few days and could not be repaired. The seaplane was therefore hoisted again, and the ship headed towards Kap Hope, where the increasing north wind scattered the ice, and cast anchor at 8 a.m. a short distance west of the houses. At 10 a.m. the seaplane started again to test its wireless, but the generator had definitively broken down. The seaplane was hoisted again and the ship anchored nearer the shore, where both anchors were dropped, for the force of the wind was now 6. The Greenlander who was to pass the winter at Scoresbysund was set ashore with his goods and dogs. Four Greenlanders were sent to the colony for the mail, and ROSENKRANTZ came on board, but his collections had to be left at the colony. The seaplane reported that the whole inner part of the fjord to some distance beyond Kap Hooker and to near Kap Stevenson was filled with ice; only off Kap Swainson was there scattered ice. — In the afternoon the north wind calmed down. At 5.30 p.m. the seaplane started towards Kap Leslie, where BACKLUND's party was supposed to stay. For the last few days it had been extremely difficult to get into wireless communication with the party, the wireless in the motorboat having suffered from the humidity of the weather. While the seaplane, which, as stated above, had no wireless, was on its way to Kap Leslie, a communication was established with BACKLUND's party, which informed us that they were staying on Jameson Land east of Kap Hooker. Shortly afterwards they reported that the seaplane had landed near the motorboat, which, however, owing to the

ice floes, was not observed by the men in the seaplane, so the plane started presently back to the ship. However, we now knew the position of the motorboat, and on the return of the seaplane it was provided with an emergency transmitter for use during forced landings; it likewise carried petrol, kerosene, provisions, and spare batteries for the wireless. The plane returned to the ship at 8 p.m. with BACKLUND and WENK on board and was hoisted. At 10 p.m. the ice was drifting into the fjord.

Sept. 10th.—The strong ice-drift continued all night, and the ship was more or less surrounded by ice. At 10 a.m. the ship moved to another place suitable for the take-off of the seaplane. BACKLUND's motorboat was still sailing towards Kap Stewart. In the forenoon the seaplane fetched VIDAR BACKLUND and some of the most important equipment and instruments of the party. Two men were now left in the boat; they were instructed not to enter the ice, but only to proceed so far that it would be possible for the seaplane to land near the boat. About noon I made an air reconnaissance to the mouth of the fjord and thence towards Kap Stewart. It seemed that the ship might go southward, though with some difficulty, to a large iceberg, south of which a lead with nearly open water extended towards the ice barrier off Kap Brewster.

Shortly after noon a consultation was held on the bridge, in which participated the Captain, the pilot, Professor BACKLUND, and KOCH. BACKLUND was of opinion that the motorboat would reach Kap Hope in the course of the afternoon, it might then be hauled ashore there, and the goods and cargo might be secured. Much spoke in favour of this solution, i. a. the circumstance that at any rate half of the collections secured in the course of summer were found in the motorboat. OVERBYE, the pilot, likewise held the view that the motorboat might reach Kap Hope in the afternoon, and the captain agreed to await the arrival of the boat, even at the risk that the ship might be jammed in the ice as in the previous night. But the three gentlemen left it to me to make the final decision. I argued that a low pressure was approaching from the south, that under the present ice conditions the ship might pass through the ice in the course of the night if the two men in the motorboat were fetched at once, and that it was so late in the year that we run the risk of being compelled to remain in Greenland for the winter if we were to experience one more gale in Scoresby Sund. Moreover Rosenvinges Bugt was barred by ice, the ship could not remain at Kap Hope, and gales and ice-drift might force the ship to pass the winter in a place which it did not choose itself. The members of the expedition were not equipped with a view to a wintering, so winter equipment would have to be fetched from Ella Ø and Eskimonæs. I therefore decided that the seaplane should start at once to the motor boat, the

collections should be deposited on the shore, the boat be moored in a lagoon, and the two men return in the seaplane, after which the ship should at once start out of the fjord. — I made this decision because I was more pessimistic about the ice conditions for the motorboat than Prof. BACKLUND and Mr. OVERBYE. During the reconnaissance at noon I found that the boat would have to pass two river deltas before reaching Kap Stewart, both of which would cause great difficulties. The boat would likewise encounter difficulties off Kap Stewart, and finally a belt of ice, which it would be difficult for the motorboat to pass, extended between the ship and the open water in Hurry Fjord.

Immediately after our consultation a wireless message was sent to the men in the motorboat, the collections were deposited ashore and the boat moored in a lagoon, the two men returned in the seaplane, and at 5 p.m. the ship definitely left the coast. In the meantime the ice conditions had altered somewhat, it took more time than expected to find the open lead, but otherwise the ice conditions turned out to be as observed on our reconnaissance at noon. In the evening we reached the open ice. During the passage I was myself in the crow's nest. At 10 p.m. we had got through the ice and encountered a heavy northeasterly swell. The ship went northeastward along the close-packed ice edge without being troubled by the few scattered ice floes.

Sept. 11th.—At 1.30 a.m. we passed the last scattered drift ice floes. It was calm in the night, but in the morning it was blowing up from the northeast. About noon the wind increased to force 5, in the afternoon to force 9, blowing from the ENE. At the same time there was a heavy swell from the ESE. At 8.30 p.m. the ship hove to, owing to wind, rain, and darkness.

In the evening of September 11th the weather bureaus forecasted strong northeasterly winds, and on September 12th the radio of Scoresbysund reported that the fjord was again filled with close-packed ice. The gale which on September 13th broke down the bridge of the "Gustav Holm", made Scoresby Sund entirely free of ice.

Sept. 12th.—In the course of the night the wind increased to force 10, persisting all day and the succeeding night.

Sept. 13th.—At 1.30 a.m. the wind, which had been blowing from the east, increased to force 11, with heavy squalls, and the vessel shipped a large quantity of water, which entirely destroyed the fore part of the bridge and caused other damage to the fore deck. The lashings of the police boat burst, and the boat was thrown on to the deck and damaged. The wind decreased somewhat in the course of the day.

Sept. 14th.—In the early morning the first lights in Iceland were sighted. The ship arrived at Reykjavik at 7.30 a.m. on September 16th, left again on September 20th, and arrived at Copenhagen on October 1st.

Summary of the summer expedition 1934.

The expedition numbered 65 members.

The s.s. "Gustav Holm" got through the ice belt off Scoresby Sund in the course of six days, stayed 38 days near the coast, and passed the ice belt on the outward voyage in one day. Ten days were spent in Scoresby Sund waiting for the geologist party at work in the interior of the sound.

The summer of 1934 was the last summer of the expedition, and this naturally influenced work. Thus all the scientists were to return home, and the two stations Eskimonæs and Ella Ø were in the future to serve as police stations, two Danes and two Greenlanders staying at each station. However, the botanist TH. SØRENSEN was to pass the winter at Eskimonæs, and he therefore continued his botanical investigations during the summer with good results. A great many investigations had been finished the previous summer. Thus the archæologists and the botanists completed their work in 1933; TH. SØRENSEN was to study fresh problems during the winter. One zoologist and two cartographers had spent the winter in East Greenland, but were now ready to return home. Thus the work of the expedition during the summer mainly comprised geological investigations, which were to be completed by intensive work.

The expedition had at its disposal one seaplane, which was chiefly to make ice reconnaissances and be at the service of the geologists.

1) Practical geology.—BACKLUND with four assistants and a motorboat fitted with a wireless station made a practic-geological reconnoitring of the interior of Scoresby Sund, independently of the ship.

MALMQVIST with two assistants made special practic-geological investigations in several areas of eruptive rocks around Kejser Franz Josephs Fjord.

EKLUND with one assistant had spent the winter in East Greenland and now continued his collecting and analyses of minerals southward to Liverpool Land.

2) Collecting of vertebrates.—SÄVE-SÖDERBERGH with two assistants and a motorboat continued his measurements of Devonian profiles on either side of the outer part of Kejser Franz Josephs Fjord and in Moskusoksefjord.

JARVIK with five assistants and five ponies made collections in Paralleldal, where localities rich in fossils had been discovered the previous year.

Other geologie work.—WEGMANN with two assistants, in continuation of his petrographic-techtonical investigations in Kempes Fjord

in the previous years, made an ascent of the inland ice and an investigation of the nunataks around Goodenoughs Land.

BÜTLER with two assistants and a motorboat continued his stratigraphic-techtonical investigations of the Devonian, especially in Moskusoksefjord and Sofia Sund.

NOE-NYGAARD with two assistants and a motorboat continued his geological investigations around Canning Land.

As will be evident from the above, the eight geologist parties were conducted by scientists who had gained experience regarding the travelling conditions in East Greenland during their work in previous years.

After the programme for the summer had been worked out, I was informed that a large cargo for the trapping company Nanok, consisting chiefly of timber, was to be transported to East Greenland in the expedition ship, and that it was desired that the ship should call at all its stations as far northward as Danmarks Havn. As pointed out to the Administration of Greenland before the departure of the expedition, these two tasks did not harmonise. However, the reports received from East Greenland about the weather and ice conditions were fairly optimistic, and I had counted upon that if the ice conditions were just as favourable as the previous years, the two parties led by MALMQVIST and NOE-NYGAARD, respectively, might make a practic-geological investigation in the areas around Bessels Fjord and Dove Bugt to complete the reconnaissance work there.

In May, June, and the first part of July the weather was very calm, but on July 23rd there was a sudden change of the weather (cf. the reports of the Danish Meteorological Institute). This change consisted mainly in a stronger cyclonic activity around the Faroes and northeastern Iceland, which resulted in high easterly winds north of Iceland, that is to say, near the ice edge. The air pressure in Northeast Greenland was fairly high at the end of July and in August, the weather being altogether calm there till the last days of August. However, the continuous strong easterly wind that blew outside the ice belt gave rise to much fog and a considerable rainfall in Greenland during the summer; this is best illustrated by the fact that not even on one single day was it possible to photograph from the air. Moreover large quantities of ice were present, and the ice was much heavier than in the four previous years. No actual land water formed along the coast.

Owing to the bad weather and the ice the work of the expedition was much impeded and the whole northern part of the programme had to be altered. The calling at the stations of the trapping company Nanok was especially hindered by the bad weather. Owing to the humid weather it was extremely difficult to maintain a wireless communication with the parties; even the wireless of the seaplane was destroyed by

the humidity of the air. The personnel on board the ship, where weather maps were prepared every day, was aware of the serious situation; some hours' gale might render it impossible for the ship to reach several of the parties; the leaders of the parties, however, who had experienced a number of good summers in East Greenland, held a more optimistic view.

The expedition had ten motorboats at its disposal during the summer, four of which were lost. In addition, there were eight wireless stations, but several of these were unreliable owing to the bad weather.

Remarks on the plan of navigation.

A plan for the navigation was made every summer. This required negotiations with the leaders of the different parties as well as with the wintering personnel (over the wireless). When the first draft was made, negotiations were carried out with the captains of the ships, for the cargoes had to be arranged according to the plan of navigation. However, at the meeting of the committee of the expedition before the departure of the expedition I always pointed out that if the ice conditions were unfavourable, the ship might spend the greater part of the summer in the pack ice belt or, if worse came to the worst, it might not reach the coast at all. In view of this possibility a sailing plan had, of course, always to be accepted with the greatest reservation. The summer of 1934 is an example of a summer in which the ice and weather conditions interfered greatly with the plans made beforehand, though they did not entirely upset them. The sailings planned for 1934 before the departure from Copenhagen, and as they came to be, will be tabulated below:

Provisional plan for the sailings of s.s. "Gustav Holm".

	Planned Dates	Dates of the voyage
Departure from Copenhagen	July 5	July 5
Arrival at Akureyri	— 13	— 13
Departure from Akureyri	— 14	— 15
Arrival at Scoresbysund	— 18	— 24
Laying out of depots in interior of Scoresby Sund	— 19—20	— 25—26
Departure from Scoresbysund	— 21	— 27
Arrival at Kap Humboldt, where the WEGMANN party is to be fetched by the "Imara" (Ella Ø motorboat)	— 24	

	Planned Dates	Dates of the voyage
Landing of JARVIK party in Gauss Halvø	— 24	Aug. 2
Work in Moskusoksefjord	— 24—26	— 2—6
Establishm. of depots for WEGMANN in Kjerulffs Fjord, MALMQVIST leaving for Vega Sund	Aug. 27	
Arrival at Ella Ø	— 28	Aug. 1
Departure from Ella Ø	— 31	— 1
Goods for Knudshoved deposited on Jackson Ø	Aug. 1	— 9
Arrival at Eskimonæs	— 2	— 9
Departure from Eskimonæs	— 5	— 12
Trapper's goods unloaded at Sandodden.	— 6—8	— 13—15

The reconnaissance from the air showed that Davy Sund was passable, so the ship spent three days here at the end of July which, according to the plan, she was to spend here at the end of August. She then proceeded up Kong Oscars Fjord to Ella Ø, whence WEGMANN's party was transported by a motorboat into Kempes Fjord, not by ship, as planned. The ship landed the horse camp under JARVIK on Gauss Halvø and then proceeded to Moskusoksefjord, and onwards to Eskimonæs and Sandodden, where it was decided (middle of August) not to go north of this place. Two plans for the sailings north of this place were available, according to one of them the ship was to sail directly from Sandodden to Danmarks Havn, according to the other she was first to visit Hochstetter. The two plans were as follows:

	Planned Dates		Dates of the voyage
Arrival Danmarks Havn.	Aug. 11	Arrival Hochstetter	Aug. 10
Depart. Danmarks Havn	— 14	Arrival Danmarks Havn.	— 13
Arrival Hochstetter	— 17	Northw. from Danmarks Havn	— 15
Geology northern Wollaston Forland	— 19	(Provided that it would be possible to sail in land water northw. from Danmarks Havn).	
Return to Eskimonæs ..	— 21		
Departure from Eskimonæs	— 22		

	Planned dates	Dates ot the voyage
Embarking of the JARVIK party from Gauss Halvø	Aug. 23	Aug. 24
Arrival at Ella Ø	— 25	— 17—27[1])
Stay Wegeners Halvø	— 27—29	July 29—31
Visit Scoresbysund	— 31	
Off Scoresby Sund		Sept. 2
Beset in the ice		— 3—8
Free of the ice		— 10
Stay at Reykjavik		— 16—20
Arrival at Copenhagen		— 30

[1]) Including two voyages up Kejser Franz Josephs Fjord.

THE TWO-YEAR EXPEDITION 1936–38

THE EXPEDITION 1936

Personnel.

	Lauge Koch, leader.
	Aa. Gilberg, surgeon.
	S. Kamman, in charge of the equipment.
s.s. "Gustav Holm".	H. L. Rosfeldt, captain.
	T. M. Jørgensen, first mate.
	R. Bang-Christensen, second mate.
	R. E. Nielsen, first engineer.
	E. C. A. Persson, second engineer.
	Aa. H. B. Juul, wireless operator.
	Crew: 15 men.
Vertebrate palæontology.	Devonian party:
	G. Säve.Söderbergh, palæontologist.
	B. Waern, scientific assistant.
	R. Hallik, scientific assistant.
	Bygum Nielsen, assistant.
	Olsson, assistant.
	R. Nielsen, in charge of the ponies.
	V. Frederiksen, in charge of the ponies.
	Permian-Triassic party:
	Eigil Nielsen, palæontologist.
	O. Harder Jensen, assistant.
Stratigraphy and geological mapping.	1st party:
	A. Vischer, geologist.
	W. Maync, geologist.
	2nd party:
	H. Bütler, geologist.
	H. P. Schaub, geologist.
	H. Stauber, geologist.
	3rd party:
	Th. Heinrichson, palæontologist.
	A. Einarsson, assistant.
Personnel at the station Eskimonæs.	N. O. Jensen, wireless operator.
	Th. Gideonsen, Greenlander, dog driver.
	Karl Andersen, Greenlander, dog driver.

Personnel at the station Ella Ø.

LEO CHRISTIANSEN, wireless operator.
A. PHILBERT, assistant.
JAKOB, Greenlander, dog driver.
KONRAD, Greenlander, dog driver.

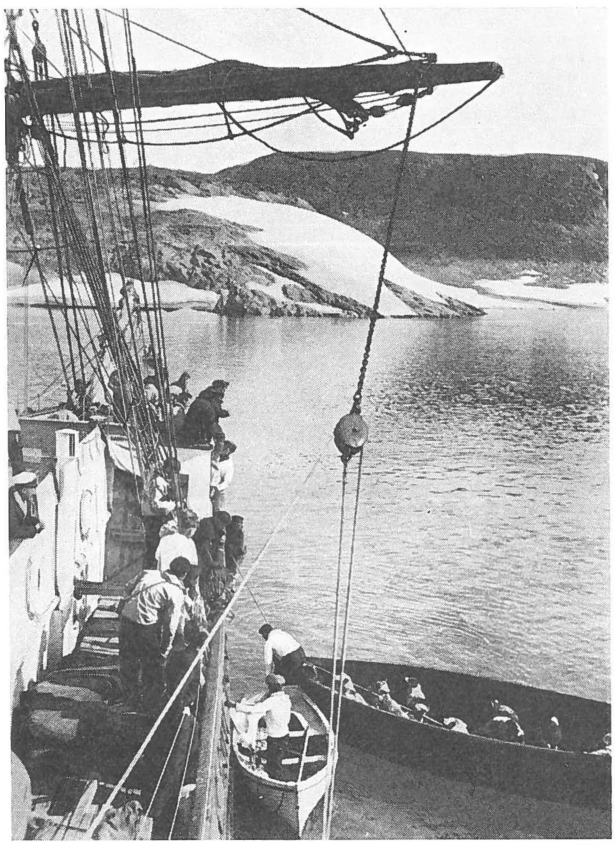


Fig. 84. Taking dogs on board at Scoresbysund. 1936

s. s. "Gustav Holm".
The voyage from Copenhagen via Scoresbysund to Ella Ø.

The "Gustav Holm" left Copenhagen on July 10th, arrived at Akureyri on July 19th, and after having taken coal and some ponies on board, left Akureyri on July 21st.

July 23rd.—Southerly wind of force 3—1, fog, but clear weather in the mouth of the fjord. In the morning the ship sailed into the mouth of the fjord in thick fog, but without meeting any ice. At 8.50 a.m. the fog almost lifted along a line from Kap Brewster to Kap Tobin. Some few washed and scattered floes were seen. Passed Kap Tobin at

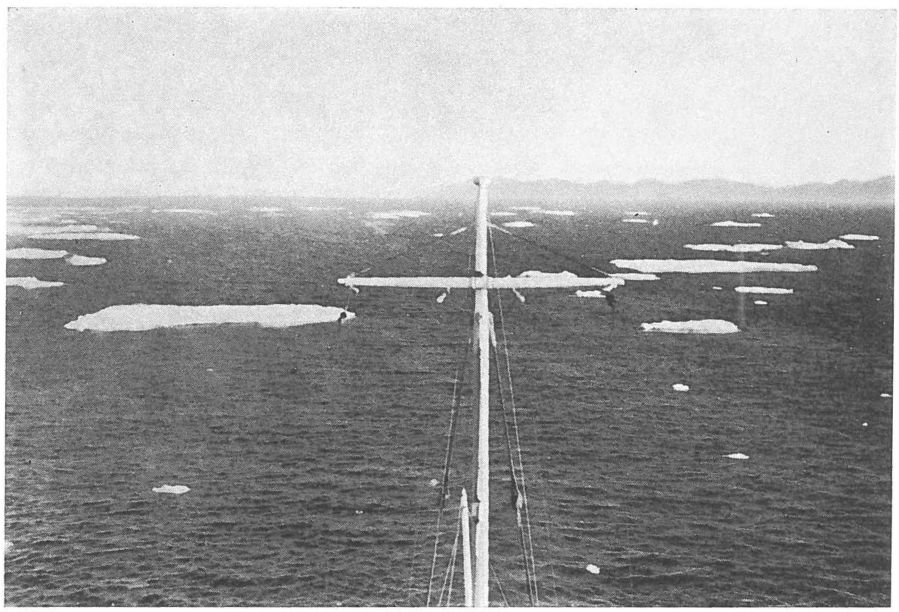


Fig. 85. Open water along Liverpool Land. 1936

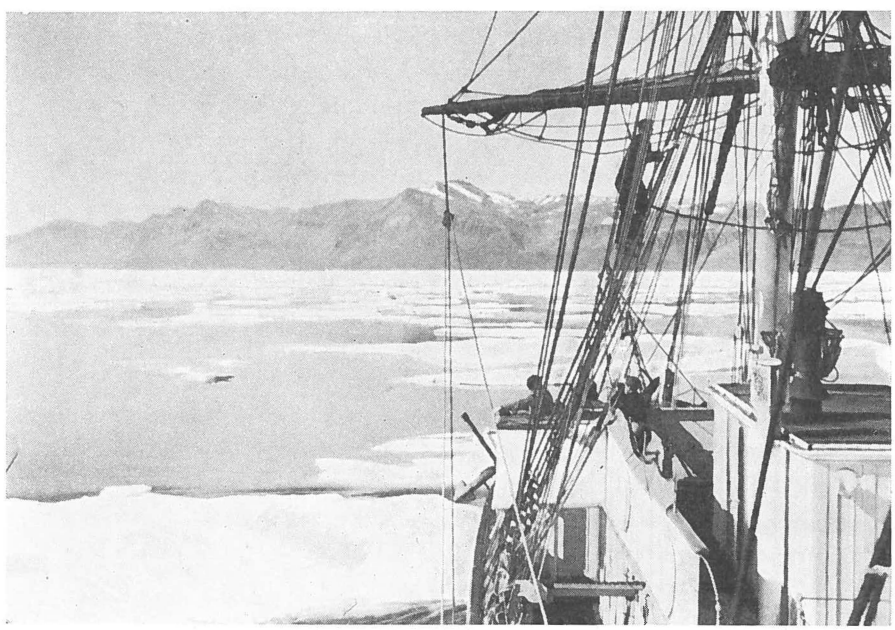


Fig. 86. Melting fjord ice in Davy Sund in July. 1936



Fig. 87. The last remnants of melting fjord ice in southern Kong Oscars Fjord. 1936

10 a.m., and at 10.45 a.m. cast anchor off the colony, where two Greenlanders and 19 dogs were taken on board, after which the ship left the colony at 0.35 p.m. Passed Rathbone Ø at 5.20 p.m. and between this island and Kap Greg passed occasional small much scattered ice floes, which presented no obstacles to navigation. The land water was 5—18 miles broad. The sky was overcast as we sailed along Liverpool Land.

July 24th.—Calm, almost clear, in the evening overcast. At 4 a.m. the ship passed Kap Wardlaw and sailed up through Kong Oscars Fjord, where, west of a line Kap Biot—Drømmebugten, we sailed among large floes of fjord ice, but they presented no great hindrances. Struck open water south of Kongeborgen at 6 p.m.

July 25th.—Calm and cloudy. At 2.30 a.m. the ship cast anchor off Ella Ø. At 6 a.m. the life-boats and the motorboats "Polypen" and "Imara" were lowered. At 9 a.m. EIGIL NIELSEN, VISCHER, MAYNC, and the wireless operator JENSEN as motorman started in the "Imara" towards Kongeborgen to make geological investigations there. At the same time the personnel to be stationed on Ella Ø went ashore with their private goods. Two floats full of provisions and other outfit as well as 64 sacks of coal were landed. At 6.30 p.m. the ship's boats were hoisted, and at 7.15 p.m. the ship started northward with the motorboat "P. 1" in tow. Passed a great many icebergs in Antarctics Sund. Passed Kap Mohn at midnight.



Fig. 88. A motorboat tries to make its way through melting fjord ice. 1936

Voyage from Ella Ø and back.

July 26th.—Calm, fairly clear. Passed Teufelsschloss at 2.40 a.m. An exceptionally great number of icebergs were present in the interior of Kejser Franz Josephs Fjord. At 8.25 a.m. the ship cast anchor off Paralleldal where SÄVE-SÖDERBERGH's party, consisting of SÄVE-SÖDERBERGH, WÄRNN, HALLIK, BYGUM NIELSEN, OLSSON, and the horsemen RICHARD NIELSEN and FREDERIKSEN, with three ponies and ten bales of hay were landed. At noon the ship started again. At 2.15 p.m. one of the motorboats was taken in tow, and at 8.25 p.m. the ship cast anchor at the head of Moskusoksefjord.

July 27th.—Calm, almost clear. In the course of the day BÜTLER's camp consisting of BÜTLER, SCHAUB, STAUBER, and two ponies were set ashore. The motorboat "Buldog" was lowered, and the horse-shed on the deck broken down.

July 28th.—Light easterly wind, slightly overcast. The ship remained at the head of Moskusoksefjord. Five tons of coal were filled into sacks to be delivered to the Nordfjord station, and in the evening the boats were hoisted.

July 29th.—Clear and calm, with local winds in the fjord. The ship started at 6.25 a.m. and anchored at 1.50 p.m. off the Nordfjord station. Five tons of coal and five tons of provisions were unloaded and stowed into the house. The work was finished at 8.50 p.m.

July 30th.—In the morning cloudy, later it cleared, local winds. In the forenoon various repairs were made of the Nordfjord station. By noon the boats were hoisted, and at 1.10 p.m. the ship left the station. Passed Skildvagten by midnight after meeting extraordinarily many icebergs in Antarctics Sund.

July 31st.—Almost clear, local winds, southeasterly wind of force 5. The ship cast anchor off Ella Ø at 1.45 a.m. At 6 a.m. a float was made of the boats, and till 5.50 p.m. four loads of kerosene and provisions were landed and the provisions were carried to the house.

Aug. 1st.—Clear and calm. Sunday, we took the day off.

Aug. 3rd.—Northerly wind of force 1, overcast. From 6 a.m. to 6.20 p.m. the remainder of the coal for the station, altogether four tons, were unloaded and carried to the house. Various goods were unloaded. All the goods for the Ella Ø station had now been unloaded and stowed into the house.

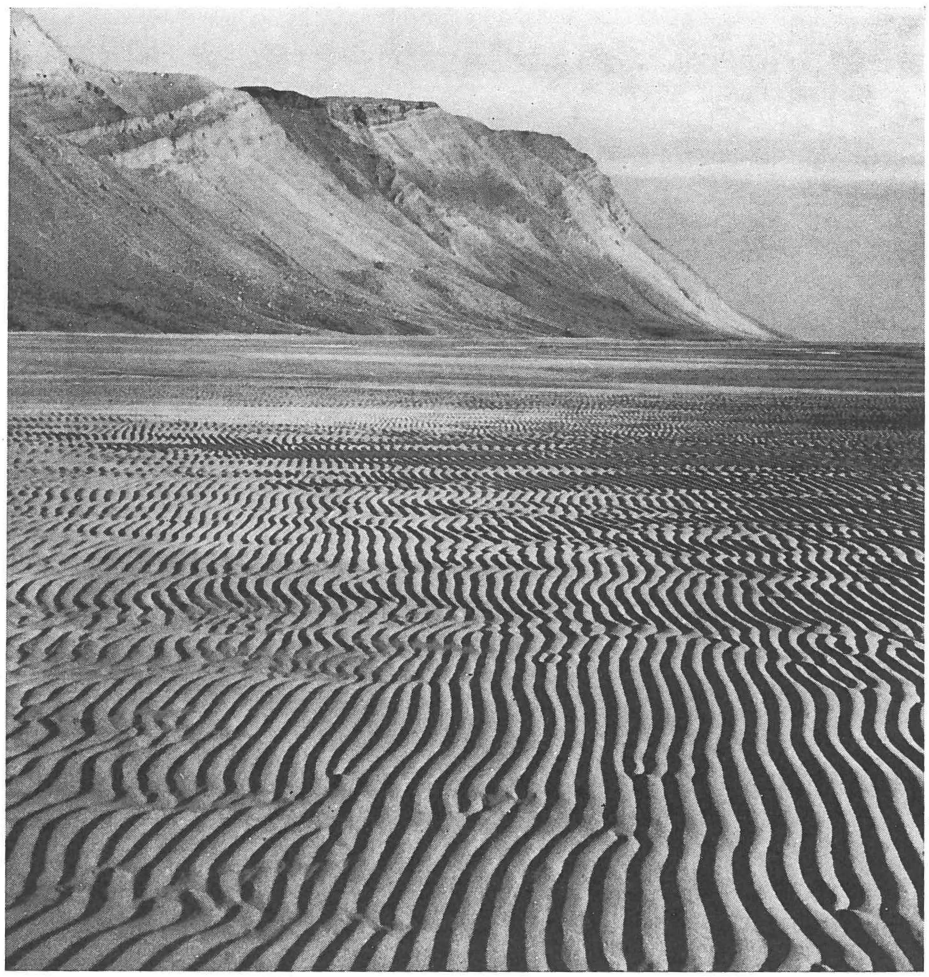
Aug. 4th.—Clear and calm. The ship made ready to start, restowed her cargo, and hoisted the boats.

Aug. 5th.—Clear and calm or with local winds. The ship left Ella Ø at 0.20 a.m., sailing west of the island and stopping in Narhvalsund, where it took in fresh water from a river from 1.45 to 10.45 a.m., when all the tanks were filled. Started then towards Haslums Øer, anchoring there at 6.50 p.m. Here EIGIL NIELSEN's party arrived in the motorboat "Imara". In the evening easterly wind with fog over Haslums Øer.

Aug. 6th.—Southeasterly wind of force 1, overcast. In the evening fog. The ship started at 8.55 a.m. and cast anchor off Ella Ø at 5.15 p.m.

Aug. 7th.—Calm, with banks of fog, in the evening rain. At 7 a.m. the "Buldog" was hoisted and various geologist parties and five dogs came on board. The "Polypen" and the "Imara" were taken in tow, and at 9.45 a.m. the ship left Ella Ø. A great many icebergs were seen everywhere in the fjords. Passed Kap Mohn at 3 p.m. Stopped from 10.30 to 11 p.m. off Paralleldal while a visit was paid to SÄVE-SÖDERBERGH's camp.

Aug. 8th.—Calm, cloudy, with squalls of rain. Passed Kap Graah at 2 a.m. and anchored at the head of Duséns Fjord at 7.35 a.m. Here the "Buldog" was lowered and the other motorboats were made ready



1936

Fig. 89. Recent ripple-marks on Traill Ø.

to start. In the evening several geologist parties were set ashore with motorboats in the interior and middle parts of Duséns Fjord (Hein-Richson and Einarson, Eigil Nielsen, Vischer, Maync, and the Greenlanders). The "Polypen" was hoisted for repairs. Coal were filled in sacks for the Eskimonæs station.

Aug. 9th.—Clear and calm. Took the Sunday off.

Aug. 10th.—Clear and calm. On the ship coal were filled in sacks, and water was fetched from the river at the head of the fjord. The "Imara" was hoisted, and, as it was impossible to hoist the "Polypen", a 400 m wire and a hawser were laid on, and the boat was towed by the ship. In the evening the geologist's camp was fetched.

Aug. 11th.—East-southeasterly wind of force 2. Banks of fog, later

thick fog. In the early morning the "Buldog" was hoisted, and the ship left the head of the fjord at 6.40 a.m. At noon she had to cast anchor near the large Vinterøer owing to thick fog. Some members of the expedition went ashore on the island, and KAMMAN observed a small colony of Sabine gulls. The "Polypen" with HEINRICHSON and assistants started round Kap Wijkander to go to Ella Ø.

Aug. 12th.—Decreasing southeasterly wind and overcast. At 9 a.m. the ship weighed anchor and passed Kap Franklin at 11 a.m. A rather heavy southerly swell was running along the whole outer coast. Passed Jackson Ø at 8.20 p.m. At 11 p.m. a jolly-boat was lowered off Kap Arnakke as four trappers wished to go to Sandodden.

Aug. 13th.—Calm weather, slightly overcast. At 3 a.m. the ship cast anchor in the East Harbour at Eskimonæs. At 6 a.m. the "Imara" and the "Buldog" were lowered to form a float, and from 7.30 a.m. to 6 p.m. provisions for the station were unloaded.

Aug. 14th.—Almost calm, cloudy, and showers of rain. Provisions, coal, and kerosene were unloaded from 6 a.m. to 6 p.m.

Aug. 15th.—East-southeasterly wind of force 2, overcast and squally. A heavy swell was running all day. The unloading was continued from 6 a.m. to 8.10 p.m., when all the goods for the Eskimonæs station had been unloaded.

Aug. 16th.—Calm, fog almost all day. In the forenoon the boats were hoisted, and at 1 p.m. the ship left Eskimonæs with the "Imara" in tow. Near Kap Arnakke the "Imara" started with JENSEN, LEO HANSEN, VISCHER, and MAYNC to Germania Havn. The ship proceeded to Sandodden, and cast anchor there at 6.30 p.m.

Aug. 17th.—Southeasterly wind of force 2, foggy, later it cleared. In the morning a float was made of the boats, and goods for the Sandodden station were unloaded from 7 a.m. to 2 p.m. Subsequently 12 tons of deck cargo for the Hochstetter station were shipped. The large motorboat of the trappers was lowered here, as the motorboat of the Sandodden station, which had been stationed at Germania Havn, did not arrive.

Aug. 18th.—Southeasterly wind of force 1, thick fog. From the early morning till 6 p.m. goods for the Hochstetter station were embarked from Sandodden. In addition thirty dogs were taken on board. Five trappers who were to return home, came on board here.

Aug. 19th.—Northerly wind of force 4, cloudy. The ship started northward from Sandodden at 3.25 a.m. A good deal of washed drift ice floes were encountered on the voyage to Bass Rock, while north of this point occasional smaller floes of fjord ice were met with.

Aug. 20th.—Northerly wind of force 3, cloudy. At 0.25 a.m. the ship cast anchor off the Nanok station at Hochstetters Forland At 6 a.m.

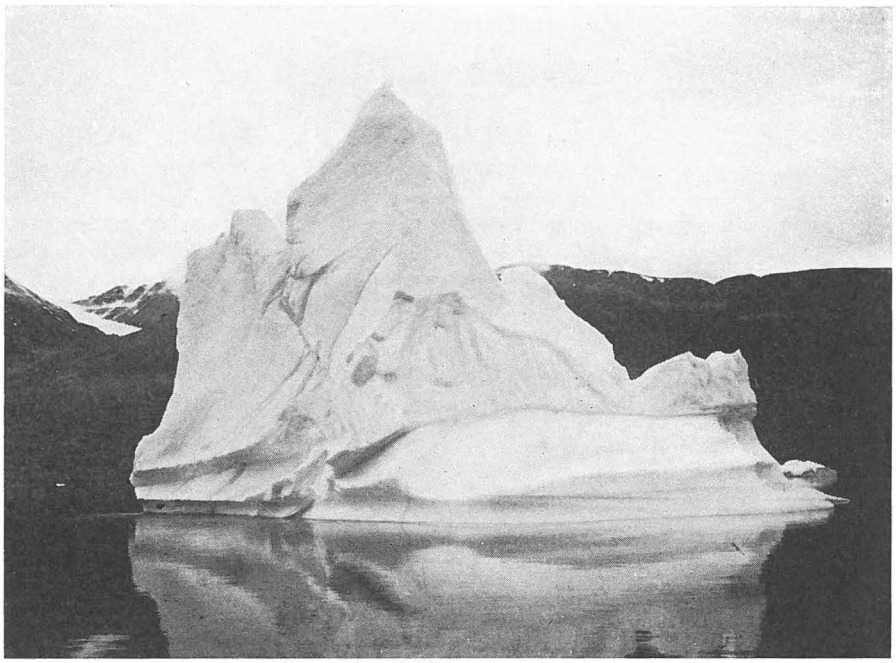


Fig. 90. Iceberg in Kejser Franz Josephs Fjord.

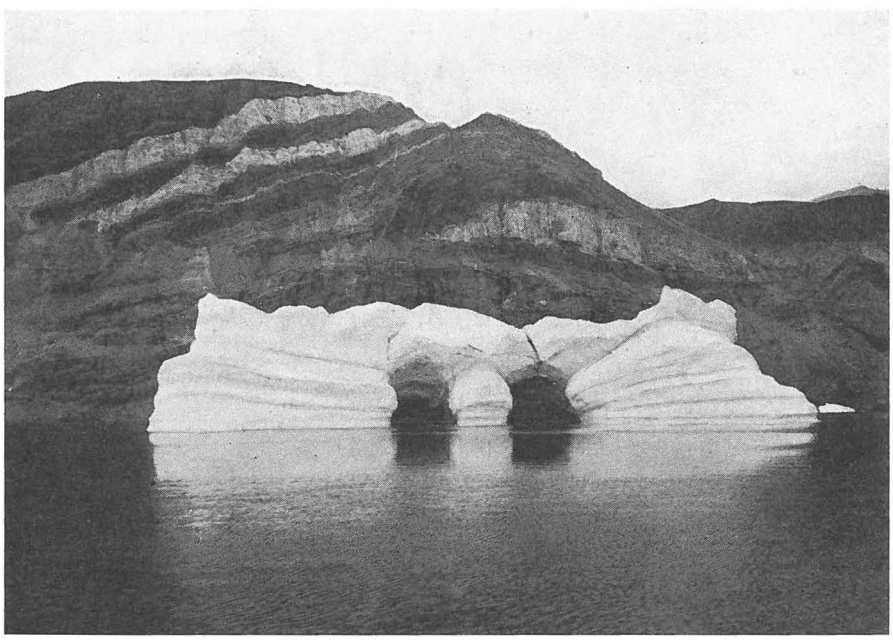


Fig. 91. Iceberg in Kejser Franz Josephs Fjord.



Fig. 92. Summer camp.

the boats were lowered, and goods for the station were unloaded all day. The unloading was much impeded by a strong wind and a heavy swell. In the afternoon a belt of ice drifted into the fjord, which moderated the swell in some degree. At noon the "Imara" with VISCHER and MAYNC arrived unexpectedly from Germania Havn. The unloading was suspended at 9.35 p.m.

Aug. 21st.—Calm, overcast. The unloading was continued from 6 a.m. to 8.45 p.m. KAMMAN paid a visit to the station at Kulhus. In the afternoon the "Imara" started towards Eskimonæs.

Aug. 22nd.—Calm, but overcast. The unloading was continued from 6 a.m. to 9.35 p.m. Two dog teams were taken on board in the evening.

Aug. 23rd.—Calm and foggy, in the evening it cleared. Owing to the fog the ship could not start from the trappers station till 10.45 a.m. Passed Bass Rock at 3 p.m.

Aug. 24th.—Calm and cloudy. Stopped from 2 to 3 a.m. off Sandodden, where various goods and some dogs were set ashore, and at 8.45 a.m. the ship cast anchor off Eskimonæs. In the course of the day four boats full of goods from the station and four barrels of kerosene were shipped.

Aug. 25th.—Calm, with local winds, overcast. In the morning the "Buldog" was hoisted, and at 9 a.m. the ship started southward from Eskimonæs.

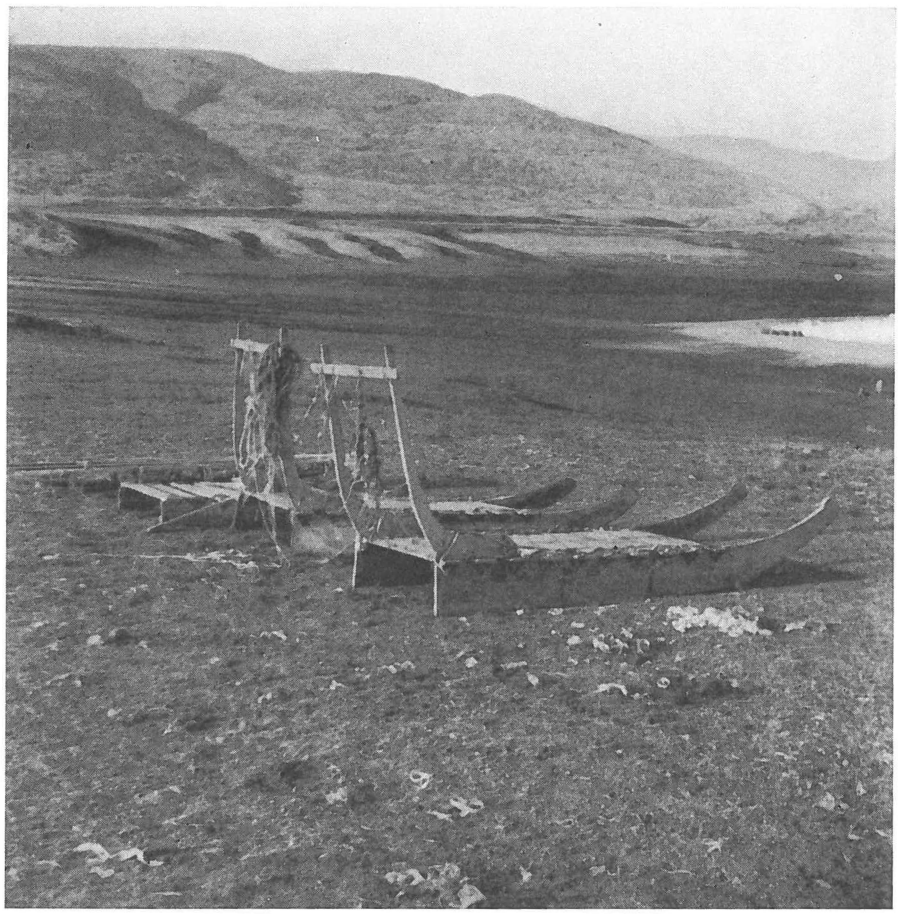


Fig. 93. Sledges at Eskimonæs in summer.

Aug. 26th.—Northwesterly wind of force 3, cloudy. At 3.45 a.m. the ship cast anchor off Paralleldal. At 6 a.m. a float was made of the boats, and SÄVE-SÖDERBERGH's camp, consisting of seven men, three ponies, and 52 cases with fossils and other goods, was taken on board, though with some difficulty owing to the heavy swell. The work was finished at 10.15 a.m., when the ship sailed into Moskusoksefjord with the float in tow, and at 4.40 met BÜTLER's party, whose outfit and collections were taken on board off Hoelsbo, and the motorboat "P.1" was taken in tow. At 7 p.m. the ship cast anchor at the south side of the fjord to take in water.

Aug. 27th.—Calm, but local winds, slightly overcast. The ship took in fresh water from a river all night. Started at 8.40 a.m., and at 9.30 a.m. cast anchor three miles west of Hoelsbo, where BÜTLER's party was taken on board, viz. three men and two ponies. Subsequently the boats were hoisted, and the ship left the place.

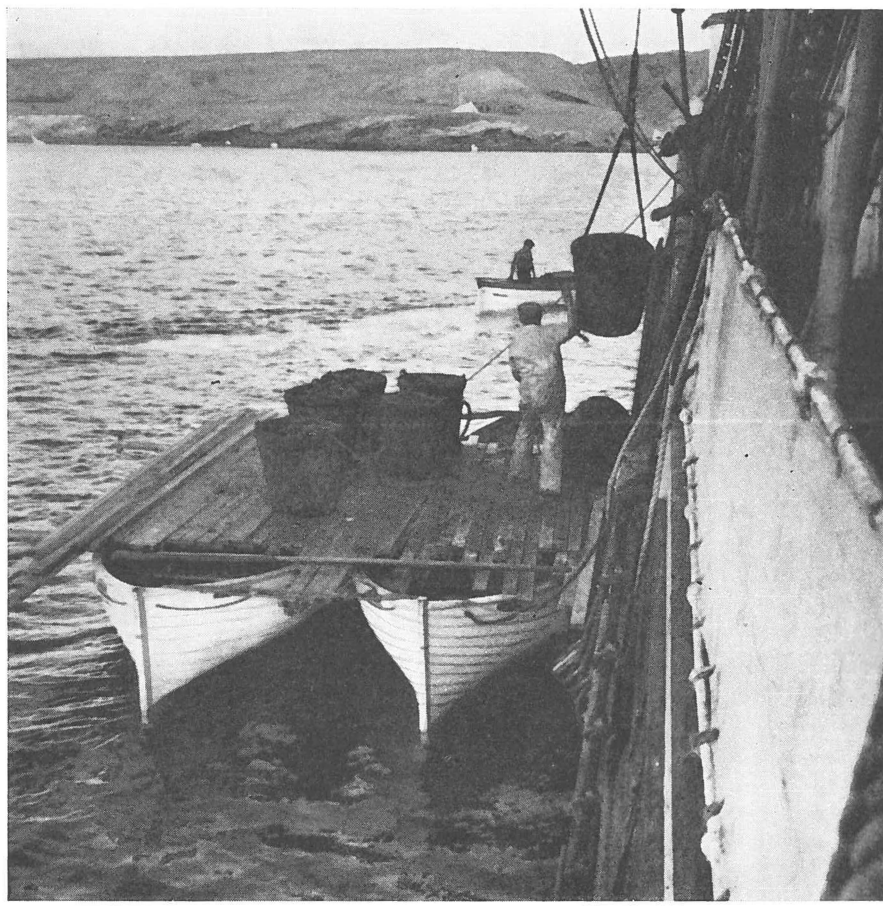


Fig. 94. Taking-in ballast for the homeward voyage.

Aug. 28th.—Calm, slightly overcast. The ship cast anchor off Ella Ø at 0.30 a.m. At 6 a.m. the motorboats "Buldog" and "P.1" were lowered, a float mas made, and as the ship, owing to the limited sailings and favourable ice conditions that summer, was able to deliver 10 tons extra coal to the Ella Ø station and 9 barrels of kerosene of her spare supply, these were unloaded until 8.15 p.m. In the forenoon the "Polypen" and the "Buldog" with eleven men and equipped with radio started for Davy Sund.

Aug. 29th.—Clear and calm, later overcast. From 6 a.m. to 3 p.m. coal were shifted from the hold to the bunkers. In the afternoon empty barrels were shipped as ballast.

Aug. 30th.—Light local wind, slightly overcast. In the course of the day 58 barrels filled with water, and in addition 7 tons of gravel were taken in as ballast.

Aug. 31st.—Northwesterly wind of force 4, clear. In the night an iceberg drifted into the harbour, and the ship had to change its anchorage. The heavy swell prevented the taking in of ballast. The cargo was re-stowed.

Sept. 1st.—Northwesterly wind of force 4, clear. The barometer was very high and was constantly rising. There was a heavy swell in the harbour, so it was impossible to take in ballast. The cargo was re-stowed.

Sept. 2nd.—Westerly wind of force 4—2, gradually cloudy. In the afternoon 40 tons of ballast were taken in, though with difficulty.

Sept. 3rd.—Westerly wind of force 5—1, clear. Seven tons of ballast and various goods were taken in. A wireless message was received from Eskimonæs, stating that owing to negligence the "Imara" had drifted out of the harbour and had probably been lost. As enough ballast had been taken in, all the boats were hoisted.

Homeward voyage.

Sept. 4th.—In the forenoon northwesterly wind of force 3, later clear and calm. At 6.15 p.m. the ship started from Ella Ø up through Sofia Sund, passing Kap Humboldt at 11.40 a.m. and Arundel Ø at 11.45 p.m.

Sept. 5th.—In the forenoon clear, in the afternoon cloudy and calm. At 6.45 a.m. the ship cast anchor off Eskimonæs, and delivered the "Buldog" to the station. The land was entirely covered with snow right down to the shore. The ship left Eskimonæs at 7.30 a.m., passed Arundel Ø at 11.20 a.m. and sailed southward along the outer coast.

Sept. 6th.—Calm and cloudy. The house at Kap Brown was visited from 6.45 to 8.05 a.m., and a barrel of kerosene was deposited there. At 11.25 a.m. the ship anchored behind Depotø. At 9 p.m. the last camping parties arrived on board, and at 10.45 p.m. the "Polypen" started via Drømmebugten to Ella Ø.

Sept. 7th.—Southeasterly wind of force 2, cloudy. Started from Depotø at 6.15 a.m. There was a high southerly swell. Passed Murray Ø at 4 p.m. and headed towards Akureyri. No ice was met with.

The "Gustav Holm" arrived at Akureyri on September 10th, left again on September 12th, and arrived at Copenhagen on September 22nd.

Summary of the summer expedition 1936.

The expedition numbered 47 members.

The s.s. "Gustav Holm" met no ice either on her upward or on her return voyage. The ship stayed in East Greenland for 47 days.

This summer a two-year expedition for the solution of purely geological problems was started. The two stations, Ella Ø and Eskimo-

næs, were repaired to serve as wintering quarters for the scientists. The Ella Ø station was in a good condition, whereas the Eskimonæs station needed more thorough repairs.

According to the request of the government, no practic-geological investigations were to be made.

The stations were equipped with first-class motorboats and large dog teams, several assistants were to be at the disposal of the scientists during the winter, and a number of depots were laid out in the course of the summer to serve during the work in the autumn and spring. The Geodetic Institute had kindly supplied the expedition with proofs of the not yet published detailed topographical maps of the area from 72° to 76° N. lat.

The main object of the expedition was a mapping of the post-Caledonian sediments in the area 71—75° N. lat. However, so many problems had arisen during the working up of the vertebrates collected on the Three-Year Expedition that it was desirable that collections should be made in 1936 also.

According to the programme the new personnel should not begin the geological mapping till about September 1st; during the summer they were trained as far as possible in travelling in East Greenland, guided by experienced men.

The following parties were at work during the summer:

G. SÄVE-SÖDERBERGH with four assistants, and two men in charge of the ponies, made collections of vertebrate fossils in the very rich locality in Paralleldal, in continuation of the work done in 1931—34.

In the autumn EIGIL NIELSEN with one assistant collected Triassic fishes along the coast between Kap Stosch and Finsch Øer.

BÜTLER, assisted by STAUBER and SCHAUB, and with two ponies made a carefully planned trip up the valleys north of Moskusoksefjord to continue his geological mapping of the Devonian commenced on the Three-Year Expedition. A motorboat with personnel was at the disposal of this party in Moskusoksefjord.

EIGIL NIELSEN, accompanied by VISCHER and MAYNC, made a voyage in motorboat to Kongeborgen for stratigraphical investigations of the Devonian and Carboniferous, and subsequently the party made a three days' investigation of the Devonian beds north of Duséns Fjord. Later in the summer VISCHER and MAYNC, who were to spend the winter in East Greenland, made a motorboat trip from Eskimonæs via Germania Havn to Hochstetters Forland and back to Eskimonæs to lay out depots.

HEINRICHSON, with one assistant, on July 25th started his palæontological collecting work in the early Palæozoic on Ella Ø. Later on he made a three days' investigation of the interior of Duséns Fjord and a subsequent motorboat trip from Kap Graah to Ella Ø.

The voyage was exceptionally favoured by the circumstance that hardly any ice was met with along the east coast of Greenland, which had never happened before. The expedition left Akureyri on July 21st, reached Scoresbysund on July 23rd, and arrived at Ella Ø two days later. All the summer parties commenced their work at the end of July and thus had a working period of one month. In addition BÜTLER and SÄVE-SÖDERBERGH had a ten days' stay in Nathorsts Fjord under especially favourable weather conditions.

By the purchase of several dogs at Scoresbysund and some few dogs from the hunting company Nanok, the much reduced stock of dogs was increased.

The expedition had seven motorboats at its disposal, one of which did not function satisfactorily and another was lost owing to negligence. The work was impeded to some extent by a heavy swell even far up the fjords. Bears were numerous, especially in the southern part of the working area; a great many of the depots were destroyed by bears in the course of the autumn. The work was not very much impeded by the weather, though on many days the sky was overcast and there was some wind; there were likewise rather heavy rainfalls during the summer. It was planned beforehand that the ship was not to go north of Hochstetters Forland, but it might doubtless have been possible to push as far northward as Nordostrundingen without being hindered by ice. Calling at the stations of the hunting company Nanok caused no great trouble, the quantities of goods for the stations being rather small.

Altogether there was no mishap of any kind during the summer, the planned work was carried out and even additional tasks were carried out with good results thanks to the favourable conditions for navigation.

Wintering Parties 1936—37.

Eskimonæs.

A. VISCHER, geologist.
W. MAYNC, geologist.
EIGIL NIELSEN, palæontologist.
O. HARDER JENSEN, assistant.
N. O. JENSEN, wireless operator.
TH. GIDEONSEN, Greenlander, dog driver.
KARL ANDERSEN, Greenlander, dog driver.

Ella Ø.

H. STAUBER, geologist.
H. P. SCHAUB, geologist.
TH. HEINRICHSON, palæontologist.
A. PHILBERT, assistant.
RICHARD NIELSEN, assistant.
JAKOB, Greenlander, dog driver.
KONRAD, Greenlander, dog driver.

THE EXPEDITION 1937

Personnel.

Lauge Koch, leader.
Aa. Gilberg, surgeon.
Aa. de Lemos, in charge of the equipment.
Ib Poulsen, in charge of the equipment.

s.s. "Gustav Holm". H. L. Rosfeldt, captain.
T. M. Jørgensen, first mate.
R. Bang-Christensen, second mate.
R. E. Nielsen, first engineer.
N. C. A. Persson, second engineer.
Aa. H. B. Juul, wireless operator.
Crew: 16 men.

Stratigraphy and geological mapping.

1st party:

A. Vischer, geologist.
W. Maync, geologist.
O. Harder Jensen, assistant.

2nd party:

H. Stauber, geologist.
H. P. Schaub, geologist.
A. Philbert, assistant.

3rd party:

Th. Heinrichson, palæontologist.
Richard Nielsen, assistant.

4th party:

W. Bierther, geologist.
Malte Andersson, palæontologist.

5th party:

H. Hübscher, geologist.
Pall Pallson, in charge of the horses.
J. Tvermose, in charge of the horses.

6th party:

A. Riitmann, geologist.
Peter Beyer, wireless operator.

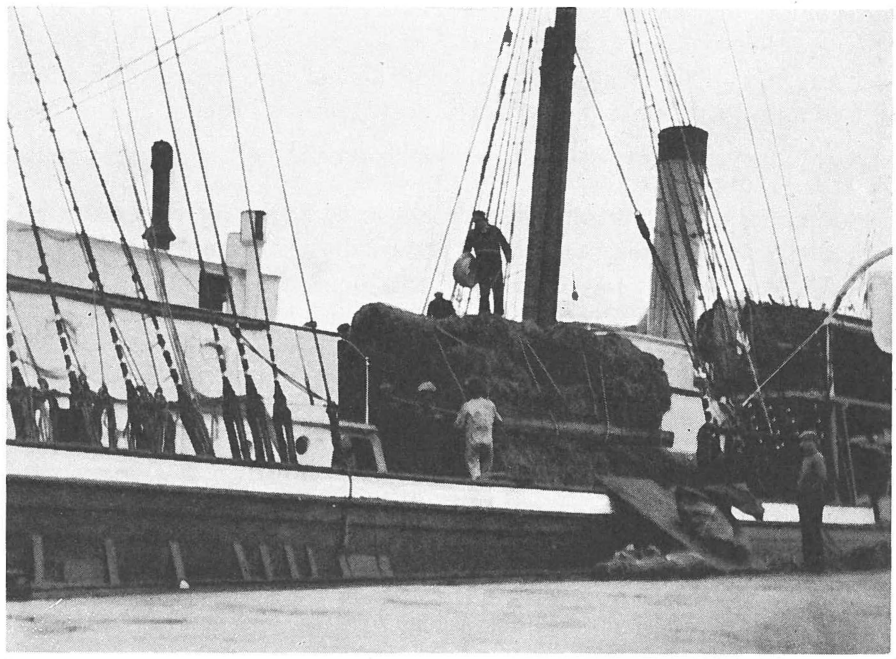


Fig. 95. The "Gustav Holm" taking in hay for the wintering ponies. 1937

7th party:
A. ØPIK, palæontologist.
K. ORVIKU, palæontologist.
S. MIDDELBOE, assistant.

8th party:
K. KLEIBER, geologist.
CARL ANDERSEN, motorman.

Zoology. E. REISINGER, zoologist.
O. STEINBÖCK, zoologist.

Botany. TH. SØRENSEN, botanist.

Archæology. HELGE LARSEN, archæologist.

Introduction.

The "Gustav Holm" left Copenhagen on July 3rd bound for Skjoldungen, carrying a seaplane which was to take air photographs on behalf of the Geodetic Institute along the south-east coast of Greenland.

The ship arrived at Isafjord on August 1st, unloaded the seaplane there, and proceeded on the same day to Akureyri, where she arrived on August 3rd. After a forced work of coaling and taking on board

the ponies for the expedition, she left Akureyri in the evening of August 5th.

Aug. 1st.—The "Gustav Holm" cast anchor in the roads of Isafjord at 1.40 p.m. With some difficulty the seaplane was lowered and moored at a buoy, after which the ship left the harbour at 10 p.m., heading towards Akureyri.

Aug. 3rd.—At 0.40 a.m. the ship anchored in the roads of Akureyri, and alongside the quay at 9 a.m. The loading was immediately commenced. A motorboat for the trappers was hoisted, a shed for the ponies built on the deck, passenger cabins were fitted, and coal shipped.

Aug. 4th.—Southeasterly wind of force 6, overcast. The ship loaded goods for the expedition all day.

From Akureyri to Gurreholm.

Aug. 5th.—Calm and overcast, rain. The loading was continued, i. a. eight Icelandic ponies and 39 cubic tons of hay were shipped. The loading was finished at 6 p.m., when the personnel of the expedition, totalling nine persons, and two trappers went on board. The deck cargo was exceedingly large and every room in the ship was full to the brim. At 7 p.m. the ship left Akureyri northward bound.

Aug. 6th.—Easterly wind, force 3—4, cloudy and foggy. The ship made good headway northward, but the speed was somewhat reduced in the evening, as the wind grew more northerly.

Aug. 7th.—Decreasing northerly wind with rainy haze in the forenoon, later calm and dense fog. At 6 a.m. the ship encountered several washed drift ice floes, and sailed all the forenoon among scattered ice though without being particularly troubled by it. The dead-reckoning showed 69°28′ N. lat., 20°04′ W. long. In the evening the ship entered a space of open water, which ended blindly in a large ice field; this caused a delay of at least one hour. As the fog was very dense, the ship moored at the ice edge at 11.30 p.m.

Aug. 8th.—Northerly wind, increasing in the forenoon to force 6, cloudy. At 2.45 a.m. the ship proceeded northward through scattered drift ice floes. The previous evening a wireless message had been received, stating that the "Quest", Captain SCHJELDERUP, had just passed through Kong Oscars Fjord and Davy Sund, and proceeding southward along Liverpool Land in a very narrow belt of land water quite close to the shore, had reached open water near Kap Greg. The observations showed that the "Gustav Holm" was near Liverpool Land, a little north of Rathbone Ø. In the forenoon the ship sailed in scattered ice among large ice fields and made fairly good headway in spite of the strong northerly winds, which made navigation very difficult. A short distance south of Kap



1937

Fig. 96. Heavy ice outside Scoresby Sund.

Greg the ship met large continuous ice masses, which it was impossible to penetrate, and at 0.45 p.m. she moored at the ice edge with two ice anchors. However, the wind pressed the ice rather closely against the shore, and at 4.40 p.m. the ship had to leave her anchorage at the floe and moored at another floe at 6 p.m.

Aug. 9th.—Decreasing northerly wind, later calm and fairly clear. The compact ice floes drifted constantly southward, and near Rathbone Ø the velocity of the current was more than one mile an hour. The ice field to which the ship had moored constantly approached Rathbone Ø, and when at 2.30 a.m. it was only 0.6 mile from the island, the ice anchors were weighed, and the ship headed towards Kap Hope, where she cast anchor at 7.45 a.m. The situation of the expedition was difficult. From Norwegian vessels we knew that very heavy ice masses were drifting southward along the east coast of Greenland. Owing to the late

season the land water had now closed along Liverpool Land. According to the plan, the new station Gurreholm should be erected in Fleming Fjord, but this was hardly practicable owing to the heavy ice masses occurring along the east coast and the late season. A wireless telegram was therefore sent to the Administration of Greenland proposing that the expedition should go into Scoresby Sund to the mouth of Schucherts Flod and erect Gurreholm there, and after this had been done, try to go to the northern stations, in the hope that the ice conditions might then have improved. In the afternoon a reply was received from the Administration of Greenland to the effect that the proposed alteration of the plans was agreed upon, and at 5.45 p.m. the ship left Kap Hope. However, as it was desirable that the building of the station should be completed as soon as possible, the ship shortly afterwards returned to Kap Hope, where eight Greenlanders were engaged in order that they might assist in the unloading and building of the station. In the evening an attempt was made to penetrate the ice west of Kap Hope, but near Kap Stewart the ice packed so closely that the ship had to turn about and sail around a large ice field that extended far out into the fjord. Subsequently the ship sailed in open water or among scattered ice floes.

Aug. 10th.—Calm and overcast. The outer part of the fjord proved to be full of large drifting ice fields, which we had to get round. Near Kap Hooker the ship attempted to push through a narrow belt of close-packed ice, but it was impossible, and she had to go quite close to the shore of Jameson Land to reach water fairly free of ice. After 4.30 a.m. no more drift ice floes and no winter ice were met with, but there were unusually many icebergs. At noon a motorboat was lowered near the mouth of Schucherts Flod, and a party went ashore to look for a building site for the station. As a fairly suitable site had been found on the west side of Jameson Land, an anchorage for the ship was found by soundings in the neighbourhood, and the ship cast anchor at 0.30 p.m. The unloading of hay, building timber, etc., was immediately begun. The work was continued till 9.30 p.m.

Aug. 11th.—Calm, but overcast. The unloading was continued from 6 a.m. to 10 p.m. Several members of the crew and the Greenlanders were occupied all day in building the house. The motorboat "Kim" was lowered.

Aug. 12th.—Calm and overcast. The unloading was continued from 7 a.m. till 9.30 p.m. The ponies were set ashore, the horse shed on the deck broken down, and the motorboat "Triton" was lowered. Several members of the crew were at work on the house all day.

Aug. 13th.—Northeasterly wind of force 5—3, overcast, in the afternoon rain. No goods were carried ashore owing to the bad weather, the place being much exposed to northeasterly winds. All members of the

crew were ashore to assist in building the house and carrying the provisions and outfit into the house or covering them with tarpaulins or boards. In the course of the day the float got adrift; afterwards it was moored to the ship, which dropped one more anchor.

Aug. 14th.—Calm and overcast, in the evening heavy rain. Building of the house all day from 6 a.m. till 9.30 p.m.

Aug. 15th.—Calm and foggy, drizzling rain, hazy. The house-building was continued from 8.30 a.m. to 8 p.m. The last supplies for the station were carried ashore and up to the house.

Aug. 16th.—In the forenoon calm, later light northwesterly wind and rain. All hands were at work from 6 a.m. till 8 p.m. in building the house and stowing the provisions into it. In the evening the "Kim" was hoisted after fetching several geologist parties.

From Gurreholm to Scoresbysund.

Aug. 17th.—Calm, but overcast and somewhat foggy, in the evening northwest wind of force 4, rain most of the day. In the morning the personnel that was to spend the winter at Gurreholm, went ashore, and at 9.15 a.m. the ship weighed anchor and left the station. The house was now roofed, only the internal fitting remained to be done. Some distance west of Kap Stewart the ship met the pack ice, which was so close that on approaching the cape, the ship had to sail in water only 9 metres deep to get round it. The whole mouth of the fjord and its south side was packed with large unbroken ice fields which it was impossible to penetrate. The wind blew with a force of 6—7 out through Hurry Fjord.

Aug. 18th.—Northerly wind of force 6—5, in the evening calm. Rain all day. At midnight a kayak-man from Kap Hope reported that the ice packed closely against the shore in the whole of Rosenvinges Bugt. At 0.30 a.m. the ship began to drift with both anchors dropped, so she weighed anchor and in a strong north wind, force 5—8, headed towards Fame Øer, where she cast anchor at 6.50.

Aug. 19th.—Calm, in the forenoon rain, later it cleared somewhat. The ship still rode at anchor off Fame Øer. Some of the passengers went ashore on the islands, while the ship took in fresh water.

Aug. 20th.—Continuous fog. In the forenoon the fog lifted somewhat, and at 10.15 a.m. the ship started southward out of Hurry Fjord. The east side of the fjord was filled with ice from Sødal and Gubbedal. The ship proceeded with great difficulty. At 4 p.m. she was outside Hulelv, and at 9.50 p.m. she moored at an ice field.

Aug. 21st.—Calm, in the forenoon fog, later it cleared somewhat. On the east side of Hurry Fjord the ice fields packed against the shore, so it was impossible for the ship to make her way through. Seven Green-



1937

Fig. 97. Pack-ice in Scoresby Sund.

landers from Kap Hope were set ashore in a jolly-boat, in order that they might walk back to the settlement. The ship then went to the west side of the fjord, where she laboured in the ice all the afternoon till 9.20 p.m., but the ice was close-packed, and hardly any progress was made.

Aug. 22nd.—Calm and overcast. In the forenoon two attempts were made to penetrate the ice, but almost without result. In the early afternoon another attempt was made, and some progress was made, but at 5 p.m. the ice packed so closely that the propeller could not work. At 9 p.m. the ice began to scatter, and the ship proceeded some distance, but had to labour hard in the ice. Moored by midnight owing to the darkness and the close-packed ice.

Aug. 23rd.—Light variable winds, rain. At 7 a.m. the ice grew more open, and some progress was made in the forenoon. However, about noon the ship struck very heavy ice, and from 1 to 4 p.m. she



1937

Fig. 98. The manager of Scoresbysund approaching the ship.

was jammed between two large floes. The ice packed hard against the ship, which heeled about 15° to the port side. Notably the rudder was exposed to a very hard pressure, it was forced hard to the port side by the ice floes, which slid in below the stern of the ship, and the figure-head was damaged by the high pressure ridges. By means of ice anchors and the steam winch it was attempted to get the ship free from the ice floes, but it was impossible. At 6 p.m. the ship righted, but did not get free of the ice. It turned out that several thick stays in the interior of the ship had broken owing to the pressure of the ice. At 8.30 p.m. the ship got free of the ice and proceeded towards the colony, but made only little headway, the ice being still close-packed. At 11 p.m. she stopped owing to ice and darkness.

Aug. 24th.—Calm, but subsequently northerly wind increasing rapidly in force, in the afternoon blowing with a force of 8. Overcast,



1937

Fig. 99. Pack-ice in Scoresby Sund.

with squalls of snow and sleet. In the forenoon an attempt was made to get on, but without success. In the afternoon the strong north wind caused some motion in the ice, but for the time being the ship was unable to proceed. She had to go with the engines full speed towards an ice-field. Unfortunately this ice field drifted towards a large stranded berg, and at 3.40 p.m. the ship was very near the berg, but at the very last moment she managed, by ordering full speed to the engine-room, to escape into a space of open water leading towards the colony. At 5 p.m. the ship cast both anchors off the colony of Scoresbysund, and moreover she got mooring ropes ashore.

Aug. 25th.—Northwesterly wind of force 3, overcast. The "Kim" and another boat were lowered, and the motorboat was placed on the boat deck. The ship took in fresh water and made ready to start northward. Started at 8.45 p.m. and headed towards Kap Tobin, but here met the



Fig. 100. Map showing the ice conditions and the route of the "Gustav Holm".

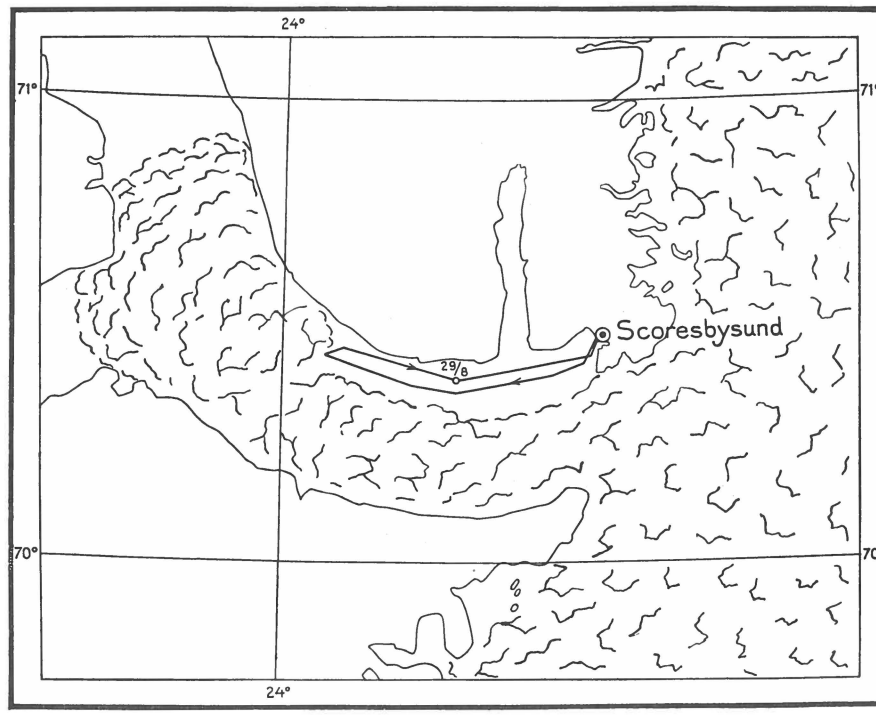


Fig. 101. Map showing the ice conditions and the route of the "Gustav Holm"

pack-ice, which lay very close from Hartz Vig in a southeasterly direction into the fjord, and no opening in this ice belt was visible. At 11.10 p.m. the ship again cast anchor off the colony.

Aug. 26th.—Calm, in the forenoon fog banks and rain, later clear with low-lying fog. A motorboat was sent to Kap Tobin, where the second mate had climbed a mountain to look out for the ice conditions, which were still very bad.

Aug. 27th.—Calm, but overcast. At 3.10 a.m. the ship weighed anchor and entered the ice east of Kap Tobin, trying to reach a space of open water, but the ice was drifting into the fjord, and after riding at anchor for a couple of hours off Kap Tobin, the ship returned and anchored off the colony at 10.10 a.m. A wireless message was sent to the Administration of Greenland reporting that there seemed to be but little possibility of calling at the northern stations.

Aug. 28th.—Calm weather, fog and snow. In the forenoon a reply was received from the Administration of Greenland, with a permission to give up calling at the northern stations. At 2.45 p.m. the ship started towards Gurreholm. As a heavy snowfall set in, which impeded the visibility, the ship moored at an ice field at 8.20 p.m.

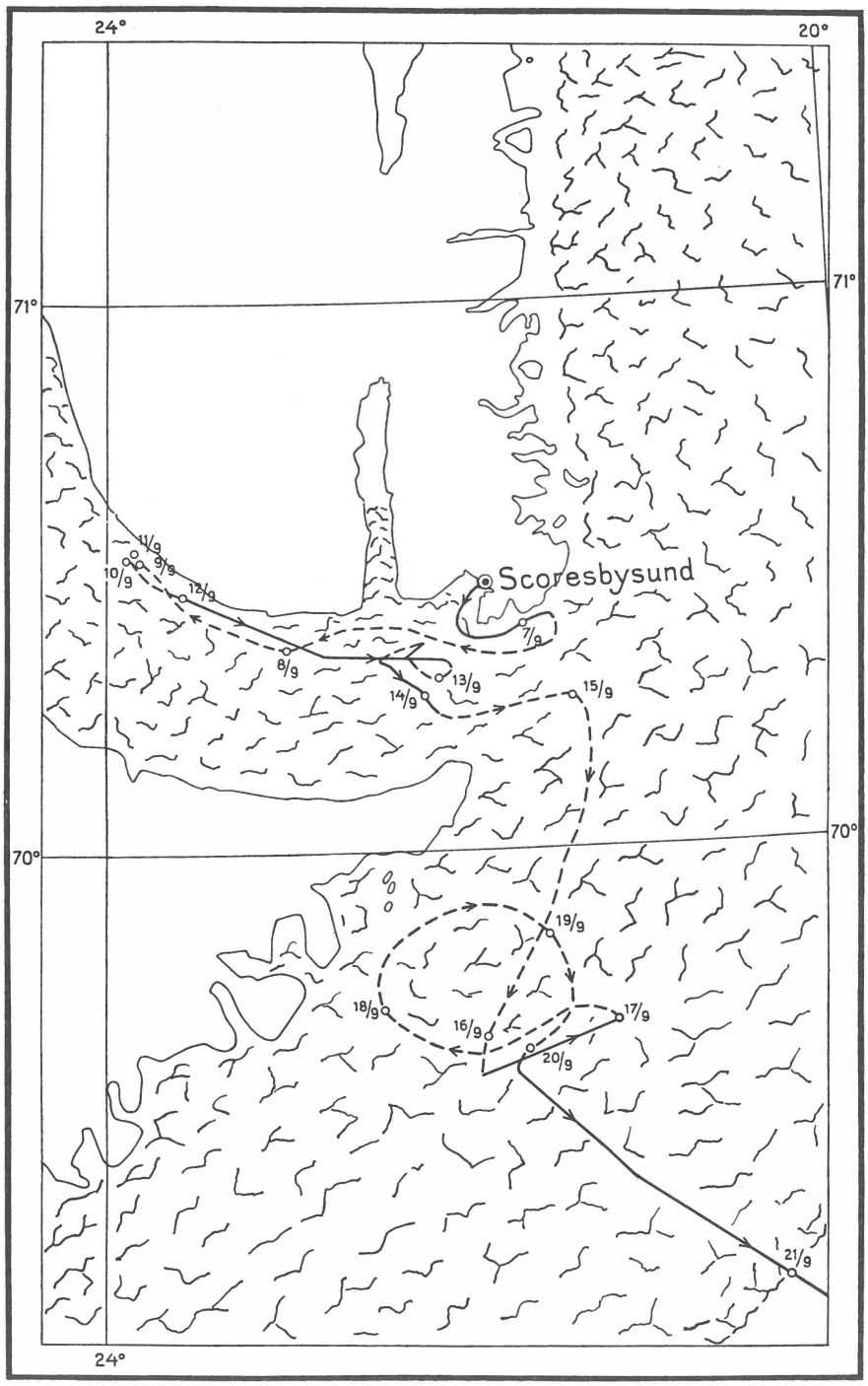


Fig. 102. Map showing the ice conditions and the route of the "Gustav Holm".



Fig. 103. My expedition house at Scoresbysund from 1926—27 is again taken over by the expedition. 1937

Aug. 29th.—Northwesterly wind, increasing to force 3, cloudy, but later clear. At 2 a.m. it was clearing, and in the morning the ship sailed among large and scattered floes, but at 7.20 a.m. met impenetrable ice fields, and at 7.35 a.m. moored at a large field. As it was constantly clearing, an observation from the crow's nest showed that the whole of Hall Bredning between Jameson Land and Milne Land was filled with close-packed large ice fields, and as not the smallest space of open water was observed, all further attempts to reach Gurreholm were regarded as hopeless. It was therefore decided to return to Scoresbysund and unload the cargo there. At 9 a.m. the ship headed towards the colony, sailing in more or less close-packed ice along the coast of Jameson Land. At 3 p.m. she cast both anchors off the colony and moored with two cables to the shore in case the north wind should increase in force. The trapping company Nanok's motorboat, which was now taken over by the expedition, was lowered, and the dogs, too, were set ashore.

Aug. 30th.—Calm and clear, with occasional banks of fog. From 6.30 a.m. to 8.30 p.m. the súpplies for the northern stations Ella Ø and the trapping stations with the exception of the coal were unloaded and stowed in a storehouse ashore.

Aug. 31st.—Calm, slightly overcast, with occasional banks of fog. The unloading was continued, chiefly of the supplies for the Eskimonæs station. Furthermore the unloading of coal was commenced. The pro-



1937

Fig. 104. My expedition house at Scoresbysund.

visions were stored partly in the store-house partly in the expedition house from 1926.

Sept. 1st.—Northerly wind of force 1, cloudy. From 7 a.m. to 6 p.m. coal were unloaded at Ferslews Pynt. In the course of the day the "Gertrud Rask" arrived, and it was decided that she should keep the coal determined for the colony as bunkers, while the "Gustav Holm" was to deliver her coal supply to the colony.

Sept. 2nd.—Light local winds, overcast, some rain. In the evening a heavy swell in the harbour. The ship unloaded coal and re-stowed her bunkers.

Sept. 3rd.—Calm and cloudy, in the evening north-northeasterly wind of force 5. The unloading of the coal was continued from 9 a.m. to 7.30 p.m. Altogether 26.8 tons of coal were delivered to the colony.

Sept. 4th.—Decreasing northeasterly wind, cloudy, but clearing. In the course of the day the ship took in 40 tons of ballast. Various outfit for the wintering party was set ashore.

Sept. 5th.—Light northerly wind, cloudy. In the forenoon it was impossible to take in ballast owing to the ice, which packed closely

around the ship. In the afternoon part of the ice drifted out of the fjord, and about twenty tons of ballast were taken in. The ship also took in fresh water.

Sept. 6th.—Light northerly winds, overcast. The ice constantly packed around the ship, so it was impossible to start. Twice in the course of the day the second mate climbed the mountains to look out for the ice conditions.

From Scoresbysund via Akureyri to Copenhagen.

Sept. 7th.—In the night calm, but in the morning a wind sprang up from the north, blowing with a force of 6, increasing to force 7; at first it blew from the northeast but later from the west. In the forenoon it was thick with snow, later cloudy. At 4 a.m. the ship made ready to start, but owing to the increasing wind the start was postponed. The port moorings were taken on board at 5 a.m., and at 6.30 a.m. the ship started, but it was difficult to proceed owing to the close-packed ice. At 10.45 a.m. we reached Kap Tobin, where the ice was less packed, and then headed northeastward along the ice edge. At 11 a.m. the wind increased, blowing at times with a force of 8, and there was a heavy fall of snow. By noon the ship sailed in an east-northeasterly direction along Liverpool Land, but gradually the wind blew with such a force that it was impossible to navigate the vessel, so she went eastward into the ice through some spaces of open water, but at 2.55 p.m. it was impossible to proceed further. At 4.45 p.m. the wind seemed to decrease, and an attempt was made to proceed, however, without any great success. When it cleared somewhat, some bearings were taken, which showed that the ship had drifted about six miles towards the south-southwest. At 6.45 p.m. the ice was so close-packed that further navigation was given up. Late in the evening the wind turned to the northwest, increasing about midnight to force 7.

Sept. 8th.—In the morning north-northwesterly wind of force 3, later calm, but overcast. In the night and the forenoon the ice drifted rapidly into the fjord, and the ship drifted nine miles in a west-northwesterly direction in eight hours in spite of a strong wind from the west-northwest. In the forenoon the ship tried several times to labour in the ice, but it was too close-packed. From 8 a.m. till noon the ship drifted further six miles into the fjord. The ice consisted of not particularly large floes. Shortly after noon the ship drifted with the floes in between two very large icebergs, which were passed at a distance of 200 and 300 m respectively. Strong eddies with open water were met with between the icebergs, and the ship was turned about a couple of times. However, as the ship had passed the bergs, the ice again closed around the ship,

and the inward drift was continued. In the afternoon the ship tried in vain to make its way towards Jameson Land in order to avoid a group of icebergs. In the evening another attempt was made to reach a space of open water at the south side of the fjord, but after about one hour's work it proved impossible.

Sept. 9th.—Calm, gradually clearing. In the forenoon the drift towards the interior of the fjord was continued though at a less rapid rate than before, and in the evening the drift seemed in the main to have ceased. In the course of the afternoon the rudder was repeatedly subject to hard pressure, and wires were therefore fitted to the rudder chains, which by means of a tackle were tightened in order to support the rudder.

Sept. 10th.—Clear and calm in the forenoon, easterly wind in the afternoon. The ship was jammed in the ice in the same place all day. Position at noon 70°33′ N. lat., 23°53′ W. long.

Sept. 11th.—Light local winds, overcast with occasional banks of fog. The ship was jammed in the ice, which showed no sign of moving till late in the evening.

Sept. 12th.—Light winds or calm, and overcast. Increasing movements of the ice were observed in the night, and in the morning the ship drifted eastward. At 8 a.m. the propeller was started, and the ship proceeded steadily though slowly. Small spaces of open water began to form in the ice. In the forenoon both the rudder and the propeller were subject to hard pressure by the ice. After labouring hard, the ship reached open water near the coast of Jameson Land at 2 p.m. and subsequently proceeded at full speed till 4 p.m., when she was almost off Kap Stewart. Here the ice was scattered with fairly large spaces of open water, so in the afternoon the vessel proceeded eastward at half speed. After dark had fallen, the ship sailed at slow speed in a southeasterly direction in packed drift ice floes with a few spaces of open water.

Sept. 13th.—At 2.45 a.m. the engines were stopped to await the breaking of the day, as the ship was jammed between some large floes. It was calm, but thick with snow all day. In the forenoon the ship got on very slowly through close-packed drift ice floes, but at 1 p.m. she had to stop. At 6 p.m. the ice grew more scattered, and the ship proceeded till 9 p.m., when she stopped owing to the darkness and the close-packed ice.

Sept. 14th.—Light northwesterly winds, overcast. In the night the ship drifted slowly towards the interior of the fjord. At 6.15 a.m. the ice was so open that it was possible to proceed eastward, though with great difficulty. A polar bear was killed. In the afternoon the wind increased, the ship set her sails shortly after noon, but at 2.30 p.m. she had to stop. Another attempt to push through the ice was made at

4.20 p.m., but it had to be given up owing to the forming of new ice among the floes.

Sept. 15th.— In the night the wind increased, and in the morning it blew from the west-northwest with a force of 7, and it was thick with snow. As it was impossible to take bearings, we did not know what happened with the ship, but we supposed that the whole ice mass was drifting rapidly out of the fjord. At 11.30 a.m. the rudder turned hard against an ice-floe, the supporting cables burst, but fortunately the rudder remained intact. In the afternoon the wind increased to force 8, and the ice began to scatter, and at the same time the shore was visible in the intervals between the squalls. At 4 p.m. the chains were removed from the rudder, and the engines started, as the ship had reached a large clearing of open water. However, after sailing about four miles in a southeasterly direction, the ship was again jammed in the ice, and owing to the strong wind it was impossible to labour in the ice. The ship had received several hard shocks, but evidently she had suffered no damage.

Sept. 16th.— In the course of the night the wind abated, it grew almost calm and the weather was clearing. At 5 a.m. the engines were started, and the ship proceeded about 500 metres through the close-packed ice; by means of the ice anchors and the winch the ship was kept free of the ice. At 9 a.m. the engines were stopped, as it was impossible to penetrate the ice.

Sept. 17th.— In the forenoon calm and foggy, later northerly and northeasterly winds of force 4—5. At 4.16 a.m. the ice grow more open around the ship, but owing to a dense fog it was impossible to gain a view of the movements of the ice. At 5 a.m. the ship proceeded in larger or smaller spaces of open water between the scattered drift ice floes. However, in the forenoon the ice grew more close-packed, and at 11.25 a.m. the ship had to stop.

Sept. 18th.— In the night and morning northeasterly wind of force 5, in the afternoon decreasing wind, and overcast. In the night the ice began to move, but no open water formed. In the morning the ship struck hard against an ice floe, and the supporting chains of the rudder burst again. Although the wind blew with a force of 5 in the morning, the current moved in a northwesterly direction. At 11 a.m. the ice became more scattered, and the engines were started. In spite of fairly good headway, the ship drifted about five miles in a northwesterly direction from 8 a.m. till noon; in the night she had drifted about thirteen miles in the direction true west to north. During the drift in the ice the starboard rudder chain broke again. At 2.30 a.m. the ship had to stop, being jammed in the ice. Supporting chains were fitted to the rudder. In the afternoon the ship drifted in a northwesterly direction

and subsequently in a north-northeasterly direction at a rate of about one and a half miles an hour.

Sept. 19th.—Calm, almost clear. In the night the ship drifted in a northeasterly, easterly, and later southeasterly direction at an average rate of 1.2 miles an hour. The ice consisted of thick ice floes interspersed with smaller pieces of ice. Position at noon: 69°51′ N. lat., 21°40′ W. long.

Sept. 20th.—In the forenoon light southerly winds with frosty fog, later increasing winds from the northeast and snow. Position at noon 69°37′ N. lat., 21°50′ W. long. At 2.20 p.m. the ice began to scatter, and it was possible to get on in a southeasterly direction in increasingly open ice all the afternoon. At 10.30 p.m. the swell was distinctly felt.

Sept. 21st.—The easterly wind gradually changed to north-northeasterly wind of force 5, with driving snow. Passed the ice edge at 0.10 a.m. and then proceeded at full speed towards Akureyri.

Sept. 22nd.—Northerly and easterly winds of varying force. At 5.50 p.m. the ship cast anchor in the roads of Akureyri.

Sept. 23rd.—Southerly wind of force 3—2, rain. At 9.30 a.m. the ship moored alongside the quay.

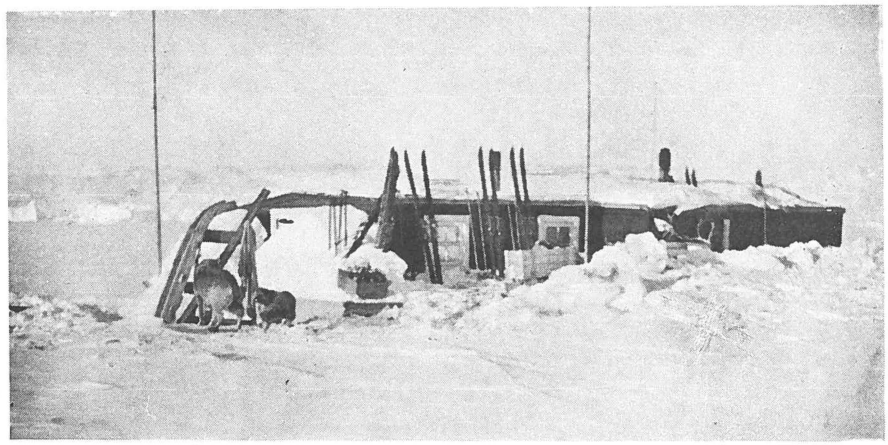
The ship left Akureyri on September 25th and arrived at Copenhagen on October 7th.

Summary of the summer expedition 1937.

The expedition was joined by 50 members.

The main object of the expedition was the erection of a new wintering station, which was called Gurreholm. The weather reports received from East Greenland in the early summer showed that the sea ice at the mouth of the fjords melted rather early. The station was therefore planned to be situated at the head of Fleming Fjord, whence there would be easy access to the interior of Jameson Land, which was to be the working field of the scientists stationed at Gurreholm.

The plan for the summer parties had been worked out with great caution. Dr. A. Rittmann with two assistants and equipped with a reliable radio was to make special vulcanological investigations at Kap Simpson while the station was being built in Fleming Fjord. Subsequently he was to continue his investigations in company with Vischer on Hold with Hope. Øpik and Orviku were to make special investigations of the fossiliferous older Palæozoic beds on Ella Ø in company with Heinrichson, who had spent the winter there. According to a request from the Zoological Museum, Copenhagen, Steinböck and Reisinger should make special zoological investigations in the fresh water lakes on Ella Ø near the station. Helge Larsen and Thorv. Sørensen would make an archæologic-botanical investigation in the



1937

Fig. 105. The station Gurreholm in the autumn.

immediate neighbourhood of Eskimonæs. Immediately after the arrival of the ship at Ella Ø, BIERTHER and MALTE ANDERSSON should go by motorboat to Syltoppene to commence their work there, which was to be continued during their wintering at the Ella Ø station. KLEIBER, who was likewise to stay in East Greenland during the winter, should commence a geological mapping of the area between Godthaab Golf and Kejser Franz Josephs Fjord.

Owing to the late departure of the expedition from Iceland, this programme could not be carried out. As late as August 7th there was land water from the mouth of Davy Sund southward along Liverpool Land, but off Kap Greg the ship was stopped by a northeasterly gale, which closed the land water belt. It was therefore decided to build the station near the mouth of Schucherts Flod. The building of the house was finished on August 17th, but at that time the whole mouth of Scoresby Sund was filled with ice; it took eight days to reach the colony, whence attempts were made, on August 25th and 27th, to push northward along the coast. On August 28th it was definitely given up to call at Ella Ø and Eskimonæs, the goods for these two stations were unloaded at Scoresbysund, and on September 8th the ship left the colony on her homeward voyage. However, at the mouth of the fjord the ship was beset in the ice and in the course of the next week drifted far towards the interior of the sound. Not till about midnight of September 20th did the ship get free of the ice.

The impossibility of calling at the northern stations naturally caused great alterations in the programme of the expedition. Thus the geologists who were to return home had to remain in East Greenland for another year, with the exception of one, who returned in a Norwegian

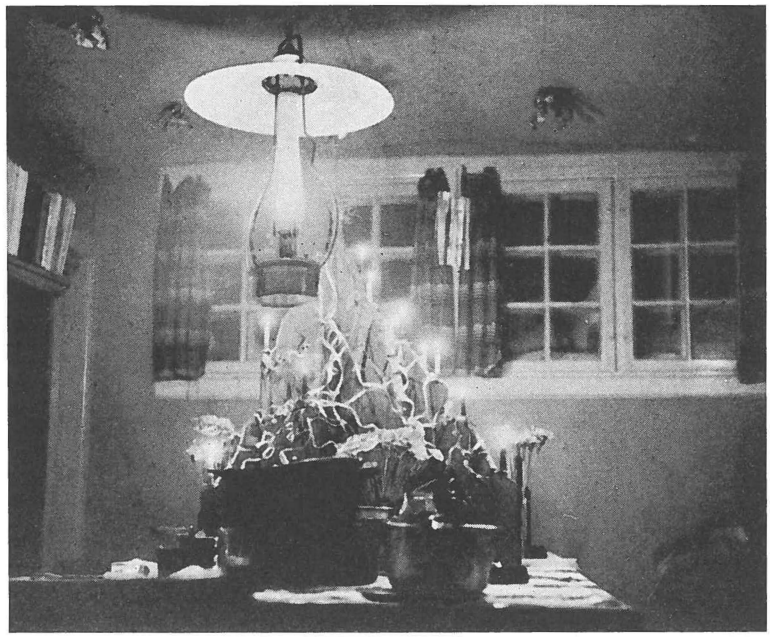


Fig. 106. Christmas Eve at Gurreholm. 1937



Fig. 107. The dining room at Gurreholm. 1937

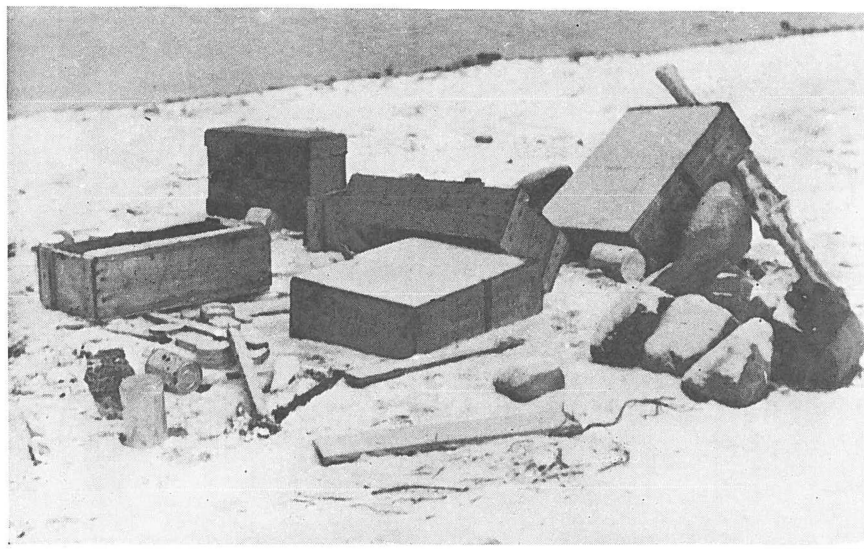


Fig. 108. A depot destroyed by bears. 1937

ship. The geologists who had come up with the ship this year had a wearisome journey with ponies across Jameson Land, and KLEIBER, who according to the programme should be stationed at Ella Ø, was now to work in the area around Carlsberg Fjord from a station just erected at Scoresbysund, for which work, however, he was not prepared. In the

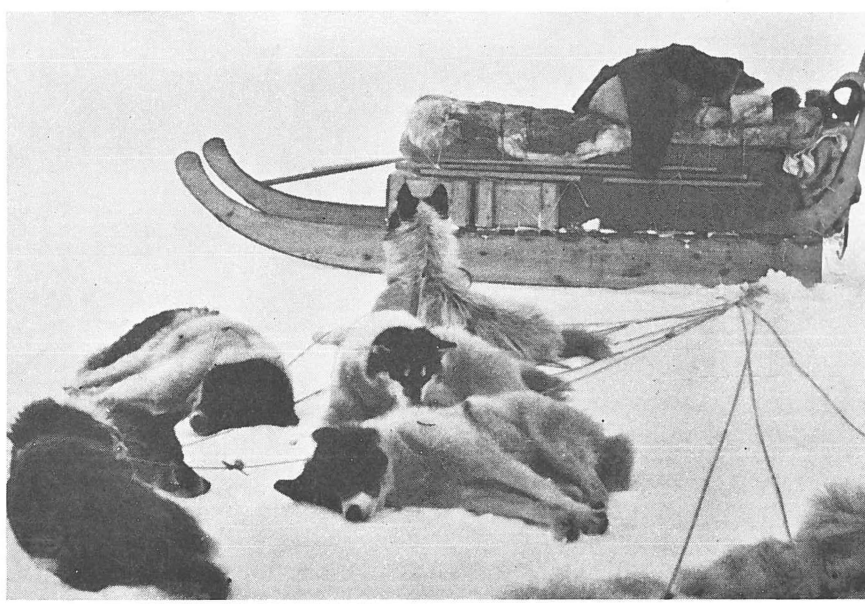


Fig. 109. Sledge and dogs.

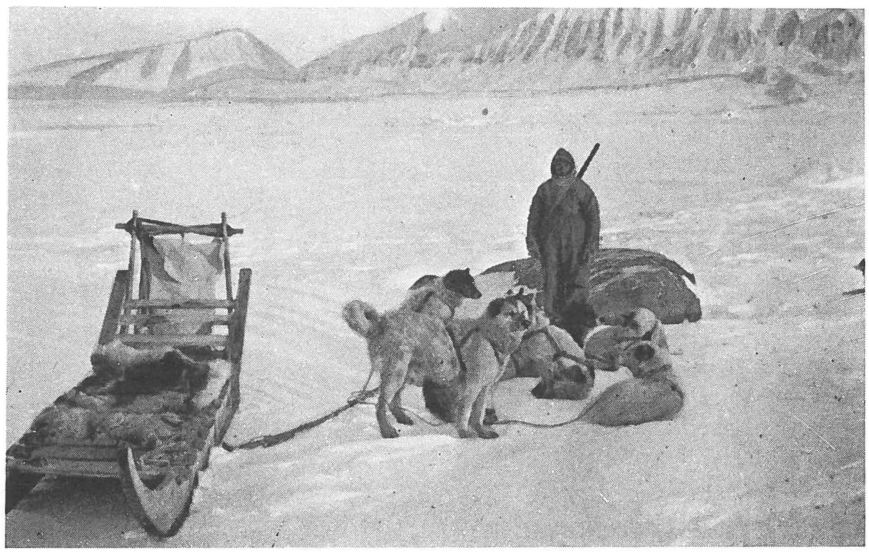


Fig. 110. Hunting in the autumn.

autumn large transports of goods had to be made by sledge to both Ella Ø and Eskimonæs, and similarly alterations in the plan for the laying out of depots for the spring journeys were required. RITTMANN's and ØPIK's parties did not reach the areas in which they were to work and were unable to make their special investigations in the areas near which the ship stayed. HELGE LARSEN's and THORV. SØRENSEN's parties were more fortunate, as they could do other work in the interior of Scoresby Sund, and the STEINBÖCK party could work in the neighbourhood of Gurreholm.

Owing to the alterations of the working programme and the circumstance that a much larger number of persons than planned came to remain in East Greenland during the winter, the expenditure of the expedition was, of course, very high.

But the arrangement had its advantages, also. Thus the geological mapping of the northern part of Jameson Land could be carried out from Gurreholm, and the geologists at Eskimonæs and Ella Ø, having overcome their disappointment, continued their work; notably VISCHER's and MAYNC's geological mapping of Hold with Hope and Gieseckes Bjerg was excellent.

Wintering Parties 1937—38.

Eskimonæs.

A. VISCHER, geologist.
W. MAYNC, geologist.
O. HARDER JENSEN, assistant.

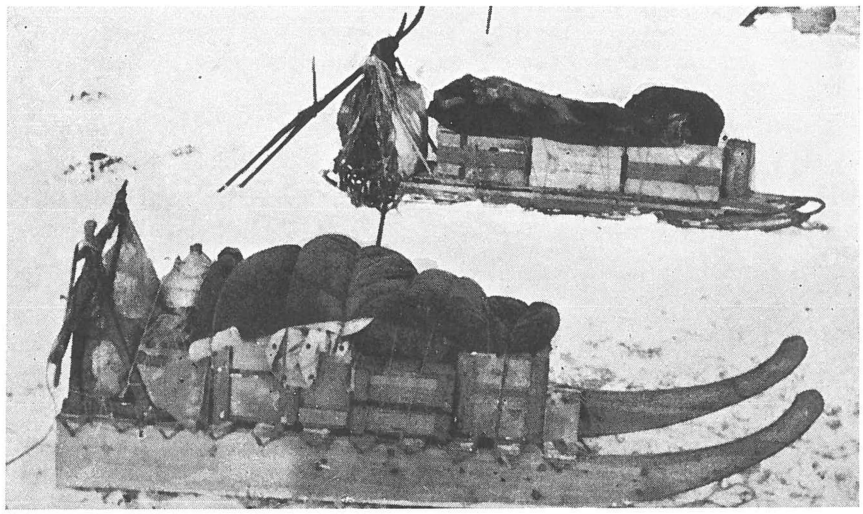


Fig. 111. Two types of sledges. 1937

N. O. JENSEN, wireless operator.
TH. GIDEONSEN, Greenlander, dog driver.
KONRAD, Greenlander, dog driver.

Ella Ø.

W. BIERTHER, geologist.
MALTE ANDERSSON, palæontologist.
TH. HEINRICHSON, palæontologist.
RICHARD NIELSEN, assistant.
AA. DE LEMOS, wireless operator.
KARL ANDERSEN, Greenlander, dog driver.
JAKOB, Greenlander, dog driver.

Gurreholm.

IB POULSEN, wireless operator.
H. STAUBER, geologist.
K. HÜBSCHER, geologist.
PÁLL PÁLSSON, in charge of the ponies.
J. TVERMOSE, in charge of the ponies.
JAKOB, Greenlander, dog driver.

Scoresbysund.

EIGIL NIELSEN, palæontologist.
K. KLEIBER, geologist.
CARL ANDERSEN, assistant.
LEO CHRISTIANSEN, wireless operator.

THE EXPEDITION 1938

Personnel.

	Lauge Koch, leader.
	A. Bindslev, surgeon.
	F. Søgaard Andersen, in charge of the equipment.
s.s. "Godthaab".	T. M. Jørgensen, captain.
	O. A. Møller, first mate.
	A. F. C. Wegeberg, second mate.
	S. L. Baumbach, first engineer.
	E. Nielsen, second engineer.
	Axel Duegaard, wireless operator.
	Crew: 12 men.
Aviation.	W. Lonsdale, chief pilot.
	A. Thorsen, wireless operator, mechanic.
	O. Garnes-Petersen, mechanic.
Stratigraphy and geological mapping.	1st party:
	H. Bütler, geologist.
	A. Mittelholzer, geologist.
	P. Bachmann, assistant.
	P. Gunnarsson, in charge of the ponies.
	2nd party:
	A. Vischer, geologist.
	N. Korst, wireless operator.
	J. Steglich-Petersen, assistant.
	3rd party:
	Th. Heinrichson, palæontologist.
	Richard Nielsen, assistant.
	4th party:
	W. Maync, geologist.
	W. Bierther, geologist.
	Malte Andersson, palæontologist.
Zoology.	K. A. Kreiss, zoologist.
Personnel at the station at Scoresbysund:	K. Kleiber, geologist.
	Carl Andersen, motorman.

Personnel at the station Eskimonæs.	N. O. JENSEN, wireless operator. O. HARDER JENSEN, assistant. TH. GIDEONSEN, Greenlander, dog driver. KONRAD, Greenlander, dog driver.
Personnel at the station Ella Ø.	AA. DE LEMOS, wireless operator. KARL ANDERSEN, Greenlander, dog driver. JAKOB, Greenlander, dog driver.
Personnel at the station Gurreholm.	IB POULSEN, wireless operator. H. STAUBER, geologist. H. HÜBSCHER, geologist. PÁLL PÁLSSON, in charge of the ponies. J. TVERMOSE, in charge of the ponies.

s. s. "Godthaab".

From Copenhagen to Moskusoksefjord.

The "Godthaab" left Copenhagen on July 1st and cast anchor at Akureyri at 6 p.m. on July 10th. The scientific staff of the expedition had arrived at Akureyri in the liner a few days before.

July 11th.—Northerly wind of force 2, overcast. The ship re-loaded part of her cargo and made ready to coal.

July 12th.—Northerly wind of force 2, overcast. Took in 36 tons of coal in the bunkers and 20 tons on the deck, and further two tons of hay on the deck. A horse shed was built on the deck.

July 13th.—Northerly wind of force 4, squalls with rain. Six Icelandic ponies were taken on board, and the fresh water tanks were filled.

July 14th.—Northerly wind of force 4, hauling slightly westward. Overcast and rain. Left Akureyri at 5.15 p.m.

July 15th.—Northerly wind of force 3—4, shifting at noon to WSW. The ship made good headway northward.

July 16th.—In the forenoon south-southwesterly wind, clear and calm, later north-northeasterly wind and fog. The ship made good progress, and at 6 p.m. met close-packed drift ice floes with occasional spaces of open water, and until midnight had proceeded six miles in the ice.

July 17th.—Northerly and easterly winds varying in force from 4 to 2, and fog. About midnight the ship was jammed in the ice. In the forenoon an attempt was made to get on, but in vain. Repeated attempts were made in the afternoon, but practically without result.

July 18th.—North-northeasterly wind of force 2. In the forenoon the ship advanced about ten miles in a northwesterly direction, as the ice grew more scattered, and in the afternoon further ten miles. At 2.30 a.m. the fog lifted, so it was possible to determine the position of the ship. At 3 p.m. the ship was stopped by close-packed ice.

July 19th.—Northeasterly wind, increasing in the course of the day to force 5. In the forenoon the ship proceeded three miles in a northwesterly direction, and in the afternoon four miles. Otherwise she was jammed in the ice all day. In the evening rain.

July 20th.—In the course of the night the wind increased to force 6, blowing from the north-northeast. The rain continued in the afternoon, when the wind shifted to northeast, force 7. No progress.

July 21st.—In the night northeasterly wind of force 8, decreasing in the forenoon, and in the evening it blew with a force of 3. The rain ceased in the morning. At 1.45 a.m. the ship was beset among several large drifting ice floes. The port side of the rudder was struck by one of the floes, which forced it hard to the starboard, so that the stock was split from the top and as far down as the eye could reach. Wire lashings tightened by wooden wedges were immediately fitted to the stock.

July 22nd.—Continuous rain with decreasing northerly wind till the morning, when it grew calm and foggy. No progress possible. In the forenoon an iron ring was fitted round the rudder post.

July 23rd.—Light northerly and northwesterly winds with fog and rain. An attempt to proceed had soon to be given up owing to close-packed ice.

July 24th.—Light southwesterly and southerly wind, overcast. Shortly after noon the ice grew more scattered, and at 2 p.m. the ship made an attempt to proceed. During this attempt several iron plates of the fore part of the ice-sheathing were broken off by the ice, and two boards on the starboard side above the water-line were squeezed in. From 4 p.m. the ship proceeded fairly well in a southeasterly direction among more or less close-packed drift ice floes, and at 10.45 she got free of the ice.

July 25th.—Light southwesterly winds, clear. The ship sailed northward along the ice edge and was in constant wireless communication with the "Gertrud Rask", which moored in a bay in the ice off Scoresby Sund. A request had been received from the "Gertrud Rask" that an ice reconnaissance should be made from the air, and at 7.15 the "Godthaab" moored near the "Gertrud Rask". The seaplane started on an ice reconnaissance at 9.05 p.m., returning one hour later. The ice reconnaissance showed that it would be possible, though difficult, to approach Scoresbysund. Koch paid a visit on board the "Gertrud Rask", and it was decided that the two ships were to keep company to Scoresbysund. However, as a wireless message from the "Gustav Holm" reported that this vessel was approaching the coast off Clavering Ø, it was decided that the "Godthaab" was at once to sail northward along the ice edge and to approach the coast near Clavering Ø instead of going to Scoresbysund.



Fig. 112. Ponies on the ship. 1938

July 26th.—Light southeasterly wind with fog. At 0.05 a.m. the two ships parted, and the "Godthaab" headed northward. There was a thick fog, which obstructed the movements of both ships. Moreover it turned out that since the ice reconnaissance made on the previous evening fairly large ice masses had drifted down from the north, and the "Godthaab" had entered this ice. As a rule it was not particularly close-packed, but not till noon did the ship get through it.

July 27th.—South-southeasterly wind of force 3—2, fog. The ship proceeded rapidly northward along the ice edge.

July 28th.—Calm and foggy. At 2 a.m. the ship encountered scattered drift ice floes, later they became more close-packed, but in the forenoon good progress was made among scattered floes. In the afternoon the ship sailed in narrow leads between large ice fields, but made

fairly good headway. In the evening the drift ice floes were very thick, and the bowsprit suffered some damage. Slow, but steady progress.

July 29th.—Light southeasterly wind, mostly with fog. In the course of the night the ship made fairly good progress in leads among large ice fields. In the morning she was near Bontekoe Ø, where the ice was very open; probably she was sailing in land water. The "Gustav Holm" lay at Eskimonæs, but owing to fog and a good deal of ice in Gael Hamkes Bugt, the "Godthaab" headed southward in order that BÜTLER's party might get to work as soon as possible. Passed Kap Hold with Hope at 4 p.m. and then headed towards Kap Franklin, sailing in more or less scattered fjord ice. Passed Kap Franklin at 10.30 p.m. No more ice west of the cape.

July 30th.—In the morning westerly wind of force 3, in Kejser Franz Josephs Fjord a marked foehn wind with clouds. At 6 a.m. the ship cast anchor near a river delta on the north side of Moskusoksefjord. As we were about to cast anchor, the steward had an attack of heart disease and died a few minutes afterwards. His dead body was carried ashore and provisionally deposited in a tent. The seaplane was lowered, and BÜTLER made a flight to Krumme Langsø to lay out a depot there. About 5 tons of goods for BÜTLER's camp were unloaded and the six Icelandic ponies were set ashore.

July 31st.—Northwesterly wind of force 1, cloudy. Several members assisted BÜTLER's party in the start up the mountains. During the ascent unfortunately one of the ponies tumbled down and had to be killed. KOCH flew to Eskimonæs, and MAYNC returned in the seaplane to the ship.

Aug. 1st.—Northwesterly wind of force 1, clear. VISCHER was fetched by seaplane from Eskimonæs, after which the seaplane was hoisted, and at 7.30 p.m. the ship sailed out of Moskusoksefjord.

From Moskusoksefjord to Gurreholm and Ella Ø.

Aug. 2nd.—Clear and calm, with local winds. Passed Kap Mohn at 4.30 a.m. At 8.20 a.m. the ship dropped anchor off Ella Ø, and at 4 p.m. the steward was buried on Ella Ø near the station.

Aug. 3rd.—Northwesterly wind of force 4, clear. The seaplane was lowered, and the unloading of goods was commenced. During the unloading one of the boats were filled with water owing to the heavy swell, and various goods were damaged or lost.

Aug. 4th.—Calm, slightly overcast. Seven tons of piece goods and 3 tons of coal were unloaded.

Aug. 5th.—Northwesterly wind of force 3, slightly overcast. Although

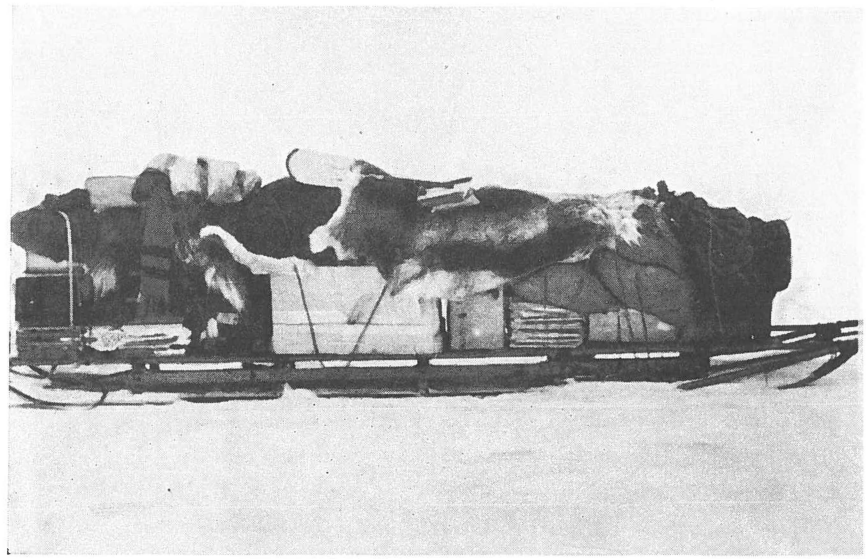


Fig. 113. A heavily loaded Nansen sledge. 1938

the swell in the harbour caused great trouble, 4 tons of piece goods and 2 tons of coal were unloaded. However, at 10 a.m. the unloading

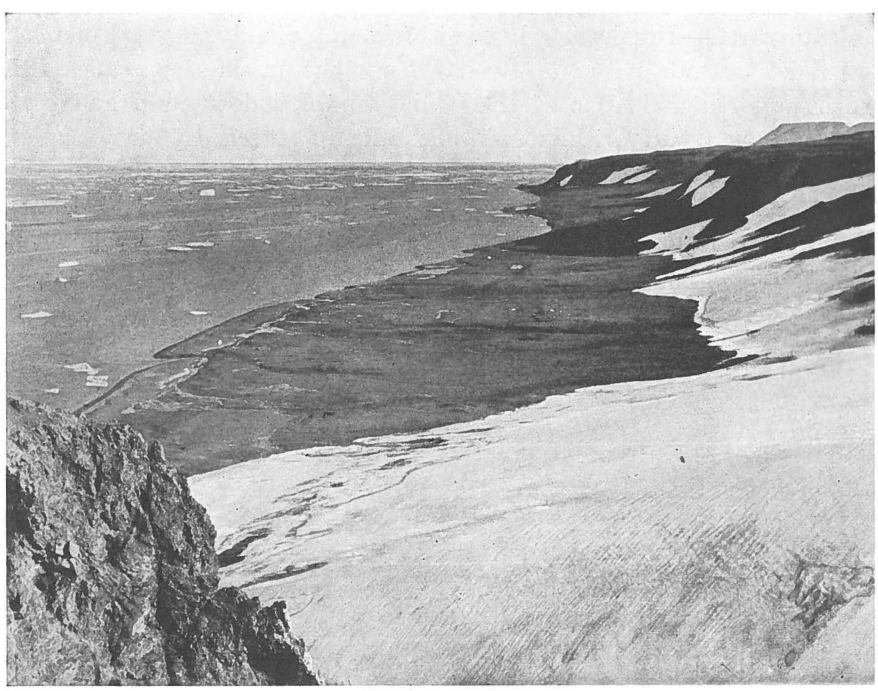


Fig. 114. Low plains along the east coast of Koldewey Ø.



Fig. 115. Travelling in deep snow.

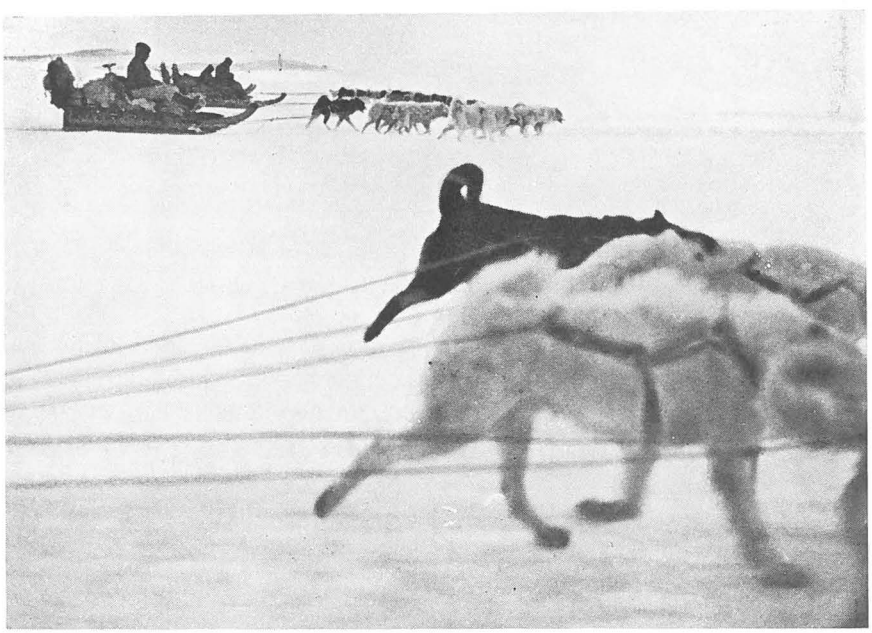


Fig. 116. Good going.

had to be stopped owing to the swell. Fifteen tons of coal were shifted from the after hold to the bunkers.

Aug. 6th.—Northwesterly wind force 5, cloudy. Eight tons of coal were unloaded, and 3 tons were shifted from the after hold to the bunkers.

Aug. 7th.—Calm and cloudy. About 20 tons of stone ballast were taken in in the course of the day.

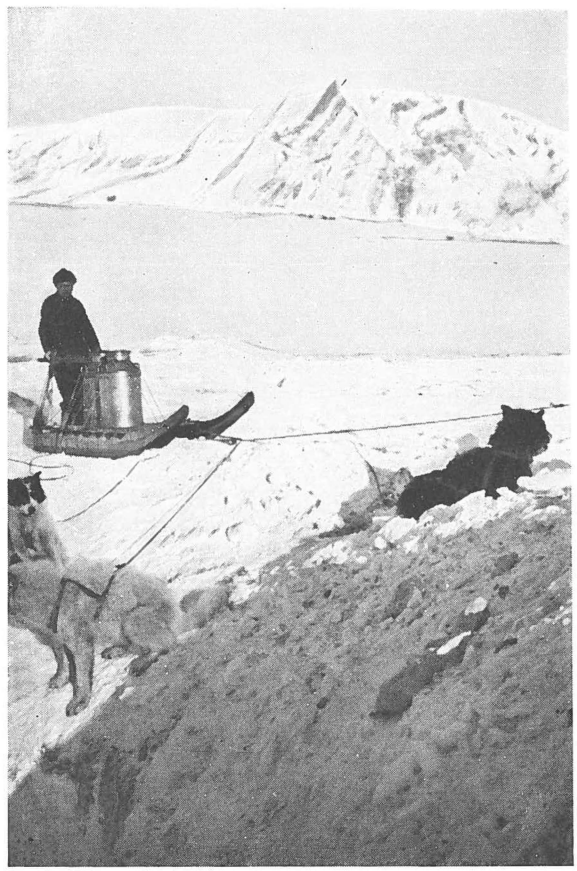


Fig. 117. Fetching water in the spring. 1938

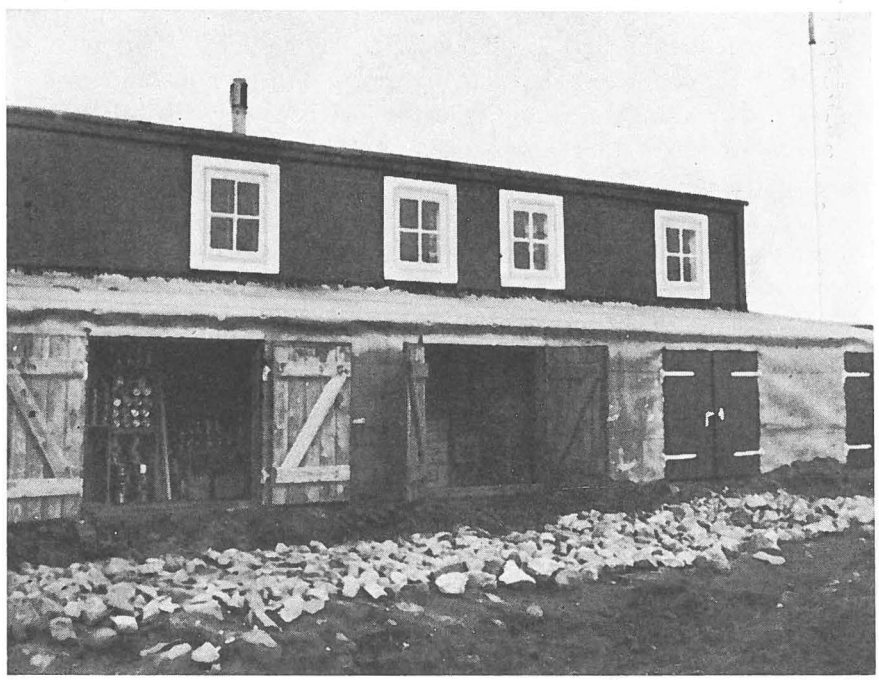
Aug. 8th.—Calm and cloudy. Two tons of coal for the station were unloaded, and 5 tons of fossils and other goods were shipped. The boats and the seaplane were hoisted, and at 4.25 the ship left Ella Ø. Passed the Norwegian ship "Polarbjørn" off Skildvagten. Cast anchor at 11.40 p.m. in Renbugten for musk-ox hunting.

Aug. 9th.—Calm or light southerly wind, cloudy. After a successful hunting trip, the ship left Renbugten at 4.30 a.m. Passed Kap Mohn at 11.45 a.m. and Haslums Øer at 9.40 p.m., when the ship was met by a southeasterly wind of force 4, with haze, which carried the ice into the fjord. The ship therefore went to Mesters Vig to fetch a party.



1938

Fig. 118. Ponies in the spring at Gurreholm.



1938

Fig. 119. Part of Gurreholm in summer.



1938

Fig. 120. The "Godthaab" after being jammed in the ice in the harbour of Scoresbysund.

Aug. 10th.—In the course of the night the east wind calmed down, and it grew calm and slightly overcast. At 2.40 a.m. a motorboat was lowered to fetch the party, but owing to ice hindrances the boat did not return till 5.15 a.m. The ship had great difficulty in sailing out of the cove, as a couple of large ice fields had barred its mouth. Had to get around several rather large ice fields in the outer part of Kong Oscars Fjord, but made fairly good headway, passing Rathbone Ø at midnight.

Aug. 11th.—Calm and cloudy. At 7 a.m. the ship cast anchor off Scoresbysund to set passengers and goods ashore, and at 7.40 she started westward along the coast of Jameson Land. A good deal of scattered drift ice floes were encountered in the mouth of the fjord as far as Kap Hooker. At 10.20 p.m. the ship cast anchor off Gurreholm.

Aug. 12th.—Calm and rainy. Various work was done on the ship, and goods from the station Gurreholm were taken on board.

Aug. 13th.—Northerly wind of force 3, rain. About 10 tons of goods were taken on board from the station in the course of the day.

Aug. 14th.—Calm and cloudy. Goods, passengers, twelve dogs and a motorboat were taken on board. At 2.15 p.m. the ship left Gurreholm.

Aug. 15th.—In the night fog, later slightly overcast and calm. Passed Kap Stewart at 1.45 a.m. Cast anchor at 5 a.m. off Scoresbysund, and in the course of the day 6 tons of expedition goods were taken on board.



Fig. 121. The "Godthaab" in the harbour of Scoresbysund. 1938

Aug. 16th.—South-southeasterly wind of force 1, clear, with banks of fog. About 2 a.m. a large ice field drifted into the bay at the colony, and the ship was pressed towards the river bed and took the ground at low water. Later the ice drifted back again, but not till 1 p.m., when the water was highest, and the seaplane and all the boats had been lowered in order to lighten the ship, did it get loose by means of the engines, which were running full speed, and the windlass. The bottom was level, so the ship had suffered no damage. As the ice began to drift into the sound again, the seaplane and the boats were hoisted, and at 3.30 p.m. the ship left the colony. On board the ship was the manager of the colony, Mr. Høegh, as the surgeon of the expedition had been asked to come to a patient at Kap Tobin. The ship stopped off Kap Hope for about an hour while the doctor was ashore, and at 5.45 p.m. headed northward.

Aug. 17th.—In the course of the night the ship sailed northward along Liverpool Land in scattered ice among large ice fields. Stopped from 3—4 p.m. off Kap Brown, where a geological collection deposited there was taken on board. At 7 p.m. the ship arrived at the house at Kap Brown, and for an hour provisions and kerosene were set ashore.

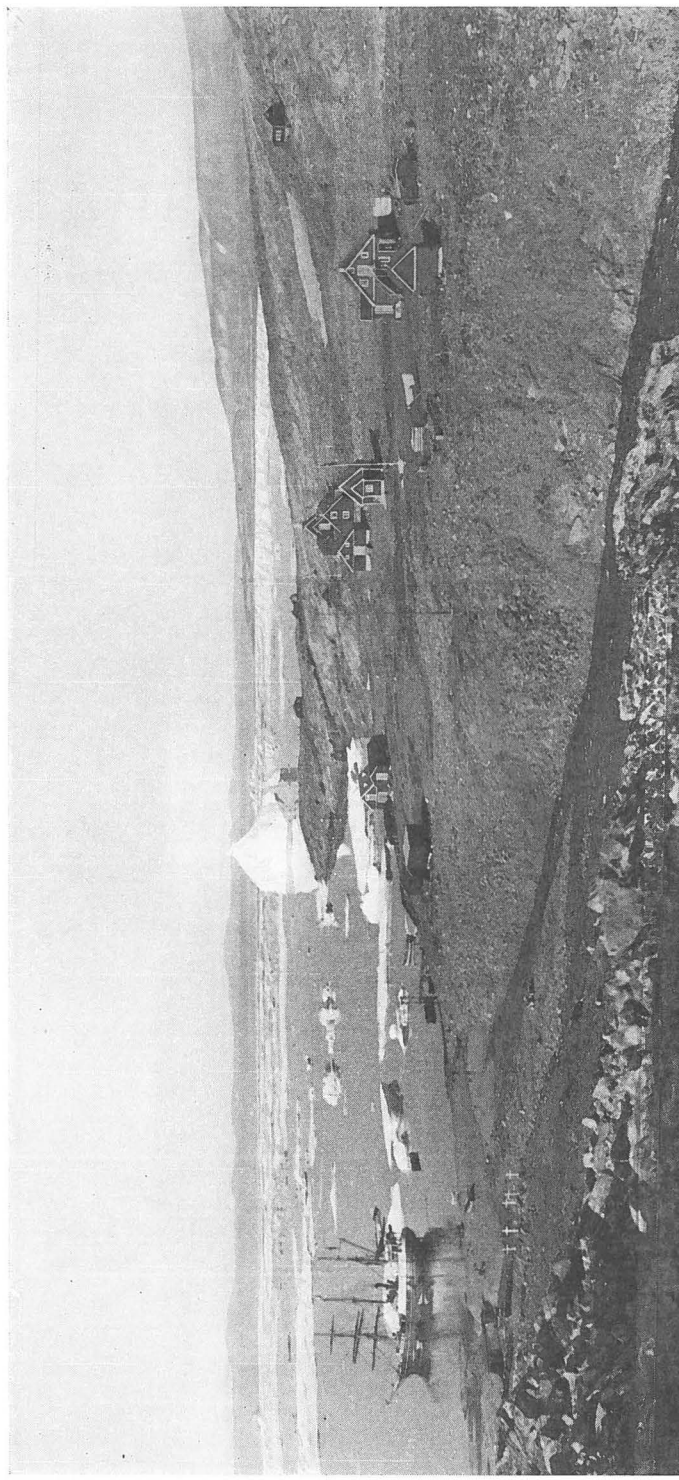
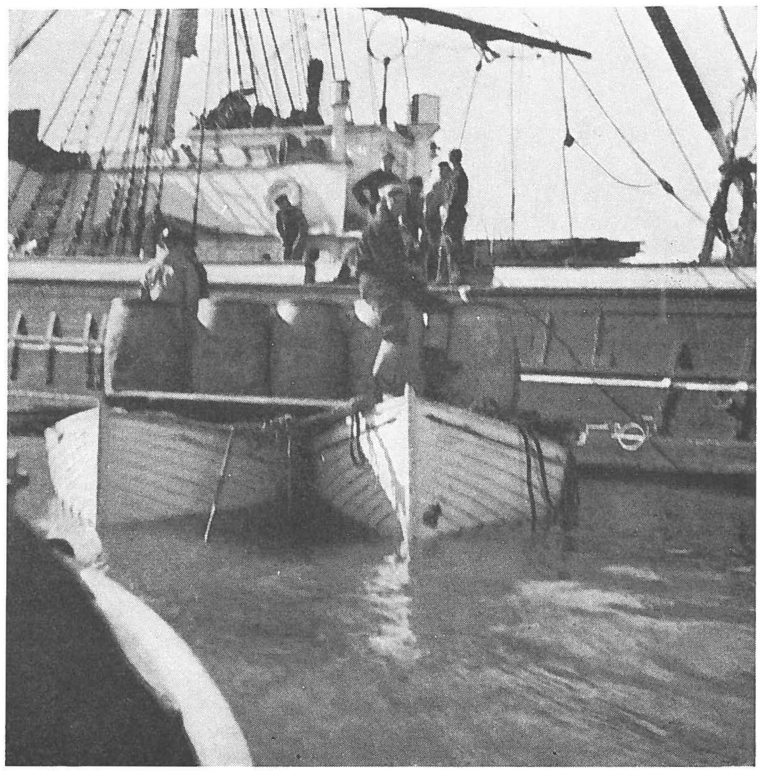


Fig. 122. The colony of Scoresbysund.



1938

Fig. 123. Unloading of kerosene.

Owing to fog in connection with fairly close-packed ice in Fleming Fjord it was impossible to fetch a geological collection at Ørsteds Dal, and the ship therefore went northward in more or less scattered ice among large ice fields. In the night dense fog.

Aug. 18th.—Light easterly winds, foggy and cloudy. At 2.30 a.m. the ship had to moor at an ice floe after several unsuccessful attempts to find a passage through the ice in Davy Sund. Not till 1 p.m. did the fog lift so much that it was possible to get on. The ice seemed to be more open, and at 3.45 p.m. the ship stopped off the mouth of Antarctics Havn. A motorboat was lowered to fetch a geological collection deposited at the Norwegian station there. While the motorboat was away, the ship sailed into the bay along the east side. At 5 p.m. the motorboat returned, and the ship proceeded northward, sailing among scattered ice floes as far as Kongeborgen.

Aug. 19th.—Calm and cloudy. At 4 a.m. the ship cast anchor off the Ella Ø station. In the forenoon 5 tons of goods for the station were unloaded. In the afternoon the boats were hoisted, and the ship left Ella Ø at 2 p.m.

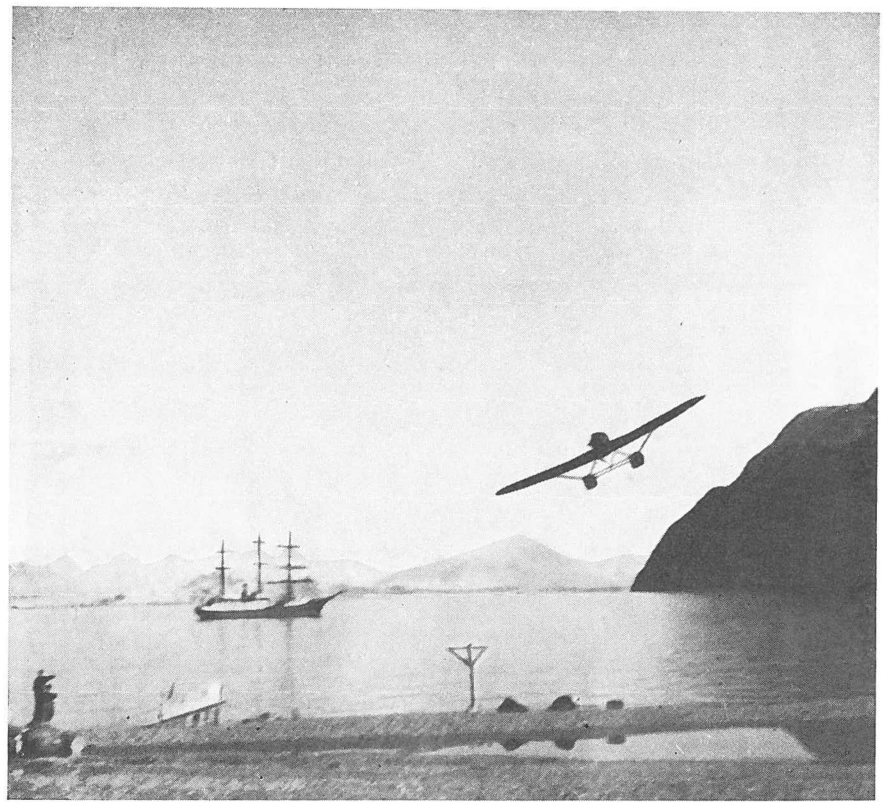


Fig. 124. The harbour at Ella Ø. 1938

From Ella Ø to Eskimonæs and back.

Aug. 20th.—Northeasterly wind of force 4, cloudy. Passed Arundel Ø at 7.35 a.m., and at 1.15 p.m. the ship cast anchor in the East Harbour at Eskimonæs. The unloading was immediately commenced, and 5 tons of goods were unloaded, while 3 tons of geological collections and private goods were taken on board.

Aug. 21st.—Light southeasterly winds and cloudy. In the forenoon the seaplane was lowered, and two flights were made, one to Kap Franklin and around Clavering Ø for counting of musk-oxen. At 2.30 p.m. the seaplane was hoisted, and at 4 p.m. the ship left Eskimonæs. Fairly large ice masses were encountered in Gael Hamkes Bugt, and in Dødemandsbugten the ship had to go very near the shore to avoid touching the ice.

Aug. 22nd.—Calm, but cloudy. More or less close-packed drift ice floes were met with along Hold with Hope, and during the ship's labour in the ice two plates were broken off. By noon the ship struck a close-



Fig. 125. Going ashore from the seaplane.

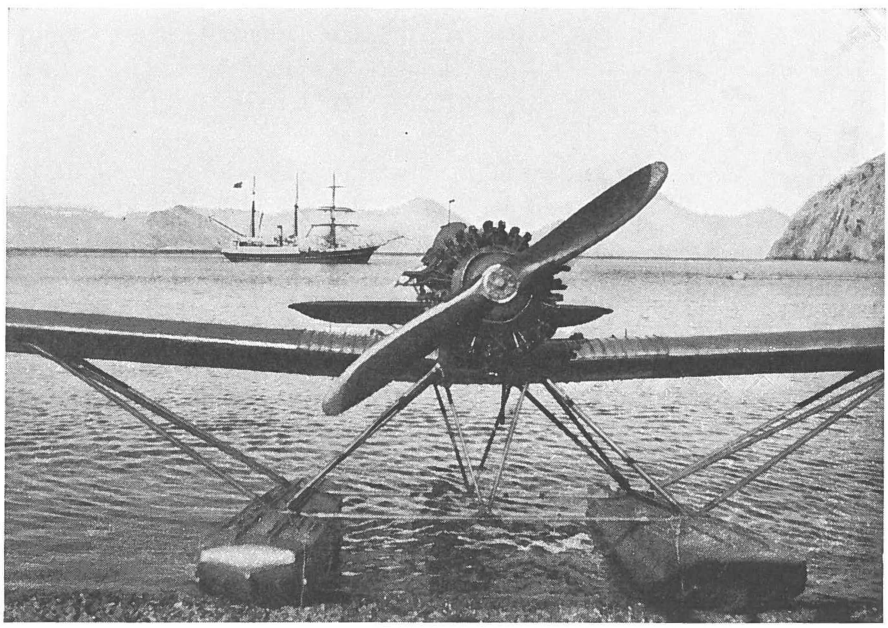


Fig. 126. The seaplane on the shore.

packed belt of ice, which it took three hours to pass, though the belt was rather narrow. In the afternoon the ship sailed among scattered drift ice floes, but repeatedly had to labour very hard to get through. At 8.30 p.m. VISCHER's party at Kap Franklin was taken on board. The ice packed very closely around the cape, the ship had to labour very hard, and not till midnight did she proceed so much that a depot of geological collections could be fetched off Margrethedal.

Aug. 23rd.—Fairly strong foehn wind in the night, later calm and slightly overcast. Left Margrethedal at 0.35 a.m. and sailed across Kejser Franz Josephs Fjord in close-packed ice till 3 a.m. Passed Kap Wijkander at 4.40 a.m. and one hour later Kap Humboldt, when there was no more ice. Stopped at 8.50 a.m. in Sofia Sund, where the seaplane was lowered. Arrived at Ella Ø at 1.15 p.m., where 5 tons of goods were unloaded, and the spare provisions were re-stowed in order to make room for the many passengers.

Aug. 24th.—Calm and rainy. About 40 tons of coal were shifted from the main hold to the bunkers.

Aug. 25th.—Southwesterly wind of force 2, slightly overcast. The ship delivered 5 tons of her coal supply to the station. Coal were re-stowed on the ship, which furthermore took in fresh water.

Aug. 26th.—Southwesterly wind of force 3, slightly overcast. In the course of the day 20 tons of stone ballast were taken on board and stowed into the main hold.

Aug. 27th.—Southwesterly wind of force 3, slightly overcast. Owing to the heavy swell it was impossible to take in ballast, but 54 empty barrels were shipped and filled with water to serve as ballast instead. Furthermore, 5 tons of goods, jolly-boats, and floats for the seaplane were shipped.

Aug. 28th.—Clear and calm, local winds in the fjord. At 6 a.m. the motorboats were hoisted, and at 6.30 a.m. the ship left Ella Ø, heading northward. Passed Kap Mohn at 10.30 a.m., where she encountered foehn wind of force 6. Stopped at 7.45 p.m. off BÜTLER's camp in Moskusoksefjord. After two hours the ship moved to the mouth of a large river on the south side of the fjord, cast anchor, and took in water during the night.

Aug. 29th.—Clear and calm. At 6.15 a.m. the seaplane returned from Eskimonæs, took in petrol, and started again. At 8 a.m. the ship left Moskusoksefjord, where a foehn wind of force 5 blew. Passed Kap Mohn at 9.10 p.m., and at 11 p.m. cast anchor off Ella Ø, where the seaplane had arrived earlier in the day. Five barrels of petrol were set ashore, and the seaplane was hoisted. Various goods and luggage were loaded, and at midnight all the expedition members that were to return home, came on board.

Homeward voyage.

Aug. 30th.—Clear and calm. At 0.30 a.m. the ship left Ella Ø and sailed southward through Kong Oscars Fjord, from 7 a.m. in scattered ice. At 8.30 a.m. the seaplane was lowered to fly to Scoresbysund; it returned at 1.30 p.m. and was hoisted. At 2.30 p.m. a motorboat was lowered near Kap Biot to fetch a depot of geological collections in Fleming Fjord south of the cape. The boat returned at 4.45 p.m., when the ship proceeded out through Davy Sund. Sailed among scattered ice all night.

Aug. 31st.—In the morning the sky was overcast, and the wind blew from the north and northwest with a force of 4. At 4 a.m. the ship got free of the ice, and headed towards Akureyri.

Sept. 1st.—Northwesterly wind of force 4 till noon, later calm and cloudy. The ship made good progress all day.

Sept. 2nd.—Northeasterly wind of force 3, later calm. At 2.30 the ship arrived at Akureyri and moored alongside the quay at 4 p.m. The loading of coal was immediately commenced. The greater number of the members of the expedition went ashore here to return to Copenhagen in the liner. The ship remained in Akureyri till September 6th, when she left for Copenhagen at 2.15 p.m.

Septh. 15th.—Arrived at Copenhagen and cast anchor at Grønlands Handels Plads at 9.05 a.m.

Summary of the summer expedition 1938.

The expedition numbered fifty-one members.

The plan of navigation had been prepared with great caution owing to the unfavourable ice conditions encountered the previous year. The expedition was equipped with a seaplane for ice reconnaissances, and in addition the various geologists were to have an opportunity to fly across their working fields to make supplementary observations, but the actual reason why a seaplane was placed at our disposal this year was that the expedition would not run the risk of another unintended wintering in case the ice conditions should prevent the ship from reaching the scientific stations.

Only one party, which was to work under the leadership of Dr. H. Bütler, went up this summer; this party was to continue the geological work commenced in 1936 in the interior of Hudson Land. In case of favourable ice conditions, the different geologist parties which had spent the winter in East Greenland were to visit each other in their particular working fields to establish a scientific collaboration by comparing the results gained.

Unfortunately this summer, also, there were exceptionally large quantities of ice along the coast of East Greenland extending far up the fjords throughout the summer; but the wind rarely blew from the east, so it was possible to navigate among the drift ice floes, and the navigation was carried out according to plan; thus the ship first went into Moskusoksefjord, where BÜTLER's party was set ashore and the geologists from Eskimonæs were fetched by seaplane and taken on board; the ship then went to Ella Ø. Subsequently she called at Gurreholm in the interior of Scoresby Sund and later at the stations Ella Ø and Eskimonæs.

Immediately after entering the ice the ship was beset and for eight days drifted southward with the ice south of Scoresby Sund. As she got free, an reconnaissance from the air showed that extraordinarily large and close-packed ice masses occurred outside and north of the mouth of Scoresby Sund, but off Clavering Ø it was possible to push through the ice in two days. Thus altogether ten days were spent in the ice. Dr. BÜTLER had the planned number of working days in Hudson Land, but otherwise great caution was used in setting camping parties ashore, since easterly winds might render navigation along the coast very difficult. However, VISHER was at work for some time north of Kap Franklin, and MAYNC studied STAUBER's Permian sections on Scoresby Land. The flights of the geologists across their working fields proved a great success, whereas the collaboration between the geologists was not established to the planned extent owing to the unfavourable ice conditions. Dr. MITTELHOLZER, the geologist who was to spend the winter in East Greenland, and his assistant served as Dr. BÜTLER's assistants during the summer and thus acquired a good knowledge of the more or less metamorphosed sedimentary series which they were to study from Eskimonæs during the following year.

After the departure of the expedition the Ella Ø station was to serve as a mere police station, while the station Gurreholm was closed. An air reconnaissance near Ella Ø shortly before the departure showed that large ice masses occurred in Davy Sund, but the ice was so open that it was possible to get through if the calm weather persisted. The ship passed the ice belt in twenty-four hours.

Wintering party 1938—39.

Eskimonæs. A. MITTELHOLZER, geologist.
P. BACHMANN, assistant.

THE SHIPS AND MOTORBOATS OF THE EXPEDITION

Danish intercourse with East Greenland in the present century has chiefly been based on three ships, viz. s.s. *Godthaab*, which up to 1925 ran to Angmagssalik, s.s. *Gustav Holm*, which in the succeeding years ran to Angmagssalik and Scoresbysund, and finally, in the period 1931—39, s.s. *Gertrud Rask*, which called regularly at both these colonies.

The expeditions to East Greenland and the ships in which they were transported were as follows:

1) Wintering at Scoresbysund 1926—27. Outward and return voyage in the s.s. *Gustav Holm.*
2) Summer expedition 1929. The s.s. *Godthaab* was placed at the disposal of the expedition.
3) Summer expedition 1930. The s.s. *Godthaab*, under naval command, was at the disposal of the expedition during its stay in the East Greenland coastal waters.
4) Combined summer and winter expedition 1931—34. In 1931, 1932, and 1933 the two ships s.s. *Gustav Holm* and s.s. *Godthaab*, and in 1934 s.s. *Gustav Holm* were placed at the disposal of the expedition.
5) Combined summer and winter expedition 1936—39. In 1936 and 1937 s.s. *Gustav Holm*, and in 1937 s.s. *Godthaab* were at the disposal of the expedition. In the summer of 1939 some few members of the expedition returned home as passengers in s.s. *Gustav Holm.*
6) On the summer expedition 1938 s.s. *Gustav Holm* served as a base for the sea-planes during the expedition's stay at Spitsbergen.

It will be seen from the above that for seven summers and one early summer s.s. *Gustav Holm*, and for six summers s.s. *Godthaab*, served as expedition ships for the expeditions to East Greenland under my leadership. In three summers the two ships cooperated, which was of great importance for the efficiency of the expedition.

Northeast Greenland may naturally be divided into three working areas, viz. the Scoresby Sund area, the area around Ella Ø, and the area from Eskimonæs to Danmarks Havn. One of the advantages of a combined summer and winter expedition to East Greenland, lasting for several years and having two ships at its disposal, is that its working area may be rather extensive, comprising all the three areas, especially

if modern technical means (radio and aircraft) are employed. On a summer expedition with one ship only a limited number of tasks can be embarked upon. If a summer expedition operates with permanent stations ashore and only one ship, the work should not be extended to more than two of the areas; if all the three areas are included in the investigation, unfavourable ice conditions may give rise to dangerous situations, as was the case in 1934.

Normally the ships stayed in East Greenland for four or five weeks, in a single year (1933) for nine weeks. If the stay near the coast has to be reduced to less than three weeks, the value of the work of special summer parties is doubtful; the main stress should then be laid on the work carried out from the winter stations. Generally the summer parties had to be content with an effective working period of four weeks; owing to the light polar summer a good deal of work, if well planned beforehand, can be done during this short space of time

To the wintering personnel the arrival of the ships as a rule means new impulses. In the course of the summer this personnel will have to make the new members that are to pass the winter in the area, acquainted with the work. Over the wireless they may have requested the aid of experts for the solution of special problems, or they may have asked for ponies, motorboats, or the like, which may enable them to fulfill the work commenced in the winter during the few weeks the ships stay near the coast.

The two ships.

The s.s. *Gustav Holm* was built, partly of oak, at Elsinore in 1893. In December 1924 the Administration of Greenland bought the ship and gave her the name *Gustav Holm.* Distinguishing letters O Y V B, length 44.10 m (144.7′), barquantine-rigged, gross tonnage 409.48, net tonnage 217, D.W. 420 tons. Coal in bunkers 120 t, fresh water 16 t, effective carrying capacity c. 300 t. Draught (loaded) c. 16′, main hold 248.3 m^3, after hold 86.8 m^3, totalling 335.1 m^3. Main hold 160.8 m^3, after hold 56.2 m^3, totalling 217 m^3. Officers: captain, 2 mates, 2 engineers; crew: 15 men. Boats: 2 life-boats, 24 feet, provided with water-tight compartments, and 1 motorboat. A two-cylinder combined engine, 230 h.p., built in 1893 by Messrs. Burmeister & Wain, Copenhagen. Consumption of coal in twenty-four hours: 4 tons. Two-bladed steel propeller. Speed in calm weather 6 miles. Provided with electrical light and central heating of the stern cabins. Steam winch, windlass, a winch at the main hold and another at the stern hold. Wireless (sound spark transmitter, short-wave receiver).

The s.s. *Godthaab*, built for whaling at Sandefjord in 1898. Sold the same year while on slip to the Administration af Greenland. Built of oak

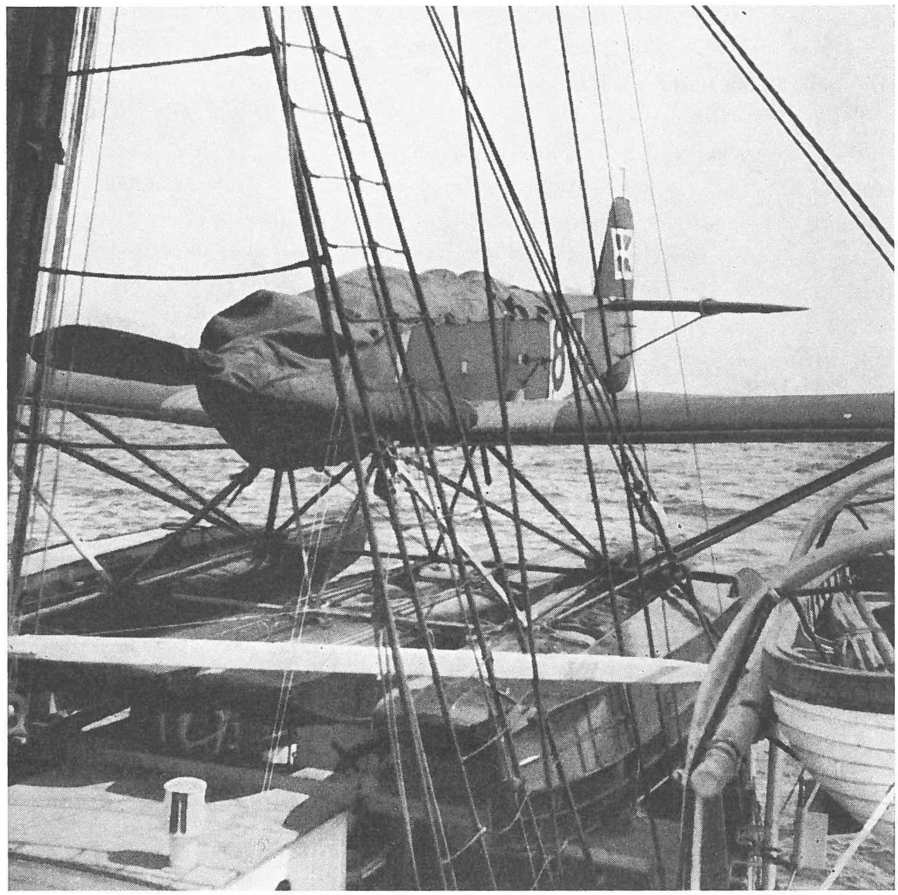


Fig. 127. The Heinkel seaplane on the "Gustav Holm".

and pine. Distinguishing letters OZOR, length 35.2 m (115.5′), barquantine-rigged. Carrying capacity: 287.45 gr. reg. tons, 162 net reg. tons. d.w. 210, main hold and stern hold 234.88 m³. Main hold 112.7, after hold 39.4, totalling 152.1 reg. t. Coal in bunkers 60 tons (generally 25 tons in the hold and 20 tons on the deck), altogether 105 tons. Fresh water 9.1 tons. Draught when loaded 14′6″. Captain, 2 mates, 2 engineers, and crew: 18 men. Two motorboats (22′), equipped with water-tight compartments, 1 jolly-boat, with room for altogether 48 persons. A two-cylinder combined engine, 240 h.p. ("Akers mekaniske Værksteder"). Coal consumption in 24 hours, c. 3 tons. Speed in calm sea, 7 miles. Steam winch, windlass, a 3 tons deck winch. Wireless. (For further details of the *Godthaab*, cf. Medd. om Grønl. Bd. 74, pp. 178—179).

The two ships were exceptionally strong, and though old, they were in a good state of repair. Both of them were well suited for ice

navigation. The *Godthaab*, in particular, was capable of manoevring in ice-filled water, while the *Gustav Holm* was better suited to withstand the heavy pressure of ice hummocks.

One of the drawbacks associated with the ships was their slow speed. However, under difficult ice conditions a ship with a low-powered engine may be an advantage, since a high speed may mean a risk to the ship. The strong rigging (the ships have sometimes been designated as sailing vessels with auxiliary engines) was only useful on the voyage from Iceland to Greenland and back, but never in the fjords.

The accomodation for passengers was, of course, very primitive. When the *Gustav Holm* was first placed at the disposal of the expedition, it only contained a few one-man cabins, one two-man cabin, and three four-man cabins for the passengers. Later on a twelve-man cabin and two four-man cabins were built in the hold. If motorboats were carried on the deck, some of the expedition members as a rule slept in them.

The *Godthaab* presented the advantage that both motorboats and seaplanes could be hoisted up and down by means of a steam winch. It would, no doubt, have been very useful if the *Gustav Holm*, too, had been equipped with a steam winch for hoisting and lowering of the seaplanes, and if steam winches had on the whole been more extensively used for the lowering and hoisting of motorboats.

The chapter on financing contains an estimate of the government's expenses in connection with the ships, including coal, provisions, wages for the crew, etc., and repairs. Some of the most important damages sustained will be mentioned here in order to give some idea of the dangers that may be encountered by ships sailing in these waters.

1929, s.s. *Godthaab*.— In the days July 21st—23rd the ship reached the waters around Clavering Ø. As conditions for sailing were unknown, the starboard anchor was kept going at 15 fathoms. Many basalt skerries occur here, so the anchor repeatedly touched the skerries; afterwards it turned out that the anchor stock was lacking; probably it had become broken and had fallen out. On August 9th the ship touched the bottom at the head of Moskusoksefjord; along the innermost 9 miles of the fjord the bottom consists of ooze. However, the ship soon got off the ground again and proved to be tight.

On the homeward voyage the ship met heavy pack and drifted with the ice from the 9th to the 18th September. In the morning of the 17th the ice began to scatter, and the ship pushed eastward about 45 miles in large spaces of open water. At 4 p.m. it was thick with snow, the wind increased to a gale from the north, and since there was a heavy swell from the northeast, we thought the ship had got free of the ice. However, shortly after she struck ice to the eastward, so she turned shoreward again, but soon met a close-packed ice edge to the

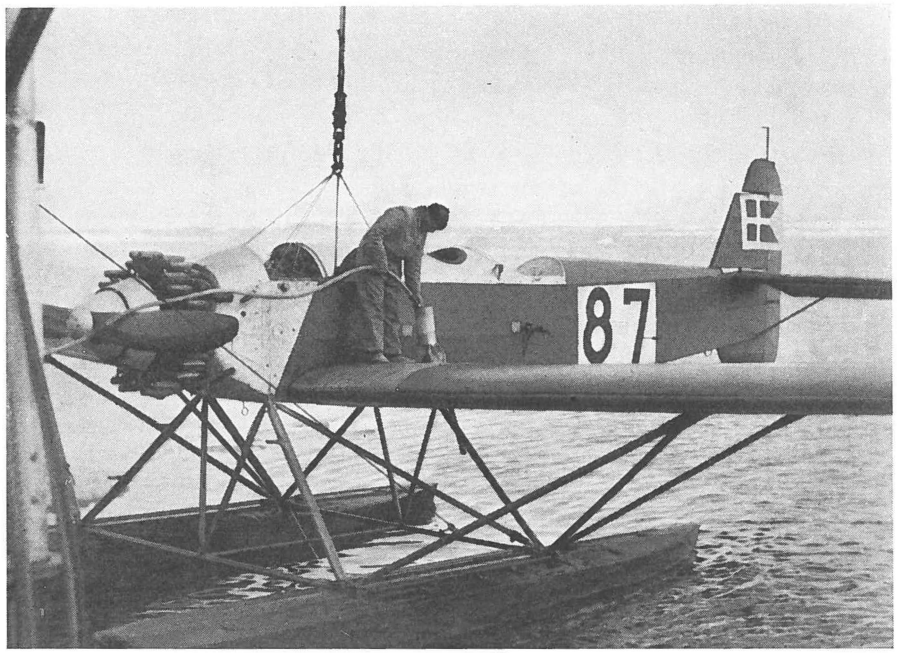


Fig. 128. Seaplane taking in fuel.

leeward. The stay sails were hoisted, and the engine was working full speed to enable the ship to keep clear of the ice. However, as the storm increased in force, carrying the ship towards the ice-edge, it was decided to enter the ice. In the course of the night the storm blew almost with the force of a hurricane, and the ice was moving violently.

On September 18th, at 1.30 a.m., the main piece of the rudder split, the ice packed so closely around the ship that we feared she would sink. When it dawned, the ship made its way into a space of open water, where the rudder was lashed together with a steel wire. The ship remained in the open water till 1 p.m., when the wind abated somewhat, and she steered eastward again to get free of the ice.

Later on the ship met the ice again; she steered into it, working with sail and engines; there was a heavy swell in the ice, especially near the edge, and the floes packed hard around the ship. At 7 p.m. the ship got free of the ice. Besides the rudder, the port side of the ship had suffered various damages; thus a couple of the planks had been crushed, the bulwarks had been crushed in several places, several chain-plates had been bent and one broken, the scuppers had been damaged, and a number of the iron plates of the ice-sheathing had been destroyed. The main deck had sprung a leak over the provision room on the port side and in front of the windlass, and water likewise penetrated through the shell plating and the deck into the bunkers.

After the return of the expedition the ship underwent thorough repairs, which were paid by the Naval Ministry; large parts of the hull amidships as well as the ice sheathing were entirely replaced.

1931.—On its voyage in through the ice south of Kap Borlase Warren the *Gustav Holm* had to labour so hard that she suffered various damages to the stem, which necessitated great repairs.

1932.—On July 17th the *Gustav Holm* was approaching Eskimonæs in Gael Hamkes Bugt. The bay was filled with ice, consisting of heavy sea ice and rotten fjord ice, there was a thick fog, and a strong current moved around the Finsch Øer. The ship drifted towards the Terneskær. During its manoevring in the ice the rudder struck an ice floe and broke in several places. On arrival of the ship at Eskimonæs the damaged rudder was replaced by the spare rudder.

1934.—In the afternoon of July 18th the *Gustav Holm* reached the ice edge. As it tried to enter the ice, which even at its edge consisted of very large and thick floes, a heavy swell suddenly set in from the southeast. During the backward manoevring the rudder struck the base of an ice floe and was forced so hard to the starboard that the whole steering gear broke down and the helmsman was hurt. The rudder itself had suffered no damage, so the hand wheel astern was taken into use. Next day, when the weather had moderated, the steering wheel astern was substituted for the broken-down steering wheel on the bridge.

On July 20th a high ice floe touched and bent the starboard davits of the foremost jolly-boat and at the same time part of the gunwales was crushed.

On July 27th the ship was beset in the pack, and both the rudder and the stern were subjected to great pressure. Afterwards it turned out that the rudder had been badly damaged. During the days in the ice many of the iron plates had been damaged or torn off, and the bow rails had got loose in several places.

In the evening of September 11th on the voyage from Scoresbysund to Reykjavik the vessel had to be hauled to the wind owing to a north-northeasterly wind lasting for several days, and a heavy sea. Shortly before midnight of September 13th, while still close-hauled, a heavy sea washed over the stern, entirely destroying the front part of the bridge. Thus the plating of the bridge was carried away, and the stanchions were broken or removed. The hood of the orlop deck companion was torn out of the hatch coaming and thrown towards the front edge of the deck house, breaking two of the stays in the house. The port deck house was loosened from the coaming and partially shattered, and the valve on the after edge of the house was torn out of the deck. The lashings of a motorboat placed on the main deck on the starboard side burst and the boat was forced astern and rather badly damaged. Two

valves in the fore deck were crushed, the azimuth dial on the bridge was destroyed. Water penetrated down to the orlop deck and caused some damage.

The damages may be summed up as follows: stern rails, ice-sheathing, and iron plates loosened, the rudder split, the propeller had to be exchanged after the return of the ship, the after main-rails were crushed, and the bridge, the front hood, the deck house, etc. had been more or less damaged.

1937.—Under the many attempts to push northward from Scoresbysund and during the subsequent protracted voyage from Scoresbysund out through the ice the *Gustav Holm* sustained several minor damages.

In the late summer the ship was subject to high pressure in the direction from stem to stern and packing of the ice in Rosenvinges Bugt near Scoresbysund, and for about twenty minutes the ship was in great danger of being sunk by the ice. After the return to Copenhagen the following damages were noted: the figure-head had become split and forced out of place, the rudder had become split and had to be discarded, several bow and stern rails had been carried away, a number of bolts had been loosened, and the plates of the ice sheathing more or less damaged. The whole bottom as well as the ice sheathing and the planking were examined and repaired. The inner bobstay had been crushed, the bow sprit had to be repaired, one of the rudder pendants had burst and the chains had to be renewed, a deck beam in the provision room had become broken, several of the bulkheads shifted, the main deck, the orlop deck, the after deck, and the waterway needed repairs the stearing gear and wheel rope were partially replaced, the lowermost bulwarks on the fore deck on the starboard side had been stoved in and were replaced. The bridge and the rigging had suffered some damage, all carved work fore and aft had to be repaired, iron bulkheads and fore part of orlop deck were leaking. The foremost fortification of the boat deck on the starboard side had become broken, an anchor had to be replaced, and various other damages had been sustained.

1938. s.s. *Godthaab*.—On July 16th the *Godthaab* tried to enter the ice off the mouth of Scoresby Sund, with the result that several plates of the ice sheathing were damaged. The ship was beset in the ice from the 16th to the 24th. On the 21st the ice packed heavily around the ship, and the main piece of the rudder was split throughout its length. It was provisionally repaired by means of wires, and afterwards, when the ship reached the shore, with iron bands. During the ship's labour in the ice several iron plates got loose and a plank on the starboard side above the water line was stoved in. On July 28th the martingale stay got loose and the bobstay was broken.

On August 16th, while the ship was riding at anchors at Scoresby-sund, heavy ice masses drifted towards the colony, forcing the ship towards the river mouth, where it remained aground during the subsequent ebb-tide. When the ice receded somewhat, and the seaplane and the boats had been lowered, the ship succeeded in getting off the ground at high-water by means of the windlass and by keeping the engines working full speed.

On August 22nd the ship was labouring very hard in the ice off Kap Borlase Warren, and two iron plates and one breast-hook got loose. Afterwards it turned out that the propeller shaft had become bent and had to be replaced.

The damages enumerated above are some of the most important damages sustained by the ships during the expeditions, according to the captains' reports.

Two times, only, the ships were in danger of being wrecked, viz. the *Godthaab* during the gale over the ice edge in September 1929 and the *Gustav Holm*, during the short, but very heavy, packing of the ice in Rosenvinges Bugt in August 1937. However, as will be evident from the above, the rudder will often become damaged, so it is absolutely necessary to have a spare rudder that may be substituted for the damaged one.

The ice sheathing and the fortifications of the stem, also, will often sustain damage, and in a couple of cases the outer plating was crushed right up to the deck. In 1930 and on two later occasions the *Godthaab* had to undergo such thorough repairs that a new ship might, no doubt, have been built for the same money.

Motorboats.

There are three periods in which it is possible to travel in East Greenland, namely from the middle of March to June 1st (sledge journeys, c. 100 days), from about July 1st to the end of September (voyages by motorboat, c. 80 days), and the period from the end of October to the end of November, in which, however, the traveller may be obstructed by the darkness and sometimes by snow (sledge journeys, c. 30 days).

The period in which motorboats can be used is by far the most important; a cooperation can be established with the ships and the seaplanes, and the work on land is not impeded by snow.

Seaworthiness.—Fairly large and seaworthy motorboats are required for voyages in the East Greenland fjords, many of these being long and broad, and strong local fjord winds blow almost every day during the summer.

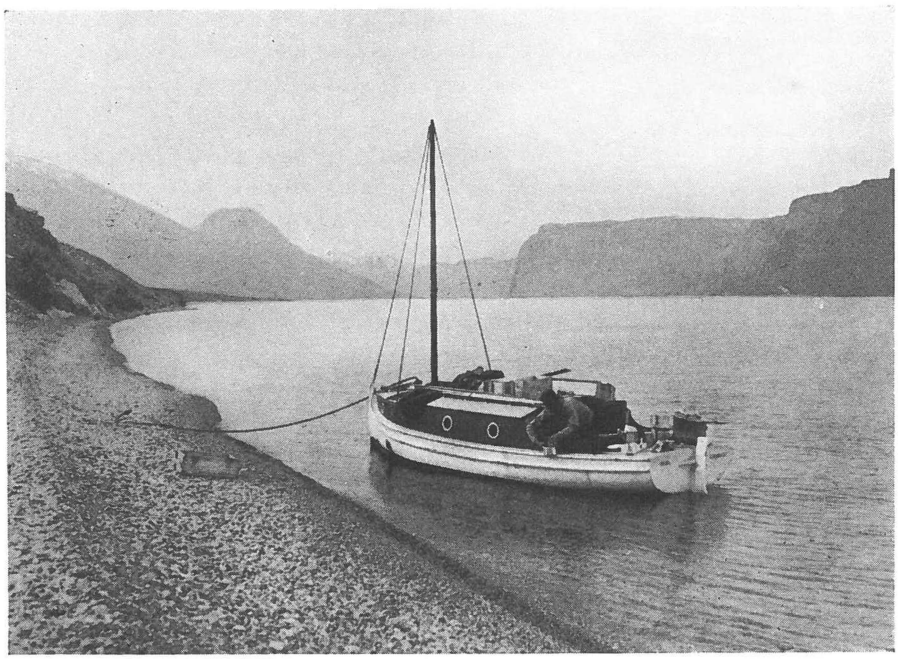


Fig. 129. The "Asut".

Only one of our boats was quite ideal for sailings in the fjords, viz. the *Johan*, which I used in 1926 and 1927 at the mouth of Scoresby Sund. It was a broad boat, provided with a strong keel and sails, and it was able to carry a heavy load even in bad weather.

The *Godthaab* is only able to carry rather small boats, while the *Gustav Holm* can transport fairly heavy motorboats of a length of up to 26 feet; but since the boats have to be placed on the so-called boat deck, they can only be c. 1 m deep.

With a view to the hoisting gears of the ships the boats were fairly light and so fitted that they could easily be lowered or taken on board. The heaviest boats, for instance the *Polypen* and the *Asut*, required extra hoisting gears. For these reasons the greater number of the motorboats of the expedition were lighter and less seaworthy than desirable.

Since several of the boats were to be hauled ashore and remain there during the winter, and the spring is very dry in East Greenland, some of them were built on the Engelhardt life-boat model. Such boats are very spacious and very resistant to the pressure of the ice; but a leakage in a boat of this type is almost irreparable. They were exceptionally tight and well suited for wintering on the shore; and they did not get leaky during the months of spring.

A number of boats were carvel-built, and some of the smaller boats were clinker-built. When well attended to and partially filled with snow in the spring, these boats, also, tolerated wintering ashore.

It is absolutely necessary for all boats in these regions to be fitted with ice-sheathings; as a rule these consist of copper plates, which cover the boat from some distance above to some distance below the water level from the stem to a little after the middle of the boat. One night in the latter part of August I sailed in a clinker-built motorboat without ice sheathing near Hochstetters Forland; there was much new ice, and the boat was cut half through on either side of the stem that night.

Since the boats were rather flat and were, as a rule, to be sailed by amateurs, they were not provided with sails; this would have been too dangerous in view of the frequent eddy winds which blow in the fjords, but even the largest boats were fitted with a pair of oars. Since the East Greenland fjords are very deep almost everywhere, the anchors of the large motorboats may sometimes be difficult to weigh; gradually we therefore used fairly small anchors, but as a rule the boats were at the same time moored to a stone ashore.

All the boats were furnished with fire-extinguishing apparatus. Some tins of pemmican, usually stored among the ballast, were always found in the boats to serve in the case of emergencies.

Engines.—The aforementioned motorboat *Johan* was provided with a very clumsy and heavy six horse-power glow-head engine (model Dan). This type of engine, which for the first three decades of the present century was much used in Greenland, requires about half an hour's heating by means of a blow-pipe before the start, and this may, of course, be rather inconvenient under certain circumstances. Strong cold may further impede the start, the oil in the engine being very thick. The start itself is effected by means of a handle and often requires the full strength of a strong man.

Another drawback associated with this type of engine is that when the engine is running slow, it is cooled and often stops moving. The engine had a very low number of revolutions. The propeller was two-bladed and reversible, which is very convenient on voyages in ice-filled water, as is often found at the mouth of Scoresby Sund.

However, the engine of the *Johan* presented several advantages for navigation in the Greenland waters; these advantages had to be given up as we changed to flatter boats and less heavy engines with a greater number of revolutions.

The expedition in 1929 was equipped with three two-cylinder 6—8 h.p. Kelwin poppet valve engines. They were easily started by means of petrol, even in cold weather, and run on kerosene except on

long voyages in ice, when petrol was used. In the large boats we gradually changed to 12—15 h.p. four-cylinder Kelwin poppet valve engines. They were, of course, difficult to start in cold weather, but this type of engine could be managed even by persons not familiar with motors.

In 1932 the newspaper *Extrabladet* presented to the expedition four motorboats equipped with Swedish Solo engines; two of the boats had five-horse-power, the other two three-horse-power engines. However, these engines proved to be less suitable in the Greenlandic climate, being rather sensitive to cold, and they were often difficult to start.

The two boats *Asut* and *Imara*, built in 1931, were provided with four-cylinder 15—18 h.p. Kelwin-Ricardo engines. They had a great number of revolutions and seemed on the whole to be of a more modern type than the Kelwin poppet valve engine. Moreover they were fitted with a gear system, so that the difficulties connected with the somewhat primitive coupling in the Kelwin poppet valve engine was avoided.

A couple of trial trips before the start of the expedition convinced me, however, that these engines were at some points (the gear system, water pumps) too complicated and too light-built for the rough handling to which they are subject on an expedition. A boat with a Kelwin poppet valve engine was therefore built in 1932, and another in 1933.

In the *Asut* and the *Imara* the engine was placed in the stem, in order that the helmsman might look out for submarine skerries and ice floes and know when the boat entered shallow water. If the party on board wanted to go ashore, the stem was as a rule run way up on to the shore. This type of boat presented many advantages, and the motorboat *Polypen* was built according to the same system. The space behind the motor was warm, and a cabin, which was perfectly tight, was built behind the place of the helmsman.

But the system had some drawbacks, also. The stem was very heavy, and if, moreover, it was short, as in the *Imara*, it shipped much water. To counter-balance the heavy stem, large fuel tanks were fitted in the stern and a small tank was placed on either side of the helmsman, who by means of pumps would thus be able to fill the two small tanks with petrol and kerosene.

This distribution of the weights required a heavy keel. At first, until the keel had been fortified, the *Polypen* gave some trouble, the long propeller shaft being liable to run hot. The cooling valve was placed near the stern of the boat in order that the cooling water pumps should not be filled with sand when the boat was run ashore on a sandy beach.

The larger boats (with cabins) as a rule carried a 12—18 feet jollyboat to be used in case of landing. If these boats were riding at anchors, one man, at any rate, always slept on board. Gradually

most of the larger motorboats became equipped with wireless installations.

All the motorboats carried spare parts for the engine. In the later years a four-cylinder Kelwin poppet valve engine was deposited at the station on Ella Ø and another was found on board the *Gustav Holm*.

Altogether the motorboats were too small and cheap and often gave rise to anxiety. What we feared the most, was a breakdown of the engine, so that the boat might be carried by wind and current out into the pack ice and the party on board be liable to succumb. Fortunately, however, all the wreckages of motorboats on the expeditions occurred in such places that the shipwrecked parties could get into communication with the ships or reach one of the stations by their own aid.

List of the Motor-Boats of the Expeditions.

1926–1927. 1) *Johan.* 24′ × 8°6″ × 3′10″. A 6 h.p. Dan glow-head engine. Ordinary Danish fishing-boat type, heavily built of oak and pine, with a heavy keel. Both boat and engine very heavy. Handed over to the manager of Scoresbysund on August 4th, 1927.

1929. 2) Life-boat 1 of the *Godthaab*. A 22-feet Engelhardt life-boat with air boxes of copper. In 1929 fitted with a two-cylinder Kelwin Poppet 6 h.p. engine.

3) Life-boat 2 of the *Godthaab*. As No. 2).

4) *Kaptajn I.* Clinker-built 19-feet open boat with bars for awnings. A 6—8 h.p. Kelwin poppet valve engine. Built for the expedition in 1929; transported on the *Godthaab* in 1931, on the *Gustav Holm* 1932—39.

1931. 5) *Asut*, built at Kastrup near Copenhagen in 1931. Dimensions 24′ × 4′ × 3′. A 15 h.p. Kelwin poppet valve engine installed in the stem, cabin in the middle of the boat, and large tanks astern. A comparatively seaworthy boat. Stationary at Eskimonæs in the summers of 1932 and 1933. Was wrecked in October 1933 during a gale north of Holland Ø.

6) *Imara.* Sister-boat to the *Asut.* Built at Kastrup in 1931, dimensions 22′ × 7′10″ × 2′10″, with a 12—15 h.p. Kelwin poppet engine. This boat was very short and flat and shipped much water in heavy seas; much less seaworthy than No. 5. Stationary at the Ella Ø station in the summers of 1931, 1932, 1933, and 1934. In 1934 it was taken home for repairs, but in 1936 sent up to Eskimonæs, where it was much used, but owing to careless mooring it drifted away about September 1st and was totally wrecked near Store Finsch Ø.

7) *Angmasetten.* Built at Skovshoved in 1908, length 19′. Had been used in West Greenland and as a tug-boat. Underwent thorough repairs in 1931. The engine, a 3 h.p. Kelwin engine, model 1924, was partially renewed, a motor winch and other installations were fitted. The boat was intended to serve during zoological investigations at the station on Ella Ø. However, it was never used, since at the beginning of September an iceberg drifted into the harbour, carrying away the boat. Later on it was found as a wreck on Haslums Øer.



Fig. 130. The motorboat "Imara".

8) *Kaptajn II.* A small, old, but strongly built 19′ tug-boat with a one-cylinder $1^1/_2$ h.p. Kelwin poppet engine, model 1924; tug-boat on the Godthaab. In the course of the summer boat No. 4 was found to be too light for use in the ice-filled water off the station in Nordfjord, so it was exchanged for this boat, which thus became station boat in the Nordfjord. As it lay very low in the water, it was not particularly seaworthy, but in September 1931 it was used for trips into Moskusoksefjord and Geologfjord, and next year a party sailed it into Moskusoksefjord and subsequently down to Ella Ø. However, on the way to Ella Ø it stranded on the north side of Suess Land; but it got off the ground and proceeded to Ella Ø, where it was condemned.

1932. 8) *Karen.* Built at Korsør in 1932, 24′ × 6′ × 2′5″, provided with a 5 h.p. Solo engine. In 1932 it was station boat at the Kulhus station, where it was used in the summers of 1932 and 1933. In 1934 it was used at Ella Ø, and in the autumn was transferred to the trapping company Nanok.



Fig. 131. Motorboat of the "Horn" type.

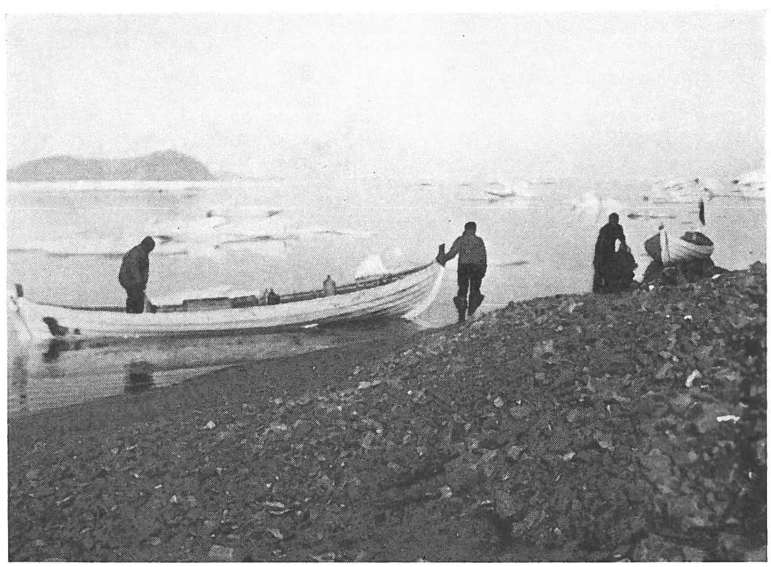


Fig. 132. Light motorboat of the Faroe type.

10) *Gerda*. Sister-boat to boat No. 9. Was used in 1932, 1933, and 1934 for voyages in the Ella Ø district. Was wrecked at the end of August, 1934, on the north side of Ymers Ø. The engine was in part saved.
11) *Horn*. Built at Copenhagen in 1932 on the Faroe fishing-boat model. Dimensions 24′ 1 6′4″ × 2′1.5″, equipped with a 3 h.p. Solo engine.



Fig. 133. Aircrafts in the harbour at Ella Ø.

Used for voyages in the Ella Ø district in 1932, 1933, and 1934. Was hauled ashore at the end of August near Antarctics Havn. Owing to the ice it was impossible to save the boat, which was destroyed in the course of the winter.

12) *Lise.* Sister boat to boat No. 11. Was used in the summers of 1932, 1933, and 1934 for voyages in the Ella Ø district. Was wrecked at the end of August 1934.

13) *P. 1.* Built at Korsør in 1932. Length 21′, equipped with a 15—18 h.p. Kelwin-Ricardo engine. Used for voyages in the Ella Ø district in the summer of 1932, carried home with the ships in the autumn. Sent up next summer and used for sailings in the Ella Ø district in 1933 and 1934; in the latter summer the engine worked unsatisfactorily. The boat was condemned on Ella Ø in the autumn of 1934, but the engine was carried home for repairs.

1933. 14) *P. 2.* Built at Korsør in 1933. Dimensions 23′3″ × 6°9″ × 2°8″, equipped with a 15—18 h.p. Kelwin-Ricardo engine. Used in East Greenland in the summers of 1933 and 1934. Carried home in 1934 and transferred to the Administration of Greenland.

15) *Ford.* Slender jolly boat with a 36 h.p. Ford petrol engine, length 19′. Bought second-hand, intended for communication between the *Gustav*

Holm and the shore or the seaplanes. Used only during the first part of the summer, after which the engine was removed, and the boat was used as a jolly-boat.

16) *Polypen.* Built at Kastrup in 1933. Dimensions 26′ × 8′ × 3′, provided with a 12—15 h.p. Kelwin poppet engine, sister-boat to boats 5 and 6 but of maximum size. Used in 1933 for voyages along the coast between Scoresbysund and Traill Ø and in Kong Oscars Fjord, and in 1934 for voyages in the interior of Scoresby Sund. Here the boat had to be left in a lagoon near the south coast of Jameson Land; it was later fetched by Greenlanders from Scoresbysund, whence it was sent to Copenhagen in 1935. In 1936 it was sent to East Greenland again after thorough repairs, and in the summers of 1936, 1937, and 1938 served as station boat on Ella Ø. In 1938 it was transferred to the police inspection service.

17) *Penta.* In 1929 the expedition carried a 3 h.p. outboard motor, which was used for sailings in the ice with the jolly-boats. In 1932 a strong, but too heavy jolly-boat was built for it, which was used in 1932 and 1933 for shorter trips within the Ella Ø district, while in 1934 and 1935 it was used at the Eskimonæs station, in 1935 as the only motorboat at the station. In 1936, 1937, and 1938 is was used for short trips from the Eskimonæs station, even late in the year. In 1938 it was transferred to the police service.

1936. 18) *Buldog.* Built at Korsør in 1936. Dimensions 22′ × 6′3″ × 3′10.5″, provided with a 6—7 h.p. Kelwin poppet engine. According to the plan it was to be carried home in the autumn, but owing to the wreckage of boat No. 6 it was transferred to the station at Eskimonæs, where it served as station boat in 1937. In 1938 it was transferred to the police inspection service.

1937. 19) *Triton.* Built in Norway. Length 24′, provided with a 12 h.p. Kelwin poppet engine. Bought second-hand. Used as station boat at Gurreholm in 1937 and 1938. Was carried home in the autumn of 1938 and taken over by the Administration of Greenland.

20) *Nanok.* Built in 1937 for the trapping company Nanok. Equipped with a 7—8 h.p. glow-head engine, Skandia model. Length 7 m, breadth 2.2 m. Bought from the company Nanok in 1937 as it was impossible for the ship to go to the northern stations of the company. Served as boat for the station at Scoresbysund in 1937 and 1938, and was subsequently taken over by the colony of Scoresbysund.

21) *Kim.* Built at Kastrup in 1933. Dimensions 8.5 m × 2.1 m × 1 m, equipped with a 15—18 h.p. Kelwin poppet engine. Bought second-hand and rebuilt before it was sent up in 1937. As the ship was unable to go to the northern stations, the boat returned home with the ship in the autumn. In the spring of 1938 the engine was exchanged for a 75 h.p. Penta petrol engine, and the boat was used at Spitsbergen as tug-boat for the seaplane *Perssuak.* (Subsequently it was sold.)

The above-mentioned boats can be classed under the following types:

1) *Johan.* Ordinary Danish fishing boat with a slow engine, very seaworthy, large hold, primitive cabin for three persons.



Fig. 134. The motor-boat "P. II".

2) *Polypen, Imara, Asut.* Built on the Engelhardt model, with a spacious cabin.
3) *P. 1, P. 2, Buldog, Triton, Kim.* Carvel-built, fairly seaworthy boats with cabins.
4) *Kaptajn I, Karen, Gerda, Nanok.* Fairly strong boats without cabins.
5) *Kaptajn II, Horn, Lise, Ford.* Light, slightly seaworthy boats without cabins.
6) *Penta.* Strong boat with an outboard motor.

Six of the twenty-one boats became wrecked and three were condemned.

PROVISIONS

This chapter may be divided into three sections,

1) Provisions for ship's companies and passengers,
2) — - the personnel wintering at the stations,
3) — - the camping parties.

The provisions used on the ships

were supplied and paid by the Administration of Greenland and were accordingly no concern of the expedition. The meals were as follows:

At 8 a.m., breakfast, including one hot dish, a dram, and a bottle of non-alcoholic beer.
- 12 o'clock, dinner, two hot dishes, claret.
- 3 p.m., coffee (on sundays with cognac or liqueur).
- 6 p.m., supper, including one hot dish, beer.

Already on the first summer expedition it became customary that from the day the ship entered the ice till it again reached the open sea the crew as well as the passengers were allowed to have an extra cop of coffee at the expense of the expedition. This was highly appreciated, not least since camping parties often started or returned in the night.

Provisions for the personnel of the stations.

During the greater part of the expedition there were two main stations, each of which was supplied with provisions estimated to suffice for eight men wintering at the station. In addition each station was supplied with spare provisions, likewise for eight men, in case it would be impossible for the ship to call at it. Finally, each station had a substation, Kap Brown and Nordfjord, respectively; in the period 1931—34 each of the substations had provisions for four men for five months, in the years 1936—38 only for two men for five months.

The provisions sent up were solidly packed in cases. The goods for each station were marked with a special colour in order to facilitate the loading and unloading; thus the goods for Eskimonæs were marked by blue, those for Ella Ø by red, those for Nordfjord by black, and those for Kap Brown by green. The cases with spare provisions were marked in a special way and the main contents of the cases were indicated.

Below a list is given of the provisions and spare provisions supplied to the Eskimonæs station and the Nordfjord station in 1936. Precisely the same provisions were supplied to the Ella Ø station and the Kap Brown station. I have chosen the list for 1936, because various changes in the composition of the provisions took place in the course of the years 1931—34, the quantity of some provisions being increased, while others were reduced or not supplied at all.

In 1936 a reduction of c. 20 per cent. of the spare provisions took place as compared with 1931, in view of the smaller number of members joining the expedition that summer. The provisions for the sub-stations were reduced by 50 per cent., since in these years they were only to be visited by persons travelling from one station to another, while during the first years members of the expedition sometimes stayed at these stations for fairly long periods.

The provisions listed below, however, should not be regarded as standard provisions. They were prepared with a view to the fact that the greater number of the wintering members of the expedition were Danes and Greenlanders; men of other nationalities will, no doubt, prefer somewhat different provisions.

List of provisions for eight men for one year.

	P_1 Eskimonæs	P_2 Spare provisions	P_3 Nordfjord
1) Pork, salted	80 kg	..	..
2) Pork, smoked	50 -	..	..
3) Ham, tinned	50 -	40 kg	5 kg
4) Roasted pork, tinned	100 -	60 -	10 -
5) Soused pig	50 -	20 -	10 -
6) Soup with meat, tinned	200 -	75 -	10 -
7) Roast beef, tinned	20 -	..	..
8) Roast veal, tinned	20 -	..	..
9) Veal cutlets, tinned	20 -	..	..
10) Lamb, tinned	20 -	..	..
11) Beef, tinned	40 -	..	5 -
12) Beefsteak, tinned	20 -	20 -	5 -
13) Boiled beef	50 -	40 -	5 -
14) Corned beef	100 -	75 -	10 -
15) Mock turtle, tinned	40 -	..	2 -

	P_1 Eskimonæs	P_2 Spare provisions	P_3 Nordfjord
16) Ox tongue, tinned	20 kg	..	..
17) Small sausages, tinned	30 -	15 kg	5 kg
18) Liver paste	50 -	20 -	10 -
19) Meat extract	3 -	..	..
20) Vitamon	6 bt.	..	..
21) Pork sausages	20 kg	..	..
22) Smoked sausages	50 -	20 -	..
23) Blood pudding, tinned	50 -	40 -	10 -
24) Fish pudding, tinned	25 -	..	..
25) Fish balls, tinned	25 -	20 -	..
26) Halibut, tinned	100 -	40 -	..
27) Anchovies	10 -	10 -	3 -
28) Herrings, skin & boneless	10 -	..	..
29) Lobster	10 -	..	..
30) Salmon	20 -	..	3 -
31) Sardines in oil	30 -	25 -	5 -
32) Sardines in tomato	10 -	..	..
33) Gaffelbitar	10 -	..	..
34) Pickled herring	1/2 barrel	..	..
35) Salt fish	50 kg	20 -	..
36) Butter in tins	150 -	..	..
37) Butter in barrels	50 -	..	..
38) Margarine	200 -	150 -	50 -
39) Clarified dripping	30 -	..	..
40) Peas, yellow	100 -	40 -	10 -
41) Beans, brown	100 -	40 -	10 -
42) Barley groats	30 -	25 -	10 -
43) Peeled barley	30 -	25 -	..
44) Oaten groats	50 -	40 -	20 -
45) Rice	50 -	40 -	20 -
46) Pork fat	30 -	40 -	5 -
47) Sago	15 -	10 -	..
48) Rye biscuits in zinc barrels	200 -	75 -	50 -
49) Wafers	3 -	..	..
50) Crisp rye bread	25 -	..	..
51) Biscuits, top & bottom	5 -	..	..
52) Biscuits, "Marie"	10 -	..	..
53) Biscuits	10 -	..	..
54) Creme crackers	10 -	..	..
55) Rye meal	400 -	300 -	50 -
56) Wheat flour	500 -	300 -	75 -
57) Sago powder	10 -	..	..
58) Ground rice	10 -	..	..
59) Potato flour	10 -	..	..
60) Brown sugar	50 -	40 -	10 -
61) Cut sugar	300 -	225 -	40 -
62) Crushed sugar	100 -	75 -	10 -
63) Fine crushed sugar	2 -	..	..
64) Cerebos salt à 675 g	10 boxes	..	2 boxes

	P_1 Eskimonæs	P_2 Spare provisions	P_3 Nordfjord
65) Liverpool salt	50 kg	40 kg	15 kg
66) Dried plums	15 -	..	3 -
67) Raisins	15 -	..	3 -
68) Tea	15 -	12 -	3 -
69) Coffee, raw	100 -	120 -	10 -
70) Coffee, roasted	50 -	..	5 -
71) Cocoa	20 -	25 -	5 -
72) Chocolate	50 -	40 -	15 -
73) Currants	2 -	..	..
74) Pepper, round	1/4 -	..	..
75) Pepper, ground	2 -	..	..
76) Cinnamon, sticks	1/2 -	..	..
77) Cinnamon, ground	2 -	..	..
78) Laurel leaves	100 g	..	..
79) Cardamom, ground	200 -	..	..
80) Isinglass	1/2 kg	..	..
81) Mustard, brown, ground	2 -	..	1/2 -
82) Mustard, Sarepta	1 -	..	..
83) Curry	2 -	..	..
84) Almonds, sweet	2 -	..	..
85) Succade	1 -	..	..
86) Macaroni	50 -	..	10 -
87) Soy	5 bt	..	..
88) Jar raisins	10 kg.	..	..
89) Shell almonds	10 -	..	..
90) Pudding powder	50 packets	..	5 p
91) Ketchup	6 bt	..	..
92) Tomato	5 kg	..	..
93) Vinegar	12 bt	..	3 bt
94) Tarragon vinegar	1 -	..	..
95) Olive oil	24 -	4 bt	5 -
96) Lime juice	24 -	..	..
97) Worchester sauce	4 -	..	1 -
98) Cheese	30 -	..	..
99) Swiss cheese	50 -	..	..
100) Eggs	10 scores	..	..
101) Dried eggs	5 kg	..	..
102) Condensed milk w. sugar	400 tins	225 tins	150 tins
103) Dried milk	30 kg	..	..
104) Hops	1 -	..	..
105) Eng. yeast cakes	50 dozen	15 dozen	10 dozen
106) Thyme, dried	3 bt	..	..
107) Parsley, dried	3 -	..	..
108) Julienne pot-herbs, dried	20 kg	20 kg	5 kg
109) Onions, dried	50 -	50 -	5 -
110) Blue berries, dried	5 -	..	..
111) Cherries, dried	5 -	..	..
112) Elder berries, dried	5 -	10 kg	1 -
113) Apricots, dried	50 -	40 -	10 -

	P_1 Eskimonæs	P_2 Spare provisions	P_3 Nordfjord
114) Peaches, dried	25 kg	..	..
115) Apples, dried	50 -	..	..
116) Russian green peas, dried	10 -	..	..
117) Potatoes, dried	150 -	120 kg	10 kg
118) Borecole, tinned	50 -	40 -	5 -
119) White cabbage, tinned	50 -	40 -	5 -
120) Red cabbage, tinned	50 -	..	..
121) Pot-herbs, mixed, tinned	75 -	40 -	5 -
122) Green peas, tinned	5 -	..	5 -
123) Beans, tinned	10 -	..	..
124) Pine apples, tinned	24 -	..	6 -
125) Peaches, tinned	24 -	..	6 -
126) Apricots, tinned	24 -	..	6 -
127) Pears, tinned	48 -	..	6 -
128) Onions	30 -	..	..
129) Carrots	30 -	..	..
130) Potatoes	500 -	..	..
131) Apples	30 -	..	..
132) Oranges	50 pieces	..	..
133) Lemons	50 -	..	..
134) Lemon juice, concentrated	12 bt	..	..
135) Raspberry syrup	10 l	..	..
136) Rhubarb syrup	20 -	..	..
137) Elderberry syrup	10 -	..	..
138) Plums, conserved	5 -	..	..
139) Cherries, conserved	5 -	..	..
140) Raspberries, conserved	5 -	..	..
141) Strawberries, conserved	5 -	..	..
142) Cowberries, conserved	5 -	..	..
143) Red Currant jelly	5 -	..	2 -
144) Preserved cucumber	10 -	..	..
145) Preserved gherkins	10 -	..	..
146) Pickles	10 -	..	2 -
147) Piccalilli	15 -	..	..
148) Jam, in tins	50 -	..	3 -
149) Honey, in tins	25 -	20 -	3 -
150) Tobacco, div	25 kg	20 -	..
151) Plate tobacco	10 -	8 -	3 -
152) Chew tobacco	5 -	5 -	..
153) Cigars	600 -	..	..
154) Cheroots	200 -	..	..
155) Brandy	10 bt	..	..
156) Aquavit	20 -	..	..
157) Angostura	2 -	..	..
158) Old rum	12 -	..	..
159) Cognac	12 -	..	..
160) Whisky	6 -	..	..
161) Sherry	6 -	..	..
162) Madeira	6 -	..	..
163) Port	6 -	..	..

Experience has shown that one soon gets tired of all kinds of tinned meat, and the provisions were therefore to be supplemented by fresh meat secured by the Greenlanders. This gave no great trouble, since the regions in which the expedition was at work were very rich in game. The marine animals, seals, narwhals and sometimes walrusses, played a great role; the most important land animals were musk-oxen and arctic hares, while the birds were of very little importance.

Some kinds of provisions were to be used on short trips, mountain climbs, etc., thus sardines, chocolate, and crisp rye-bread, while the Greenlanders were especially fond of the rye biscuits.

Cheese will, as a rule, crumble away, but is much appreciated by Europeans in the autumn when the cold begins to make itself felt.

Dried vegetables, notably dried onions, were extensively used. Fresh vegetables (onions and carrots) had, of course, to be eaten during the autumn. Fresh potatoes, dug immediately before the departure of the expedition, were stored in such a way that they did not thaw again when once frozen. When they were to be boiled, they were put into boiling water in a frozen state. In this way the wintering members had fresh potatoes till some time in the spring.

Fresh fruits, apples, oranges, and lemons, did not tolerate freezing. Fruit syrup in bottles did not tolerate great degrees of cold, so they were kept in suitable places at the main stations. Beer, mineral waters, and light wines were not supplied for the same reason. Spirits and stronger wines were supplied by the expedition, but the individual members were not allowed to bring with them spirits for private use. The tobacco included in the list was intended for festive occasions; in addition each member of the expedition had his personal ration of tobacco.

In the spring the stations required over the wireless provisions for the coming year on the basis of the above list. Thus, for instance, P_1, 13—20, 95—12, meant that Eskimonæs required 20 kg of boiled beef and 12 bottles of olive oil.

Gradually the spare provisions were removed to some minor sheds built near the main stations, to be saved in case the latter should be destroyed by fire.

It could not be avoided that a good deal of provisions grew unfit for use in the course of the years. However, owing to the dry climate and the dry store houses, various kinds of provisions, for instance flour, kept surprisingly well; the same applies to the tinned provisions, which were, as a rule, frozen during the greater part of the year. A good deal of the oldest provisions were laid out in depots to serve on sledge journeys or for camping parties. It was a rule, however, that the depots should be abundantly supplied, and if any provisions showed the

slightest indication of not being in a good condition, they had immediately to be discarded.

A case of scurvy occurred at the end of the winter of 1936 at Ella Ø, which had not been visited by the ship the previous summer.

In the spring of 1937 two members of the expedition were attacked by a peculiar poisoning while on a sledge journey near Traill Ø, and for a short period they were seriously ill. The cause of their disease was never discovered. They were unfit for work during the early summer, but on their return to Denmark they had almost recovered.

Apart from these few cases, the health of the wintering personnel was good during all the years of the expedition.

Camping Provisions.

In the summer of 1929 the expedition carried various provisions, a certain quantity of which was supplied to parties which were at work independently of the ship. A similar procedure was adopted in 1930 and 1931. In 1932, however, the so-called provision cases were introduced, each case containing provisions sufficient for one man for six days. The cases, which were made of board $^1/_2''$ thick and had the following dimensions: $615 \times 340 \times 157$ mm, were packed in Copenhagen before the departure. After being emptied, the boxes were used for packing of samples, and the leader of the party, who was equipped with a bottle of black painting and a hair pencil, marked these cases with collections to be sent home with the ship by a mark, usually the initials of the leader, and a number in order that he might be able to see at once what the cases contained.

In 1932 the expedition was equipped with 200 such cases, in 1933 with 400, in 1936 with 70, and in 1937 and 1938 with 120 cases. As the empty cases were insufficient for the collections to be brought home, the ship carried materials for a number of cases, which could easily be prepared by means of nails; the materials were bundled three and three together.

The contents of the provision cases were altered somewhat in the course of the years until 1936, when we had arrived at a certain quantity and composition of the provisions which proved to suffice for a man occupied with hard work in the Greenlandic climate. However, the provisions were so abundant that when a party was fetched at the agreed date, a fairly considerable surplus of various kinds of provisions was always left. Thus we knew that a party might subsist for some time, though on a somewhat uniform diet, in case the ship should be prevented, for instance by drift ice, in fetching the party at the date agreed upon.

Contents of a provision case.—The favorite tinned meat was hog's hearts in creme sauce, so from 1936 all the cases contained 1 kg of this and in addition 3 kg of other kinds of tinned meat, varying between roasted pork, roast beef, soup mith meat, beef, beefsteak, corned beef, Bavarian sausages, gullash, and pea-soup with pork. In addition it contained 3 small tins of liver paste, 2 tins of sardines in oil (to be used during mountain climbs), furthermore 200 g smoked sausage, 2/2 kg butter, 1/2 kg barley groats, 2/2 kg oaten groats, 3 × 1/2 kg rye crisp bread, 1 1/2 kg sugar (packed in extra strong bags), 1/2 kg coffee, 1/2 kg chocolate, 50 g tea, 3 tins unsweetened milk, 600 g cheese, 500 g dried apricots, 1/2 kg preserved peaches, 1/2 kg preserved pears, Cerebos salt, pepper, mustard, Oxo soup extract, 10 boxes with matches, 20 Meta tablets, 3 needles for the Primus stove, tin openers, nails, and 4—5 newspapers for packing of samples.

When a party was to be landed or start out in a motorboat, the number of provision cases to be supplied was at once calculated on the basis of the number of members and the duration of the trip. The cases were always placed in such a way in the hold that they could be easily unloaded, consequently it took only a minimum of time to provide a party with the necessary provisions. Each case weighed 20 kg, so they were easy to carry ashore and some way inland, if necessary. On a Greenland expedition it is of importance that the packages do not weigh more than can be easily carried by one man; heavy packages may be very troublesome and exhausting to unload and transport.

Each camping party was provided with a case, of the dimensions of two provision cases placed one above the other, containing eating and cooking gear, two Primus stoves with spare parts, funnels, a hammer, pincers, an ax, etc. In addition the camps were provided with a number of strong 20 l and 40 l oil cans. Mountain climbing parties or parties at work far inland or flying parties were in addition equipped with particularly light Primus stoves and cooking gear, usually bought according to the desires of the leader of the party.

In a few cases camps were erected in places where there was no fresh water in August, or where the water was polluted with gypsum or mud. As a rule, however, blocks of calf ice were found along the coast, but when the wind blew from certain quarters, this could not be relied upon, and the parties had to be provided with fresh water in wooden containers.

PONIES

As the expeditions always called at an Icelandic port on their upward voyages, it was natural to use Icelandic ponies for the transport of heavy loads; in the period 1932—1938 a total of 38 ponies were used in East Greenland. As the grass vegetation in these regions did not provide sufficient food for the ponies, the expedition carried hay from Iceland, apart from the first year in a compressed state, and in most recent years highly compressed hay in bales from Denmark, as also strong food the main constituent of which was ground maize; finally, the ponies often had the barley and oaten groats left from the provision cases. The vegetation, especially in the interior of the country, varied considerably from year to year. Thus in 1936, when there was no ice off the east coast of Greenland at the height of summer, and consequently abundant clouds and precipitation, the vegetation was so luxuriant that it provided no small supply to the horse food, whereas in 1938, when large ice masses occurred off the east coast and the precipitation was consequently much lower, there was hardly any grass for the ponies.

In the first two or three years the ponies were bought in the neighbourhood of Akureyri by the Danish Legation. Subsequently they were bought by the Icelandic members of the expedition, who were familiar with horses and took care of them during the expedition. The ponies were preferably to be 6—8 years old (as is well known, the Icelandic ponies may be 14—16 years old) and in a good condition, some of them should be well-trained pack-horses, others riding-horses. After serving in East Greenland for 4—6 weeks, the ponies were lean. They were never transported back to Iceland; sometimes they were taken on board the ship and shot, or they were transported to one of the stations, where they were used for carrying coal and kerosene from the shore to the station as long as sufficient food for them was at hand. In two cases, viz. in 1933—34 and in 1937—38, the ponies survived during the winter.

In 1932 saddles and packing bags were bought in Iceland, but they were not satisfactory. In 1933 and subsequent years the expedition borrowed an equipment of first class harness and pack saddles from the

Danish Army; during the World War 1914—18 the Army had used Icelandic ponies for the transport of machine guns and ammunition, but this was later given up owing to the insufficient supply of Icelandic ponies in this country. Mounts with room for two provision cases could be fitted to the saddle, one on either side. Square oil tanks, which could take 40 kg oil, were likewise prepared. Thus a pony carried a load of 40 kg on either side, and on top of it horse food and various kinds of equipment, altogether the ponies carried a load of c. 120 kg on level ground, but only about 80 kg in the mountains.

From the Army we also borrowed straps, by means of which the front legs of the ponies were lashed, in order that they should not run away from the camps. The ponies were very curious, and time upon time they tried to join a herd of musk-oxen. As a rule, however, the musk-oxen were frightened and ran away before the ponies reached the herd.

1932.—The expedition was equipped with two ponies for transport of the ore-prospecting gear to a height of c. 800 m on Clavering Ø. The ground was fairly smooth, but rising steeply, and the transports were somewhat hindered by soil-flow. The ponies were led by Mr. SCHOURUP SØRENSEN, who had served in the Danish Army under surveying in Iceland, and Mr. S. KAMMAN. After the investigations had been finished and the camp had returned to the shore, the ponies ran away; about the middle of October they appeared at Eskimonæs, when they were very lean; one of them was shot, while the other escaped and was seen no more.

1933.—The expedition was equipped with eleven ponies. They were first at work on the south coast of Jameson Land. Subsequently two ponies were landed on Ymers Ø, where they were to transport the heavy collections of Devonian vertebrates down to the shore. Seven ponies were stationed on Clavering Ø to serve during the practic-geological investigations led by Mr. O. EKLUND; these ponies were attended by the Icelander Mr. HANSSON and Mr. SCHOURUP SØRENSEN. As a surplus of horse food was left at the end of the summer, a horse shed was built at Eskimonæs, and three ponies wintered there. They carried out various work during the winter, but were killed in the spring. Two ponies were used for excursions to the interior of Clavering Ø to altitudes of up to 1200 m by Messrs. MALMQVIST and KAMMAN. The travelling conditions were very difficult; it was realised that the ponies could only be used with advantage in fairly broad and level valleys. After their return the ponies were handed over to the EKLUND party.

1934.—Five ponies were used for transports led by JARVIK, and on a journey across Gauss Halvø. This year, also, it proved that rough territory was unsuitable for horse transports, whereas the ponies could

be used with advantage for transport of heavy loads of collections over rather short distances.

1936.—The expedition was equipped with six ponies, two of which were placed at the disposal of Dr. BÜTLER during a trip to the interior of Hudson Land, where the valleys are broad and level, while four transported collections of Devonian vertebrates for the SÄVE-SÖDERBERGH party in Paralleldal.

1937.—The expedition was equipped with eight ponies, all of which were to winter at the station Gurreholm. The horse stable was found in the station house proper. Owing to the rainy summer there was a fairly luxuriant vegetation around the station, and in the late summer and autumn long journeys with the ponies were undertaken across Scoresby Land to Antarctics Havn; these journeys were of special importance, because the ship was unable to call at the northern stations that year. By means of the ponies it was possible to make extensive geological investigations between Scoresbysund and Davy Sund in the autumn. In the course of the winter the ponies grew more long-haired, and altogether they did not tolerate the wintering as well as expected. Moreover heavy snowfalls occurred in the winter of 1937—38, which prevented transports with ponies both in the autumn and the early spring, whereas fairly long journeys across Jameson Land were made in the early summer. The ponies were attended by an Icelander familiar with horses and a Dane.

At the height of summer and until the beginning of October Jameson Land is well suited for horse transports, but it is a question whether it is profitable to let the horses winter. No doubt it is most profitable to use horses in July-September and dogs in the months of spring.

1938.—Six ponies were transported to East Greenland this summer, which were to serve on a four weeks' journey in the interior of Hudson Land under the leadership of Dr. H. BÜTLER, who, as stated above, also travelled here in 1936. A route up the valleys was planned on the basis of the topographical maps prepared by the Geodetic Institute, and a depot was established by means of the seaplane near Krumme Langsø. The ponies crossed the rivers in the most suitable places, while persons and equipment were carried across in a rubber boat. It was a very trying journey, but thanks to Dr. BÜTLER's experience and careful planning and the first class equipment and ponies, which were attended by the Icelander P. GUNNARSSON, who from his childhood was familiar with horse transports in the inaccessible regions in northern Iceland, it was successfully accomplished. During the ascent from Moskusoksefjord a mishap occurred, one of the ponies sliding down the mountain and being so seriously injured that it had to be shot at once.

Altogether Icelandic ponies are well suited for transports and journeys over fairly level territory in East Greenland, especially for transports of heavy loads over rather short distances. The ponies should be first class and attended by Icelanders familiar with that kind of work. As a rule they should not survive during the winter, but after the summer work has come to an end they may mean a valuable addition to the dog food at the stations.

WIRELESS EQUIPMENT

In the period from 1926 to 1939 the radio developed from a plaything to a factor of essential importance for the work of the expedition.

In **1926—27** the expedition had a receiving set, which during the winter enabled us to listen to music from London, and about the New Yew we heard some few Danish words.

In **1929** and **1930** the s. s. "Godthaab" was equipped with a radio, by means of which messages about the position of the ship were transmitted to Copenhagen almost every day. Only exceptionally, however, was it possible to receive weather reports from Iceland.

In **1931** the two ships (s. s. "Godthaab" and s. s. "Gustav Holm") were equipped with radio, and in the course of the summer two stations were erected ashore, at Eskimonæs and Ella Ø respectively; the latter, however, did not function till after the ships had left the coast. The radio service that summer was mostly limited to transmission of messages about the position of the ships.

In **1932** the radio service of the expedition was considerably increased. In the spring regular weather messages and reports on the activities of the wintering personnel were transmitted to Copenhagen, and during the summer the activities of the members were followed and directed over the wireless. Besides the radio stations of the ships and the stations at Ella Ø and Eskimonæs, a third one ashore was erected at Kulhus on Hochstetters Forland. Radio was further equipped in the two seaplanes and in two motorboats, and a mobile set made it possible to communicate with a camping party during short periods. The meteorological service was much extended, and weather reports were received, especially from Icelandic and East Greenland stations; regular communication was established with Scoresbysund and sometimes with Angmagssalik. At the end of August the Scoresbysund radio received a message that a depression was approaching rapidly up the east coast of Greenland; this enabled us to save one of the seaplanes by letting it start immediately for Iceland.

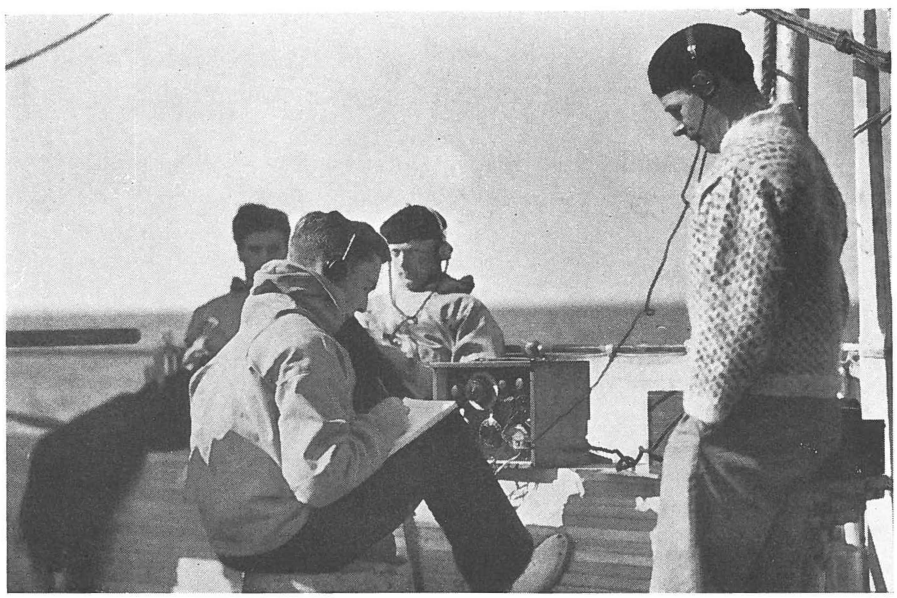


Fig. 135. Instructions in the use of the wireless.

In **1933** the radio equipment included the aforementioned two ship's stations, three stations ashore, two seaplane stations, three motorboat stations, and two mobile sets, totalling 12 wireless stations, which twice a day reported about the work of the various parties. Many weather reports were received, especially from South Greenland and Iceland. The seaplane stations proved very useful, directing from the air the movements of the ships through the ice.

In **1934** the radio equipment comprised: one ship's station (s. s. Gustav Holm), two permanent stations ashore (Eskimonæs and Ella Ø), one radio station in the seaplane, three in motorboats, and three mobile stations.

In **1936** the following stations were available: one ship's station (s. s. Gustav Holm), the stations at Eskimonæs and Ella Ø, two motorboat stations, and two mobile stations.

In **1937** the expedition had at its disposal: one ship's station (s. s. Gustav Holm), three permanent stations ashore (Eskimonæs, Ella Ø, Gurreholm), one motorboat station, and one mobile station. Further, the service offered by the Scoresbysund radio was very helpful for the expedition.

In **1938** the wireless comprised: one ship's station (s. s. Godthaab) one seaplane station, three stations ashore (Eskimonæs, Ella Ø, Gurreholm), two motorboat stations, and one mobile station.

The individual stations.

The wireless station of the s. s. Godthaab consisted of a 1 K.W. M. P. Pedersen short-wave and medium-wave transmitter, and a receiver of the same make.

The wireless of the s. s. Gustav Holm comprised: 1 K.W. Elektromekano long-wave and medium-wave transmitter, and a $^1/_2$ K.W. Elektromekano short-wave transmitter. Receivers of the same make.

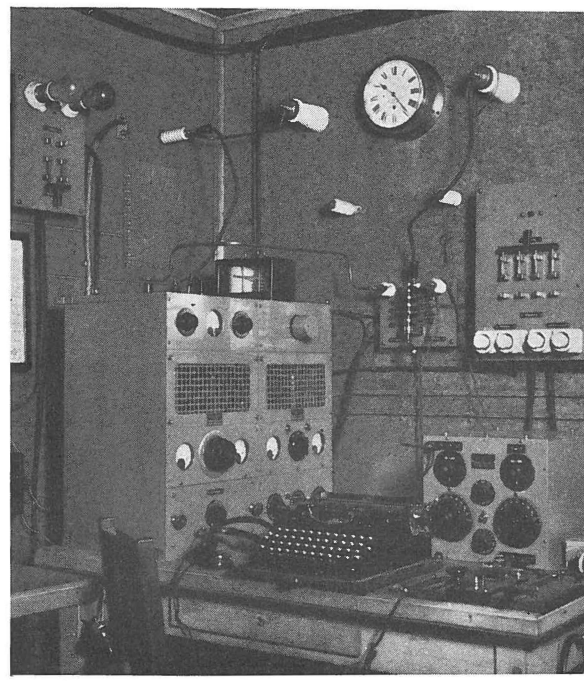


Fig. 136. The wireless station at Eskimonæs.

The permanent stations at Eskimonæs and Ella Ø were identical, consisting of a 200 Watt Elektromekano short-wave, medium-wave, and long-wave transmitter for both telegraphy and telephony; the latter, in particular, was much used. Receivers of the same make.

The stations at the Kulhus and Gurreholm stations had ca. 25 Watt transmitters. The station at Kulhus was only operated during the summer, the other three all the year round. The Eskimonæs and Ella Ø stations communicated daily with each other, and during the summer received daily weather reports from the seaplanes when in the air and from the motorboat and mobile stations; the latter stations were operated by amateurs, while the permanent stations ashore and the ships' stations were operated by certificated operators. It turned out that while the ground stations were always able to receive messages from the aircrafts,

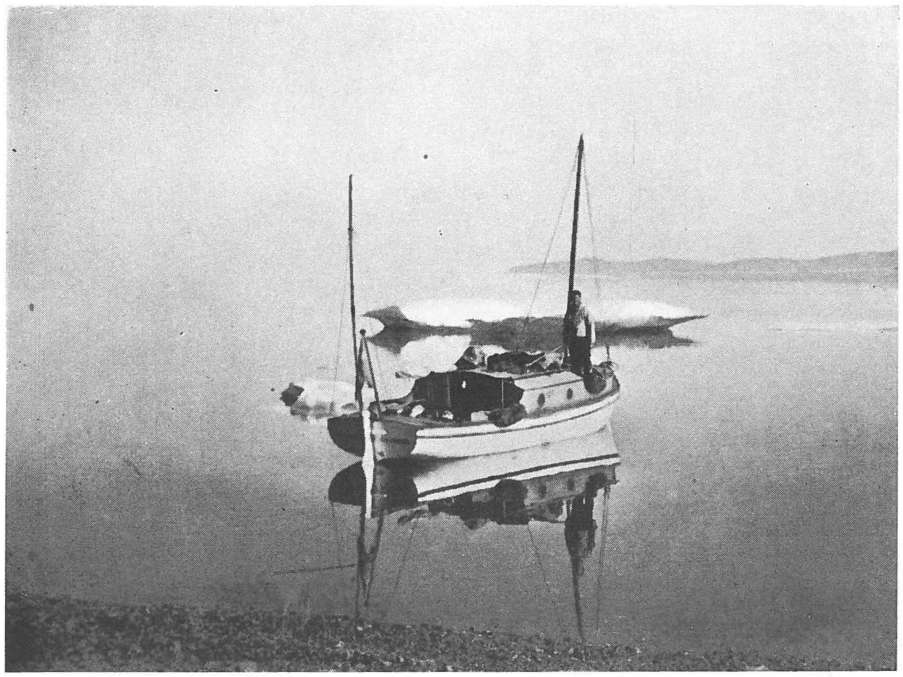


Fig. 137. Antennae on a motorboat.

the latter were unable to pick up messages from the ground station when flying over the inland ice and sometimes if only a mountain separated them from the ground station. Before the start of a long flight the route was drawn on a map and a figure indicated for every 10 km; during the flight the pilot reported to the ground stations whenever a figure on the map was passed; thus the ground stations always knew the position of the aircraft at the particular moment. This was a precautionary measure for the case an accident should occur.

The stations at Eskimonæs, Ella Ø, and, in part, Gurreholm maintained constant connection with Denmark, sending reports and receiving instructions. On the whole the stations functioned satisfactorily, notably Eskimonæs often communicated directly with the Lyngby Radio, its location being particularly favourable for radio-telegraphy. Communication with Scoresbysund was, as a rule, good (short-wave), better from Eskimonæs than from Ella Ø, the latter station being surrounded by high mountains. For communication with stations to the west, the location of Ella Ø was the best; thus it was possible for this station to maintain almost daily communication with Godhavn on the island of Disko (West Greenland), distance ca. 1000 km. Communication by telephone was, as a rule, just as stabile as by radio.

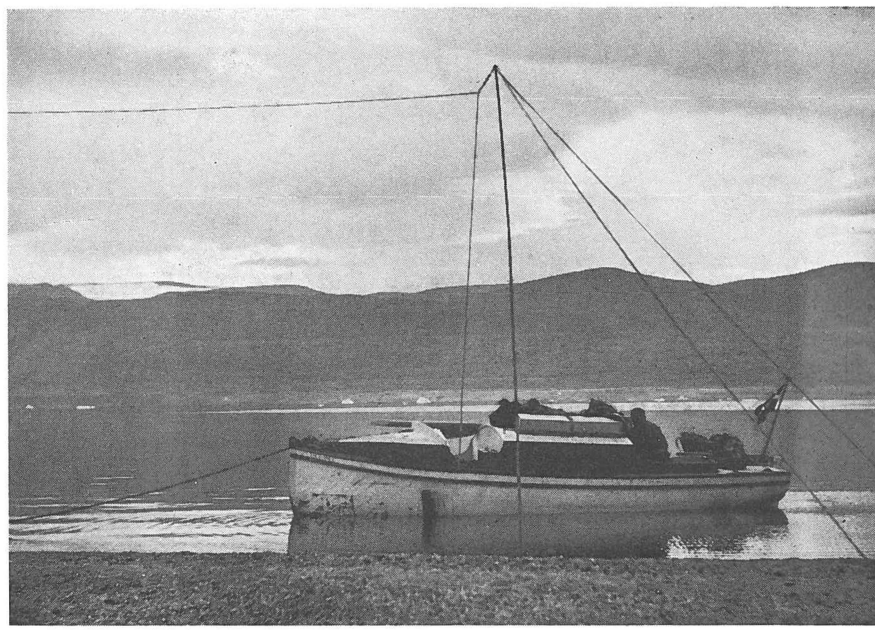


Fig. 138. Antennae on a motorboat.

The radios of the aircrafts (ca. 500 Watt long- and short-wave transmitters) were of German manufacture. The power was supplied by a small propeller generator. In 1933 short-wave transmitters in aluminium boxes were fitted in the aircrafts to serve in case of emergencies (ca. 20 Watts, only for telegraphy, dry batteries).

The motorboat stations and the mobile stations ashore were practically identical and may therefore be treated *en bloc*. Only one of them, viz. the transmitter in the m. s. Polypen, received its energy from a generator operated by the engine of the boat. It functioned particularly well and even on several occasions communicated with Denmark. All the other stations were made by amateurs and had an aerial effect of 10—20 Watts. The energy was supplied from dry batteries. They were short-wave transmitters of inconsiderable weight and hence easily transported from one place to another. In the motorboats aerials were suspended between bamboo masts fore and aft. One of the transmitters was experimentally adapted for telephony, but it had only an inconsiderable range. The telegraphic range of the stations, however, was fairly wide, and nearly all of them did good service day upon day during the summer, maintaining communication with the ships' stations and the permanent stations ashore, transmitting messages about position, work, provisions, weather, etc. Further, the parties were directed over

the wireless from one place to another, and received instructions of interest for the work and safety of the parties.

It will be seen from the above that the wireless enabled the leader of the expedition to follow the work of the members from day to day during the summer. Disturbance by foreign stations was inconsiderable. The operators were free to select the wave-length which they regarded as most suitable at the particular moment, and a foreign station approaching East Greenland was soon localised, thus, for instance, that of Colonel LINDBERGH in 1933.

As mentioned above, the weather reports from South Greenland and Iceland were sometimes of importance for the expedition; however, compared with the intensive weather service after the war, the between-war service was rather primitive.

HOUSES

In 1920 I built my first expedition house in ca. 78° N. lat. in North-west Greenland. It was planned to last for three years, but owing to heavy northerly gales it sustained much damage already the second winter.

In 1926 my second expedition house was built at Scoresbysund. As the Administration of Greenland desired that it should be used for other purposes after the expedition, it was very strong, being built of logs and several layers of heavy boards on a concrete base.

In 1931 two stations to last for at least three years and some smaller travellers' houses were erected in East Greenland. On my sledge journeys in 1926 and 1927 and on the ships expeditions in the summers of 1929 and 1930 I had tried to find favourable sites for these stations. With a view to sledging in winter and navigation in summer, only two areas might come into question, viz. the area around Clavering Ø and the large area including Kejser Franz Josephs Fjord and Kong Oscars Fjord. Before establishing a permanent station it is desirable to acquire an intimate knowledge of various conditions in the place, first of all the harbour conditions. Thus a station should be placed near a sheltered natural harbour with good holding ground and fairly free of drift-ice and icebergs during the period of navigation. The only suitable place on Clavering Ø was its southernmost point, Eskimonæs, where two natural harbours with good holding ground are found; the so-called east harbour cannot always be used in the summer owing to ice-drift along the shore, but the west harbour, the only really good harbour in the Clavering Ø area, is practically always free of ice. The house was built in the immediate vicinity of the two harbours (see fig. 141).

There was some doubt as to whether the house should preferably be built in Young Sound in the place where the radio station Daneborg was later erected, for in some years Young Sound will become free of ice earlier than the waters around Eskimonæs. In recent years, however,

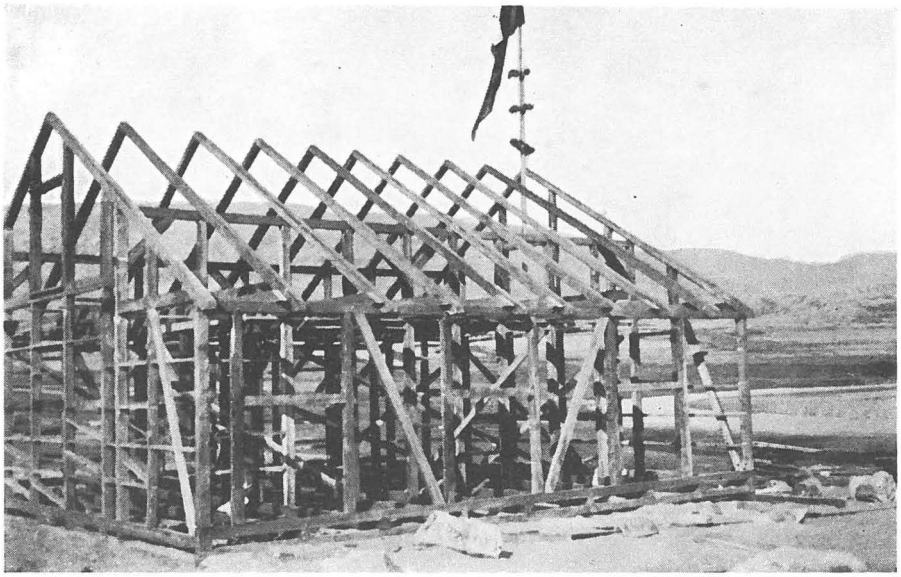


Fig. 139. Framework of the house at Eskimonæs.



Fig. 140. The Eskimonæs station almost finished.



Fig. 141. The station Eskimonæs and its surroundings.

the latter waters have been the first to become ice-free, so in that respect the two sites are probably equally good; but there is no good holding ground off Daneborg, and there is also a good deal of drift-ice. Moreover Daneborg has, as a rule, a larger number of foggy days than Eskimonæs, and in winter the station is troubled by very strong northerly gales.

As regards the situation of the other station there were several possibilities. From a navigational point of view the interior of Moskusoksefjord would be well suited, as a ship might be sheltered here during the winter. The fjord water is almost fresh, which is of importance for cleaning of the boilers of old ships, and the fjord water could likewise be used for filling the boilers. However, it turned out that heavy snowfalls and deep snow occurred here during the winter, in the summer it was often foggy, and in view of the work in the district a station here would be rather out of the way.

Another place that came into consideration was the head of Duséns Fjord. Here, too, a ship might be well sheltered in the winter, and fresh water was available. But the snow is deep in winter, and travelling in the district from this place is not ideal, either.



Fig. 142. The Eskimonæs station in winter.

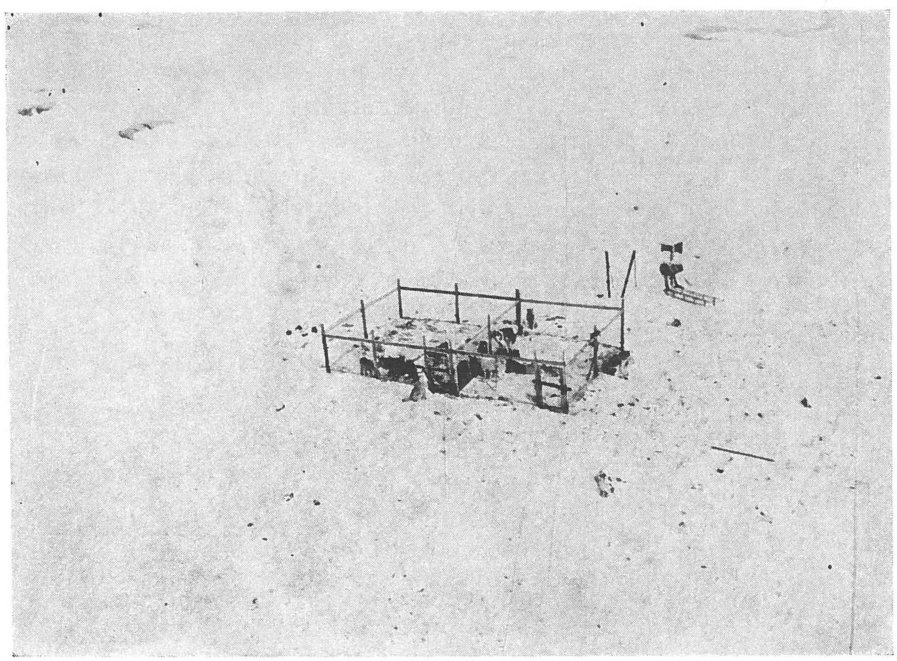


Fig. 143. Dog-yard at Eskimonæs.

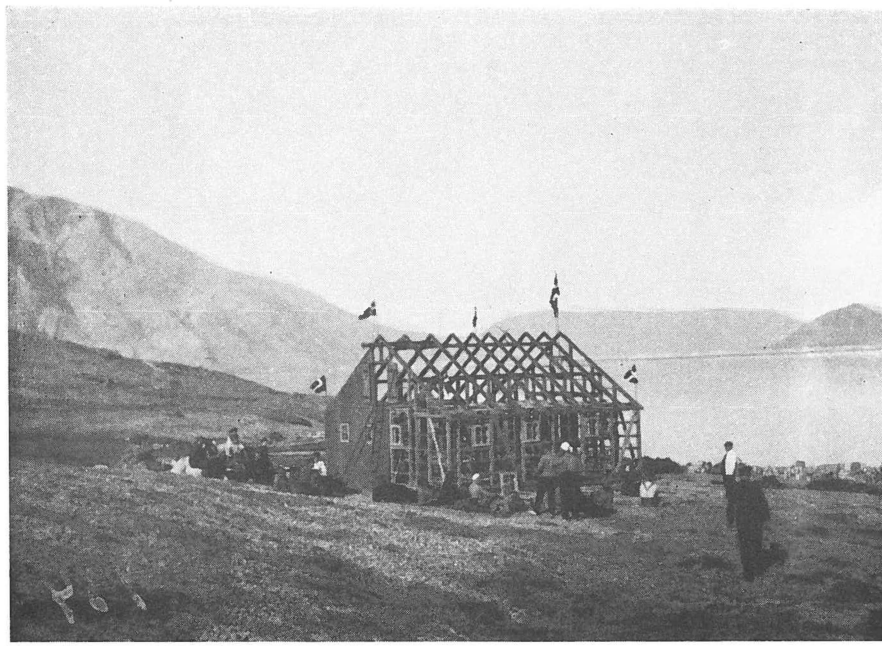


Fig. 144. Building of the station at Ella Ø.

The choice of the north coast of Ella Ø near Kap Oswald was due to various reasons: a small cove presented excellent anchorage, the climate was fine with many sunny days, the water is rarely agitated, and only exceptionally does swell caused by foehn winds from the northwest occur. Later it turned out that both at Eskimonæs and at Ella Ø there are good landing conditions for aircrafts, though in some years occasional icebergs may drift in to Ella Ø, causing difficulties for ships and seaplanes. In the last few years it has been necessary to erect a station on Maria Ø a little north of Ella Ø, where there is good holding ground for ships and motorboats, and seaplanes may run directly ashore, as on Ella Ø, and there is no great risk of meeting icebergs, but fogs are more frequent in the summer.

Both at Eskimonæs and at Ella Ø there is sufficient fresh water available in summer for the inmates of the station, whereas the conditions for ships to obtain supply of water are not ideal in the two places. An absolute condition for the erection of a station is also the presence of a fairly level and absolutely dry raised beach, as is found at both Eskimonæs and Ella Ø; at Eskimonæs it consists of sand, so water will never gather around the house in summer; at Ella Ø conditions are even more ideal, large dry gravelly areas being found, in which all the water from the melting snow seeps down and disappears.



Fig. 145. Storing of provisions. Ella Ø.

Favourable wind conditions prevail round the stations both summer and winter. Eskimonæs is sheltered from the heavy northeasterly gales in winter, but snow-free ice is encountered not far to the east. Southerly

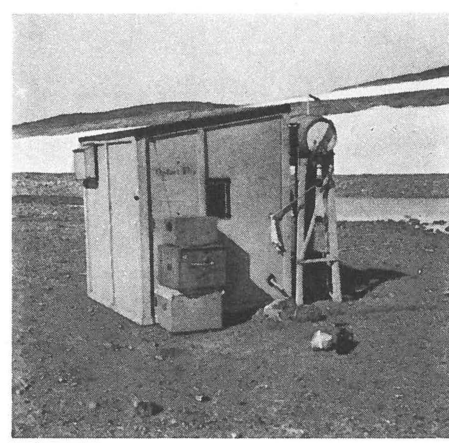


Fig. 146. Dark-room for development of photographs.

winds rarely blow. Southeasterly winds may produce some swell in the east harbour, but are of no importance in the west harbour. Easterly and westerly winds are, as a rule, light. West of the station there is often deep snow in winter, preventing travelling by sledge. The climate



Fig. 147. Eskimonæs in early spring.

at Ella Ø is among the best known in East Greenland, winds are rare, and the weather is nearly always clear both summer and winter.

Comparatively good hunting is found around the stations. On Clavering Ø there is a large population of musk-oxen, and fairly large narwhal shoals pass Eskimonæs in summer. Many hares often occur near and east of the Ella Ø station, and there is easy access to Ymers Ø, where large herds of musk-oxen occur, and to the regions around Mesters Vig, where musk-oxen are likewise fairly abundant. Through Vega Sund there is an easy passage to Scott Keltie Øer, where there are many seals, especially in the autumn, and in summer a number of fjord seals occur off the station. Before the erection of the stations in East Greenland a considerable migration of bears took place in the autumn, especially around Ella Ø, the bears migrating to the glaciers at the head of the fjord to breed. However, this migration has now ceased.

As regards the travelling huts, we found in 1929 a place at the mouth of a large valley on the east coast of Strindbergs Land where there was good holding ground, no large icebergs, and generally calm weather. The situation of the other substation at Kap Brown in Fleming Fjord was less favourable both in respect to ice and weather conditions.

In 1932 the station Kulhus was erected on Hochstetters Forland. It was built there, because the surface of the ground was strewn with



Fig. 148. The Eskimonæs station at wintertime.

coal fragments, so sufficient coal to heat the house could be picked up in the immediate neighbourhood of the station.

In 1937 it was planned to erect a station in the interior of Fleming Fjord for a wintering party whose members were to investigate the northern part of Jameson Land. The place was not particularly favourable, there would be much snow in the winter, and very likely the ice conditions would not allow a ship to call every summer. This was the case in 1937, so the station, which was called Gurreholm, was built east of Sydkap in the northern part of Scoresby Sund. The ship found a suitable anchorage immediately east of the large river Schucherts Elv. No icebergs occurred, but the ground was swampy and presented no ideal building site, and there was much snow in the winter; however, it was fairly easy to get to the area to be investigated, and we had no choice.

Thus, in the period August 1931 to August 1937 the following six stations were erected:

1) Hochstetters Forland (Kulhus)
2) Clavering Ø (Eskimonæs)
3) Strindbergs Land (Nordfjord)
4) Kap Oswald (Ella Ø)
5) North side of Wegeners Halvø (Kap Brown)
6) Western Jameson Land (Gurreholm).



Fig. 149. The Nordfjord station.

Three of these stations (Eskimonæs, Ella Ø, and Gurreholm) were intended to serve as wintering quarters for scientists, while the other three (Kulhus, Nordfjord, and Kap Brown) were substations or travellers' huts to be used by members of sledge or motorboat trips; however, they have repeatedly been used for prolonged stays and even for winterings. Thus two men wintered at Kulhus in 1933—34. In the summer of 1934 the house was taken over by the trappers living north of the place, but as the ship was unable to push as far north in the summer of 1934, and the trappers had no spare provisions, they remained in the house during the winter of 1934—35. Since then it has been occupied for shorter periods, but since 1939 it must be regarded as abandoned.

The Eskimonæs station was occupied uninterruptedly from its erection in 1931 to March 1, 1943, when it was burnt down by German soldiers.—The house at Nordfjord was occupied by 4—5 men from its



Fig. 150. Living-room of the Eskimonæs station.

erection in August 1931 to the end of November, from March to July 1938 by 3 men, and in the winter of 1948—49 by 2 men. In addition it has in the course of years been used by travelling parties for longer or shorter stays. It is still in a fairly good state of repairs and may be used by travellers. The station on Ella Ø has been occupied since its erection in 1931 to date with the exception of the period from March 1943 to the end of July 1947, in which it was only used by travelling parties. The number of members of the wintering parties varied between 1 and 9. Since the summer of 1950 the station has been occupied by a military patrol of 7 men. The Kap Brown house has, since its erection in 1931, been used as at travellers' hut on sledge journeys to and from Scoresbysund, but to a much less extent than the house at Nordfjord. At present it is in a rather poor condition, still it may be used for shorter stays. The station of Gurreholm was occupied by 6 men from its erection in 1937 to August 1938 and further during the war from 1941 to 1945. Occasionally it has been used by travellers, both Danes and Greenlanders. At present it is used by the colony at Scoresbysund as



Fig. 151. Living room of the Ella Ø station.

storage room and sometimes as trading station for the Eskimos living at Sydkap.

In the spring of 1943 Ella Ø was visited by German soldiers, who destroyed the wireless station including all masts and aerials, whereas the house itself was left intact.

Construction and Furnishing of the Houses.

The houses represent two types of construction. One consists of a house in the middle surrounded on three sides by sheds, the height of which is determined by the height of the windows, comparable to the side aisles of a church. The houses at Eskimonæs, Ella Ø, and Gurreholm are of this type. On the houses of the other type (Kulhus, Nordfjord, Kap Brown) the roof reaches the ground on two sides, so the house consists of a square room in the middle and two oblique-walled rooms on either side, and a pointed loft. There was no concrete base, but the flooring boards were placed directly on the ground. The

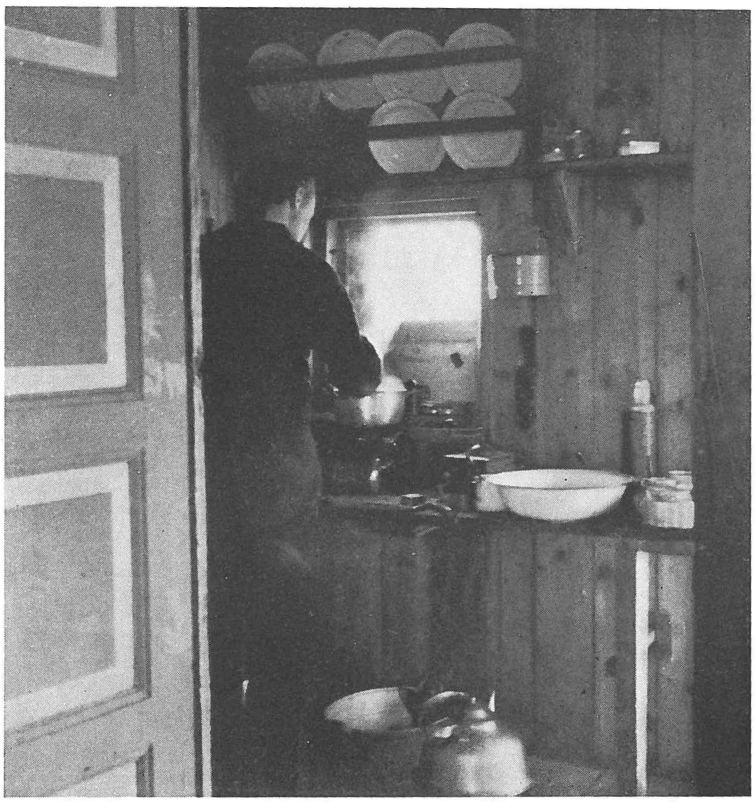


Fig. 152. Eskimonæs station. The kitchen.

provisions and coal stored in the side rooms were considered sufficient heavy to keep the house in place; this measure proved very useful. All the houses were provided with flooring, and draught from below was avoided by surrounding the house by a mound of sand or gravel.

The stations at Eskimonæs and Ella Ø were quite alike, built of Masonit plates on a timber construction made in Denmark. Their area was 66 sq. m (external measure). The roof and the side sheds were covered with tarboard. The walls consisted outwardly of two layers of hard Masonit and inwardly of one layer of semi-hard Masonit; the interspace between the outer and the inner layer was 12 cm, and the isolation was air. The floor consisted of two layers of boards with an intermediate layer of Insulite. The ceiling consisted of Masonit divided into fields by wooden ridges. The house contained the following rooms: Porch (1.5 sq. m), passage (3.8 sq. m), accumulator room (0.75 sq. m), engine room (2 sq. m), living room (23.8 sq. m), 5 equally large (3 sq. m) bed-rooms, and one pantry (3 sq. m), a workshop (5 sq. m), wireless station (5 sq. m), and bed-room for two Greenlanders (5 sq. m). There

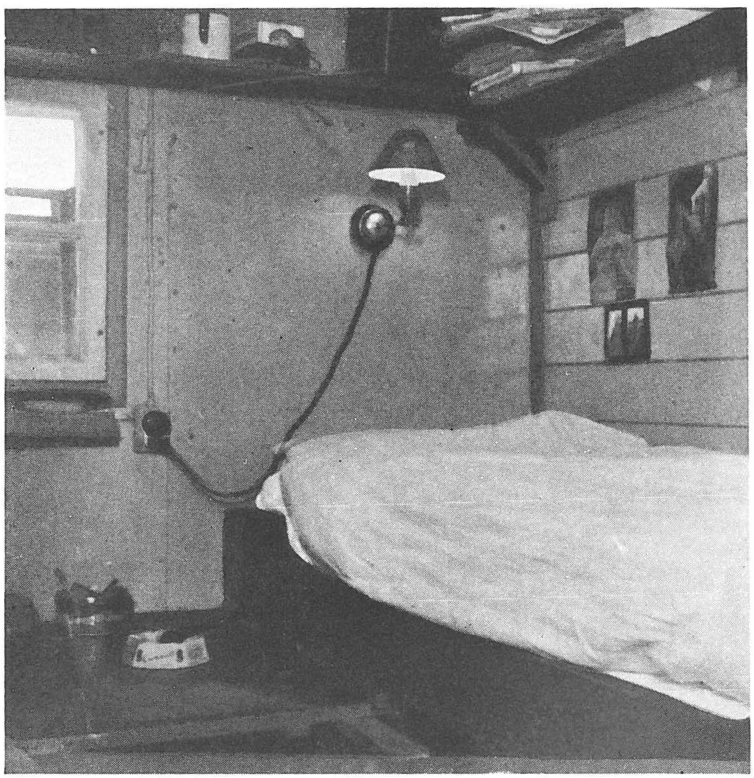


Fig. 153. A one-man cabin.

was a loft over the whole house, accessible by a fixed ladder in the workshop and a double shutter in the gable of the house, used in summer, when provisions were stowed in. All the rooms except the engine room and the accumulator room opened into the living room. All the bedrooms were equipped with fixed berths, under which were six drawers; further, a small collapsible table and a chair. The living room contained a stove and a kitchen range (opposite each other), a large fixed cupboard on one end wall, a large table (1.0×3.6 m), a smaller table, a varying number of chairs, and a bookcase. Electrical lighting (30 lamps) was installed in the house, the power being supplied by a Delco engine of 850 Watts. Further, there was a storage battery of 120 Ampère hours. The Delco engine and the storage battery supplied energy to the radio. The front of the house was facing eastward and had three double windows, and further all the rooms of the house were provided with windows.

The substations Kulhus, Nordfjord, and Kap Brown were of the other type. The roof was covered with tarred roofing board. The area

of the Kulhus and Nordfjord was ca. 28 sq. m, that of the Kap Brown house ca. 24 sq. m. The houses at Nordfjord and Kulhus contain three rooms: a small passage, a small pantry, and a living room of ca. 16 sq. m, at Kulhus with four open sleeping compartsments, in the other two houses with a plank bed for 5—6 men. In the living-room were trap-



Fig. 154. Engine for generation of electric power.

doors leading to the side rooms, and a loft was found in all three houses, to which there was access through a shutter in the gable of the house above the front door. The living room was provided with large windows in the front side of the house, whereas the loft had no window.

Gurreholm differed somewhat from the other two stations. A horse shed for eight wintering horses was built at one end of the house. The roof was level, the house being so long that it was not necessary to have a storage room under the roof, but the sheds along the sides were maintained. As on the other stations, each man had his own bed-room, and there was a common living-room, and a kitchen.

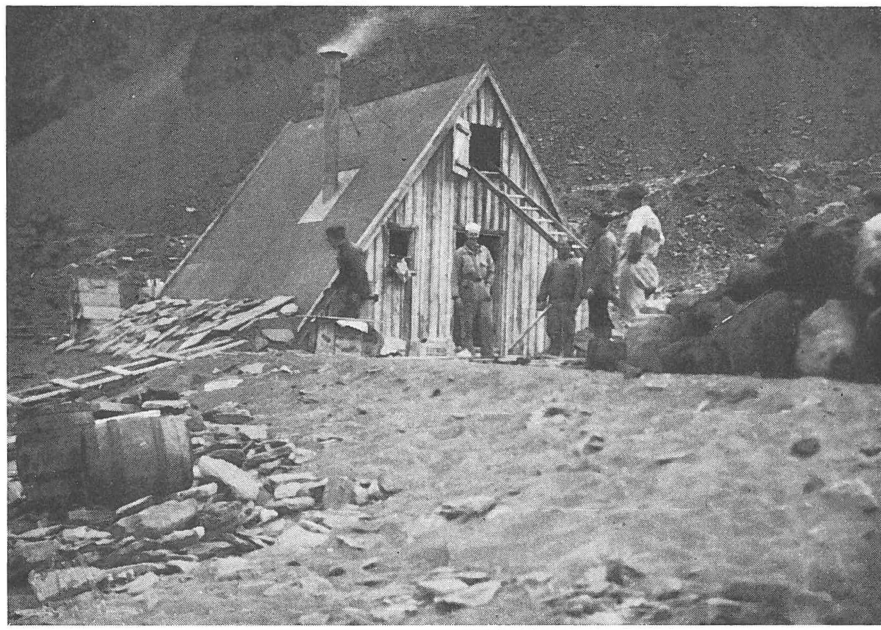


Fig. 155. The Kap Brown station.



Fig. 156. The Kap Brown station, built by the officers and crew of the "Gustav Holm" in twenty-four hours.

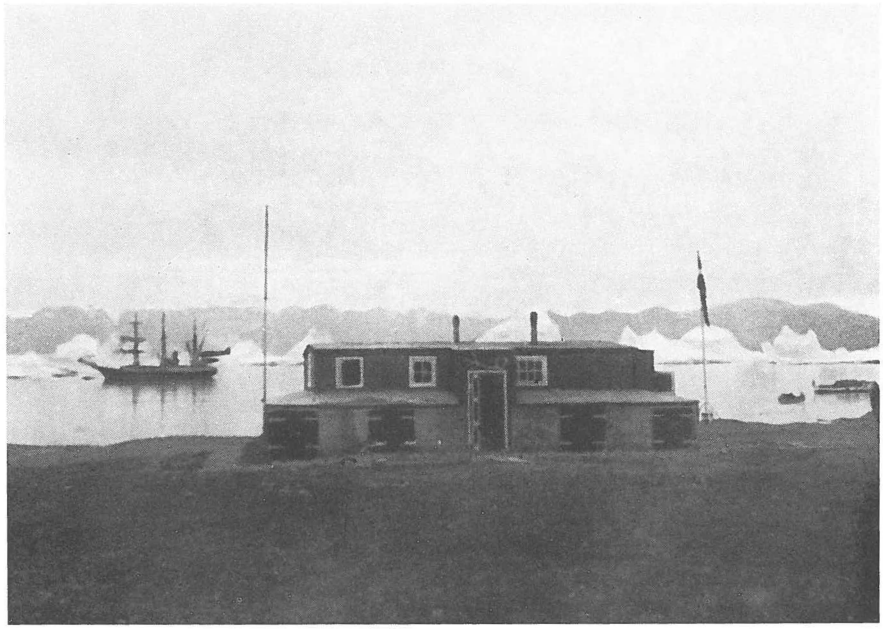


Fig. 157. The Gurreholm station.

Originally the houses were planned to be in use for some few years only. It has turned out, however, that the houses, which have been carefully tended, are practically just as good to-day as they were on the day they were finished, though they are now twenty years old. In the past twenty years the requirements for room and comfort have increased, so to-day a wintering scientist would hardly consider such primitive conditions satisfactory, but the scientists who wintered in the houses during the past twenty years have always been content with the conditions offered.