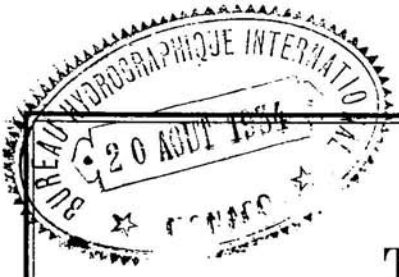


# THE POLAR RECORD

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**Director** .....

**Director** Long 21/8/34. agreed

**Secretary-General** .....

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MR JOHN RYMILL

Leader of the British Graham Land Expedition

# FOREWORD

The formal opening of the new building of the Polar Research Institute will be performed on November 16 by the Rt. Hon. Stanley Baldwin, Chancellor of the University of Cambridge.

In our next issue it may be possible to print a full account of the building for the benefit of overseas readers; in the meantime it may be briefly described as follows.

Sir Herbert Baker was given the general requirements and has succeeded, we believe, not only in fulfilling them but in planning a building which, in form and decoration, is a worthy memorial in itself to the name of Captain Scott.

It consists of two main floors and an enlarged attic floor. On the ground floor the entrance doors open into a vestibule which is the chief decorative element inside the building. Above a mosaic floor in black and white there are two lofty domes, the surfaces of which have been decorated by Mr Macdonald Gill with coloured maps of the two polar regions, incorporating the ships of the more prominent explorers of the past.

Beyond the vestibule is the main room, shaped like an L, in one limb of which will be the more practical section of the collections and in the other the more historical section.

On either side of the oak staircase at one end are small rooms for the Director and the Director's Assistant. Above these, on the first floor, are two small research rooms, beyond which is the Library, perhaps the most important part of the whole building. This is of pleasing appearance, carried out in oak, with excellent lighting from two tiers of windows. Beyond the Library and reached through an entrance framed by solid oak pillars is the Map Room, and this, like the Library, is floored with an oak parquet.

The attic floor deserves a better title and will probably be known as the Gallery, since it is designed to accommodate the increasing number of pictures, drawings and photographs, which have a very utilitarian as well as an artistic value.

The floor is of oak parquet and the walls are faced with Gaboon mahogany, the pinkish tinge of which makes the attic rival the Library in appearance. One of the walls being sloping and therefore not available for hanging pictures, recourse has been had to an idea of Sir Sydney

Cockerell's, as used in the Fitzwilliam Museum, of having display cupboards let into the wall, each having several doors fitting one over the other on which can be fastened thin drawings.

The memorial character of the building is emphasised by its façade, which, in addition to having Lady Hilton Young's bust of Captain Scott over the entrance doors, has a large inscription at the level of the balustrade which runs round the building below the roof. This inscription was suggested by the Rt. Hon. H. A. L. Fisher and runs: QUAESIVIT ARCANA POLI VIDET DEI, which may be rendered as "He sought the secrets of the Pole, he sees the secrets of God."

It is pleasant to record that His Majesty the King has approved the grant of the Polar Medal in bronze to the members of Sir Douglas Mawson's last expedition to the Antarctic. Sailing in the old *Discovery*, Captain Scott's first exploring ship, the expedition was in Antarctic waters for the summer seasons of 1929–30 and 1930–31 and traversed very thoroughly almost the whole of the coast which is now the Australian sector of the continent.

The wreck of the *Tcheluskin* in February might have been a very tragic event and the subsequent rescue of the whole party by aeroplanes is a very notable achievement. It has received the greatest commendation from all nations, and shows not only the great efforts the U.S.S.R. is making in its polar territories, but the very high efficiency of its pilots and air material used in Arctic service. It is very satisfactory to record that the Soviet Government has shown its appreciation by awarding special medals to the eight pilots who took part in the rescue.

The deep interest of Norway in polar exploration is reflected in the recent issue of a collected edition of the scientific results of the *Maud* expedition. They are dedicated very appropriately to its leader, the late Roald Amundsen, and consist of five large volumes, the cost of which has been largely defrayed from official sources, an example which might be noted by other countries.

The annual awards of the Royal Geographical Society include some for polar work. Most gratifying is the recognition of Captain Ejnar Mikkelsen by the King, in approving the award to him of the Patron's Medal. An appreciation of Captain Mikkelsen's work will appear in our next issue. The Murchison Grant was awarded to Mr John Rymill for his work in Greenland and the Cuthbert Peek Grant to Mr Edward Shackleton—son of Sir Ernest—for his projected expedition to Ellesmere Land.

# ARCTIC REGIONS

## SVALBARD, FRANZ JOSEF LAND, AND RUSSIAN ARCTIC REGIONS

*Soviet Union Expeditions*, 1933.

*Sibiriakov Expedition*, 1933.

In the course of a journey to Cape Chelyuskin and back, during the late summer of 1933, a party of scientists, led by Professor W. J. Wiese, carried out a number of useful investigations, and were successful in discovering a new island. This expedition was organised by the Arctic Institute for the purpose of making hydrographic and biological investigations in the northern Kara Sea and had hoped to obtain the use of the ice-breaker *Taimyr*. When it was found that this vessel was not available, the expedition obtained passages on board the ice-breaker *Sibiriakov*, bound for Cape Chelyuskin with stores, but much of the scientific programme had of necessity to be curtailed.

The expedition, which included the following scientists:

Miss O. J. Dushechkina, hydro-chemist,
G. P. Gorbunov, hydro-biologist,
Professor B. L. Issachenko, micro-biologist,
Capt. J. V. Khlebnikov, in command of the ship,
A. F. Laktionov, hydrologist,
Miss V. V. Leontieva, student-assistant,
V. P. Meleshko, hydrologist,
D. A. Mokhnach, astronomer,
Miss A. A. Sharova, hydro-chemist,
G. F. Uhl, soil specialist,
V. V. Vagin, hydro-biologist,
Miss A. A. Yegorova, micro-biologist,
K. M. Zvantzev, meteorologist,

left Archangel on July 26, and reached Dickson Island on August 2, having encountered heavily packed ice in the Kara Sea between Lat. 74° 18′ N., Long. 62° 48′ E., and Lat. 73° 54′ N., Long. 73° 51′ E. On August 8, a course was set for Sidorov Island, discovered in 1932 by the *Sibiriakov* Expedition, but a thick fog prevented the projected visit to the island, and heavy pack-ice was met with the same day, necessitating a change of direction, and finally, owing to consequent fuel shortage, a return to Dickson Island. On August 14 the expedition reached the group of islands discovered in Lat. 75° 54′ N., Long. 82° 58′ E., by the *Rusanov* Expedition of 1932. A landing was made on the largest of these

islands, which have been named the Izvestia C.E.C. Islands, in honour of the newspaper of the Central Executive Committee, and botanical, zoological, geological and hydrological investigations were made. Two days later another island was discovered, in Lat. 75° 29′ N., Long. 98° 24′ E., and named Arctic Institute Island. Dickson Island was reached on August 19, and after a stay of five days, the expedition left for Cape Chelyuskin, accompanied by four steamers, and conducted through the ice by the ice-breaker *Krassin*, after a reconnaissance of the route from the air. The *Sibiriakov*, in company with the trading fleet, arrived at Cape Chelyuskin on August 31, and the next few days were spent in landing the stores for the party wintering at the station. This was a difficult operation, owing to the continuous drift of icebergs along the shore. Low temperatures, and the consequent danger of being frozen in, compelled the expedition to leave Cape Chelyuskin on September 13, as young ice was already in the process of forming. The return journey was carried out with considerable difficulty. On reaching Russian Island the ship was delayed for a week in heavy pack, the young ice having by that time attained the thickness of about 9 in. Fortunately, the vessel was overtaken at this point by the ice-breakers *Krassin* and *Rusanov* on their return from the Laptev Sea, and was able, with their help, to reach Dickson Island, by way of Arctic Institute Island, on September 30. The expedition returned to Archangel on October 16.

The chief scientific work of the expedition consisted of hydrographic research carried out in the Kara Sea and the Gulf of Yenisei, special attention being paid to the study of currents. Hourly observations of the drift of the ice were made at Cape Chelyuskin. In addition, a full programme of marine biological work was carried out, and geological and botanical investigations were made on the islands visited by the expedition, as a result of which large collections were brought back by the party.

*Biological Expedition to Novaya Zemlya*, 1933.

The biological work, begun in Novaya Zemlya under the auspices of the Arctic Institute in 1931, was continued in the summer of 1933. The second expedition, which was planned on a much larger scale than the preceding one, was led by W. K. Yessipov, and the work was divided amongst four parties.

1. *Ornithological Party.* This party, consisting of four scientists led by S. K. Krassovsky, made a study of the life history of the guillemot at the

bird rocks at Bezinyannaya (Nameless) Bay. A census of the kittiwake and burgomaster gulls was also taken: and a study made of the two species of lemmings.

2. *Hunting Party.* A. N. Dubrovsky and two assistants, working in the neighbourhood of Matochkin Shar, studied the life history and hunting conditions of the Arctic fox, sea mammals, and the ornithofauna.

3. *Geological Party.* Led by Miss V. D. Alexandrovna, and consisting of three assistants, made investigations on Mezhdusharski Island.

4. *Ship's Party.* A party of three scientists, under the leadership of W. K. Yessipov, made a journey along the east coast of Novaya Zemlya on board M/V *Arctic*, commanded by Captain P. N. Nikolaev. During the voyage, which lasted from July to September, 1933, the party explored the coast from Brandta Bay, on the southern island, as far as Neznaemi Bay on the northern island. It was found that Brandta, Chekina and Neznaemi Bays, where the party made special investigations, abounded in fish and sea mammals, and would form excellent harbours. Hydrological and biological work was carried out at various points along the coast, and soundings made. Survey work also formed part of the programme.

Miss M. I. Vladomirskaya undertook to spend the winter of 1933–34 at Cape Lagerni in Matochkin Shar, to continue the study of Arctic foxes, and to carry out ornithological work.

*Lena Trading Fleet Expedition*, 1933.

This expedition was organised by the Central Department of the Northern Sea Route, with the object of reinforcing the river fleet on the Lena, in order that cargoes, transported to the mouth of the river by sea, might be conveyed up to Yakutsk.

The vessels destined for this river service, and including a powerful tug, the *Pervaya Piatiletka* (1400 H.P.) and a large iron-sheathed lighter, both in the charge of Captain V. L. Modzalevsky, left Omsk on July 18, 1933, and after a voyage of twenty-seven days down the Irtysh and Ob rivers, met the cargo fleet and the ice-breaker *Krassin* near Dickson Island. The vessels were specially strengthened for the journey through the ice, and carried fifteen months' provisions in case of a compulsory wintering.

The cargo vessels bound for the Lena left Dickson Island, accompanied by the *Krassin* on August 24, in spite of unfavourable ice reports

resulting from the customary air survey of the route. The river fleet followed, unescorted, on September 2, the lateness of the season forbidding a longer wait in the hope of better conditions. Pack-ice was encountered a few hours after leaving Dickson Island, and the next three days were spent in tacking among the floes. Fortunately the weather was mild, and the pack fairly loose, and steady progress was made. The river fleet came up with the *Krassin* on September 5, just before reaching Vilkitski Strait, and Cape Chelyuskin was passed two days later. The next two days were the most critical period of the voyage. The new ice had already begun to form on the Laptev Sea, and the ships were repeatedly caught in the ice. In the morning of September 10, however, the open sea was reached, and the river fleet arrived at its destination, Tiksi Bay, at the mouth of the Lena, on September 12; the cargo fleet having arrived four days earlier. The unloading of the cargo boats was carried through without delay, with the help of the tug and lighter, after which the river fleet, consisting of fifteen barges drawn by the tug, set out for Yakutsk. The personnel of the expedition included several scientists, but the unusually quick passage from Dickson Island to Tiksi Bay necessitated a curtailment of the scientific programme. Scientists on board the *Krassin*, however, were able to carry out useful hydrographical work during the voyage.

*Arctic Coal Trust Expedition*, 1933.

A geological and prospecting expedition, sent out by the Arctic Coal Trust, spent six weeks in Spitsbergen in 1933, making investigations in the neighbourhood of the Soviet Coal Mines.

Experiments were made with a view to finding a solution for the difficulties experienced in sinking deep shafts in frozen layers. Boring, under these conditions, is much impeded in Spitsbergen by frequent breakages due to the freezing of the water in the shafts, and various mixtures were added by the party to this water, in order to find a solution which would not freeze. The interesting results of these experiments are published in the *Bulletin* of the Arctic Institute, Nos. 9–10 of 1933.

*Academy of Sciences Expedition to Pechora*, 1933.

An expedition, equipped by the Academy of Sciences, for the purpose of studying the breeding conditions of reindeer, was at work in the Pechora district during the summer of 1933. The party consisted of:

V. N. VASSILIEV, leader.
M. B. EDEMSKI, geologist.
A. P. KARPINSKI, President of the Academy of Sciences.
S. T. SOLOVIANOV.
A. J. TOLMACHEV, Secretary of the Permanent Polar Committee.

*Hydrographic Expeditions*, 1933.

During the summer of 1933, hydrographic work was carried out by several expeditions, in the waters off Northern Russia and Siberia.

A large expedition, organised by the Siberian Hydrographic Department of the Northern Sea Route, and having the use of six specially equipped steamers, was at work in the Ob and Yenisei districts of the Kara Sea. The party included:

V. I. VOROBIEV, leader of the expedition.
V. D. GRIGORIEV, leader of the Yenisei party.
V. N. KOSTERKIN, leader of the Ob party.
A. G. SHABUNIN, leader of the Kara Sea party.

The work included a survey, covering about 1000 miles of coastline, the fixing of places by astronomical observations and the erection of navigation marks. The party spent the winter at Novo Morjovo. The Piassina Delta was explored, and a wireless station was established at Cape Ragozina, on Byeli (White) Island. During work in the Malyguin Strait, dividing this island from the mainland, M/V *Chronometer*, one of the vessels engaged, ran aground, and sustained serious damage. M/V *Circule* was sent to the rescue, however, and the damaged vessel was towed to Novy Port for repairs. Work in the Yenisei region included soundings of the river north of Igarka, and a survey of the shores of the river from Igarka to Nikolsk.

Another hydrographic expedition, consisting of seven scientists, led by S. D. Lappo, was at work for three months in the Laptev Sea, during the summer of 1933. The expedition had the use of S/S *Pioneer* (50 tons) commanded by Captain A. A. Kukharsky.

Although bad weather delayed the work considerably, surveying was carried out in the Lena Delta region, and information collected regarding navigation in these waters. The expedition, having concluded the programme of work, returned to Tiksi Bay on September 17.

*Russian Discoveries in Franz Josef Land,* 1933.

Several new discoveries and corrections to existing maps were the result of a voyage to Franz Josef Land, made in the late summer of 1933 by a party on board the hunting vessel, S/S *Smolny.*

The expedition left Murmansk on July 16, 1933, and reached the first pack-ice in Lat. 78° 10′ N., Long. 37° 20′ E., remaining in the ice until Franz Josef Land was reached. On arrival at the archipelago the ship passed Miers Sound, which was covered with thin ice, and entered British Channel. Thick hummocky ice was met with, however, and the expedition was forced to turn south into De Bruyne Sound. Having rounded McClintock and Hall Islands from the south, the *Smolny* proceeded to Austria Sound, the southern entrance to which was blocked by large fields of old ice. It is reported by the expedition that the eastern part of the archipelago becomes free from ice before the western portion, which, in 1933, remained ice-bound until the end of August. The straits began to freeze on September 13, and the expedition left on October 4 for Cape Zhelaniya, which was reached without encountering ice.

The following corrections were made to the maps of Franz Josef Land, as a result of the observations of the expedition:

1. A group of six islands was discovered extending in a north-easterly direction from Cape Schrotter, Hohenloe Island. The group is arranged in two parallel rows of three islands, which are described as long, narrow and low, two of them much smaller in size than the other four. The straits between the islands, although shallow, are accessible to a cutter.

2. Two small islands were found about 1 mile to the north-east of Torup Island.

3. Corrections were made to the maps of the small islands in the vicinity of Rainer Island. These were found to consist of three low flat islands, about a mile to the north of Rainer Island; a ridge about 3 miles long, of low narrow islands, stretching in the direction of Coburg Island, and a small circular island, near the east shore of Rainer Island.

4. Two islands were discovered in Italian Strait, where only one, shown on the maps issued by the Fiala Expedition, was believed to exist. The larger island, in Lat. 81° 12′ N., Long. 57° 11′ E., is about 3 miles long, and is steep and rocky on the north-west side. It is to be named Apollonov Island, after the captain of the *Smolny.* The smaller island is in Lat. 81° 12′ N., Long. 57° 13′ E.

5. A chain of small islands was discovered near the north entrance to American Strait, between Payer Island and Stolichka Island. Another small island, named MacGee Island by the Fiala Expedition, was relocated to the south of these islands.

6. Three small islands were discovered in De Long Strait.

7. A small island was discovered near Cape Brice, Ziegler Island.

8. An island was discovered off Vilczek Land, in a previously unknown bay between Cape Fairbanks and Cape Shmarda.

9. An island of considerable height, although only three-quarters of a mile long, was located to the north-east of Hayes Island, from which it was separated by a narrow strait.

10. Three islands were discovered off the north coast of Hall Island.

11. A bank, previously uncharted, was discovered just over a mile to the south-west of Lütke Island.

A party on board the hunting vessel, *Lensoviet*, which visited Franz Josef Land in the summer of 1933 under the command of Captain Vorotilov, were successful in locating Lamont Island, and fixing its position. This island, situated to the east of Vilczek Land, in Lat. 79° 45′ N., Long. 58° 40′ E., was discovered by Weyprecht and Payer (Austro-Hungarian Expedition, 1875), but was omitted on the map brought out by the Fiala Expedition, which has formed a basis for subsequent maps. Lamont Island is about half a mile long and very barren. The approaches are difficult, owing to a series of banks.

*Expedition to the Bolshezemelskaya Tundra*, 1933.

A party consisting of I. I. Sokolov, leader, and V. K. Yessipov, visited the Bolshezemelskaya tundra, on the mainland to the south of Novaya Zemlya, during the summer of 1933, for the purpose of animal investigations. The work included special studies of pasturage and the health conditions of reindeer.

This party was assisted by E. I. Burmakin, Miss Petrushina, V. A. Shtarev, and Mrs K. E. Vorobieva.

*Chukchis Air Expedition*, 1933.

An expedition planned with the object of completing the air survey begun in the Chukchis region in 1932, was at work during the summer of

1933, under the direction of S. V. Obruchev and K. A. Salischev. Starting work in July, and using Markovo as a base, the expedition carried out a survey of the Anadyr Basin, followed by a systematic survey of the three principal mountain ranges of the area, the Koriatzhy, Anadyr and Guyden Mountains. As a result of the season's work, the following maps will be published:

1. The Anadyr Basin, about 232,000 sq. miles, on a scale of 10 km. to 1 cm.

2. The north-east Chukchis Peninsula, as far as the meridian of Cape North (approximately 150,000 sq. km.) and the coast of the Bering Sea, on a scale of 25 km. to 1 cm.

It is hoped that a detailed description of the work of this expedition will be published in the near future in *Arctica*, the publication of the Arctic Institute.

*Soviet Geological Expeditions*, 1933.

A geological prospecting party, consisting of the following:

G. V. GORBATSKY, leader,
Miss E. V. CHERNUKHINA,
Miss M. T. KIRIUSHINA,
N. T. PETROVSKY,
V. I. SHUTKEVICH,
E. V. TREPETZOV,

spent some time in Novaya Zemlya during the summer of 1933.

The work of the expedition included a complete geological survey of the stretch of coast, 30 miles long, in the north, from Cape Zhelaniya to Krasivaya Bay, details of which are published in the *Bulletin* of the Arctic Institute, No. 11 of 1933. Investigations on the Petersen Glacier to the south of Cape Zhelaniya were also made.

Another expedition, with similar objects in view, was at work at the same time in the district lying between the Lesser Annui River, the Kolyma River, and Chaun Bay, in the Chukchis region, where it was hoped that gold and stibnite deposits might be found, as well as coal and oil. The party, led by V. A. Vakar, started work in August, 1933, from Nijni Kolymsk, and two scientists undertook the exploration of the right bank of the Kolyma, while the leader of the party investigated the Lesser Annui. At the time of going to press no further news of the party has reached us.

Geological and survey work was also carried out on the west coast of Novaya Zemlya during the summer of 1933, in the district between Russian Harbour, and Inostrantzev Bay, by a party led by M. M. Yermolayev, who is in charge of the permanent research station at Russian Harbour. The resulting map, on a scale of 1 : 100,000, embraces a tract of country from the sea coast as far inland as the Lomonossov Mountains. Detailed geological investigations revealed the presence of oil, but not in sufficient quantity to be of commercial value.

Another geological expedition spent a month, during the summer of 1933, in the neighbourhood of Bulun, on the River Lena, for the purpose of ascertaining the value of the coal found in that region for use for steamers navigating in the vicinity. The party, which consisted of:

I. G. NIKOLAYEV, leader,
M. I. GUREVICH,
A. I. GUSSEV,
A. I. RAKITOV,
V. SIDOROVSKY,

started work on August 12, 1933, and carried out a complete exploration of the district between Lat. 70° 30′ and 72° 00′ N., and Long. 127° and 129° E. The coal found was not of sufficiently good quality to be exploited, except at places near the sea coast or navigable rivers, where the transport problem could be solved.

These expeditions are part of the systematic geological investigation of the Russian Arctic undertaken by the Arctic Institute.

*Chukchis Geological Expedition*, 1933–34.

A party of three scientists, consisting of V. Serpukhov, geologist, a topographer and a mining engineer, spent the summer of 1933 and the winter of 1933–34 at work at the polar station of Cape Severny.

Leaving Vladivostok at the end of July, 1933, on board S/S *Lieutenant Schmidt*, the party started work at the beginning of August at the Wankarem River. A complete geological survey of the country south of Cape Severny resulted in the discovery of copper, arsenic and nickel beds. The party planned to resume work in March, 1934.

*The Position of Einsamkeit (Lonely) Island.*

Voyages made during the navigation season of 1934 may, it is hoped, settle the question of the position of Einsamkeit (Lonely) Island, about which there has been much controversy in the past. The position of the

island, as determined by J. J. Hachel of the *Tcheluskin* Expedition, is stated to be Lat. 77° 33′ N., Long. 82° 02′ E., which places it 50 miles farther to the westward than indicated on the maps. The expedition also reports that the island is much smaller in size than was supposed. It is considered possible, however, that this island may be a new discovery, and one of the objects of voyages made in that locality during the summer of 1934 will be to settle this doubtful point.

*Soviet Union Research Stations*, 1933–34.

Steady work has been carried out during the past year at the various permanent research stations established in high latitudes by the Soviet Government, and news of many achievements, either exploratory or scientific, has reached us. Unfortunately it is impossible, owing to lack of space, to print accounts of their activities in this number of this journal, but it is hoped that full reports of their work may appear in *The Polar Record*, No. 9.

*Projected Expeditions*, 1934.

The following expeditions have been planned for the summer of 1934 by the Soviet Government, working through the Arctic Institute and the Central Department of the Northern Sea Route.

1. A renewed attempt to make the voyage through the North-East Passage will be made by a fleet of eight trading vessels, escorted by the ice-breaker *Lütke*. The fleet planned to leave Vladivostok on June 15, and make the passage from east to west at leisure, each ship spending the winter at an allotted place on the north coast of Siberia to carry out meteorological and geological work, including prospecting for tin, coal and gold on the Chukchis Peninsula. The ice-breaker will go direct to Murmansk, possibly accompanied by the *Krassin* on her return to Russia after the rescue of the crew of the *Tcheluskin*.

2. The Kara Sea Fleet will leave Murmansk in July, under the escort of the *Krassin*. Having given the fleet safe conduct as far as the Yenisei, the ice-breaker will then conduct the Lena River Fleet to the mouth of the Lena, and return escorting three ships of last year's expedition, which had been forced to spend the winter near Samuel Island, off Cape Chelyuskin, to the same region.

3. An expedition left Archangel in July, 1934, on board the ice-breaker *Sibiriakov*, bound for the Liakhov (New Siberian) Islands. The object of the expedition is to carry equipment to the research station on Kotelny Island, the largest of the group.

*Norwegian-Swedish Expedition to Spitsbergen*, 1934.

An expedition, under the joint leadership of Professor H. U. Sverdrup of Bergen, and Professor H. W. Ahlmann of Stockholm, left Bergen on June 10, on board a coal steamer bound for Longyear City, Spitsbergen. Besides the two leaders, the party consists of:

M. KNUDSEN, student. Bergen.
M. OLSSON, meteorologist. Stockholm.

On arrival at Longyear City, the party will continue the journey to Cross Bay on board their own motor cutter, and will proceed to the Isachsen Plateau, about 3000 ft. above sea-level, using dog transport. Here the party intend to spend six or seven weeks making glaciological studies, particularly in connection with the July 14 Glacier.

The party will return to Norway at the beginning of September.

*Dr Ritter's Expedition to Spitsbergen*, 1933–35.

News has been received that Dr Hans Ritter, of Prague University, who is carrying out glaciological observations at Wijde Bay, Spitsbergen, intends to spend another winter at the work. Dr Ritter arrived in Spitsbergen in the summer of 1933, and in company with two trapper companions has taken up his quarters at Wijde Bay. Little news has been received of him since his arrival, but it is hoped that some account of his work may be available for the next number of *The Polar Record*.

# THE WRECK OF THE *TCHELUSKIN*

The *Tcheluskin* expedition left Murmansk on August 10, 1933, with the object of completing a navigation of the North-East Passage both ways, if possible, during one season; and of proving that such a voyage is practicable for a cargo vessel of the type of the *Tcheluskin*. It is hoped that eventually there may be a regular service of cargo boats on this route, and experiments, with this end in view, have been carried out for several years under the auspices of the Chief Administration of the Northern Sea Route. An account of the expedition, up to the end of December, 1933, when the vessel became beset in the ice, appeared in *The Polar Record*, No. 7.

It will be remembered that the expedition, under the leadership of Professor Otto Schmidt, reached the vicinity of Wrangel Island, having completed one half of its allotted task, by the middle of September, 1933, after an unusually difficult passage through heavy pack-ice, in bad weather. One of the objects of the expedition was to relieve the Russian colonists on Wrangel Island, and land a party to replace those whose work on the island was completed. Unfortunately the ship was prevented from approaching the island by the state of the ice, and the relief party was therefore landed with the help of the seaplane, and forty people brought back to the ship by the same means. The expedition then attempted to return to Murmansk, but a storm blew the vessel 300 miles north of her course, low temperatures were met with, and heavy pack-ice, and she became frozen in. A break-up of the ice on December 1 gave the party hope of a release, but the pack closed in once more, and by the end of December the vessel had already drifted some 1250 miles, with no prospect of getting free. On February 13, 1934, severe storms from the north caused an upheaval of the ice, and during a blizzard the *Tcheluskin* crashed into a 30 ft. iceberg. The starboard side of the vessel was ripped open, the boiler dislocated and the pumps smashed, and she sank about 2 hours later, at a point approximately Lat. 73° N., Long. 173° W., north-west of Bering Strait, about 156 miles from Cape Severni and 144 miles from Cape Wellen. The crew and passengers, numbering 104, were able to rescue the scientific records and ship's papers, as well as provisions for two months, tents, a wireless set, and the plane, also materials with which to build huts. A message was sent to the outside world giving news of the disaster, and temporary quarters were built on the ice, including a hut for the women and children, a kitchen and a watch tower. The men

slept on the ice in their sleeping bags, although the temperature was continually below zero, and gales and heavy snow storms were frequent.

When the ship was first frozen in, as early as December, 1933, attempts had been made to reach the marooned vessel, and planes built specially for Arctic work were already mustered at Providence Bay on the Chukhotsk Peninsula, awaiting a chance of rescuing the party. At that time, however, there seemed to be little danger; the party had ample provisions, and it was proposed to spend the winter in the ice, and return to Murmansk when the vessel should be released in the spring. The perpetual darkness at that time of the year had also made locating the vessel and landing too grave a risk to be undertaken except in a case of extreme necessity. Now, however, plans were at once made to rescue the refugees, who were in constant danger owing to the possibility of a break-up of the ice. Although only 150 miles from the Siberian coast, the state of the pack made a relief expedition by dog sledge out of the question; but a number of planes were immediately dispatched to Cape Wellen and Cape Onman, where bases had been established. The ice-breaker *Krassin* was dispatched from Leningrad to the Bering Sea, by way of the Panama Canal; and Russian airmen, amongst whom was the famous explorer, George Uschakov, went to Alaska, and bought large American planes, which they flew to the scene of action from Nome. On March 5, after several previous attempts had failed owing to bad weather, Liapidevski, a pilot with much Arctic experience, managed to locate the camp then on the ice, and take the women and children in safety to Cape Wellen. The rest of the party were rescued in a series of brilliant flights, the planes visiting the camp whenever flying was possible. The ice-field near the camp became so broken finally that the last thirty-five members of the party to be rescued had to make their way over the pack for a considerable distance, jumping the leads, before a suitable landing ground could be found for the planes. The last rescues were carried out on April 12, just as the ice was breaking and the weather growing rapidly worse. Even the dogs were saved. Professor Schmidt, who was seriously ill with pneumonia, refused to leave the camp until ordered to do so by the Government; he was taken to the hospital at Fairbanks, Alaska, where he made a good recovery.

Those taking part in the rescue work were as follows: DORONIN, GALISHEV and VODOPIANOV, working from Vladivostok; KAMANIN and MOLOKOV, who used S/S *Smolensk*, stationed just south of Providence Bay, as a base; LEVANEVSKI, SLEPNEV and USCHAKOV, working from Alaska; and LIAPIDEVSKI, who made his base at Cape Wellen.

It has been learned that the Soviet Government has conferred a new Order, *Hero of the Soviet Union*, on each of the airmen who took part in this gallant rescue, which adds to the history of polar exploration yet another tale of heroism in the far north.

In connection with the rescue of the crew of the *Tcheluskin*, mention must be made of the fine journey performed by the ice-breaker *Krassin*, which was sent to take part in the rescue work.

Leaving Kronstadt on March 22, 1934, the ice-breaker arrived at the entrance to the Panama Canal on April 17, and reached the Pacific on April 20, after two days' unavoidable delay at Colon to re-fuel. The Bering Sea was reached just over three weeks later, the whole distance of 12,000 miles from Kronstadt to Providence Bay having been covered in fifty-two days, in spite of delays, and bad weather encountered in the Atlantic.

## GREENLAND

*Danish Three-Year Expedition to East Greenland*, 1931–34.

The summer of 1934 will see the completion of the three-year programme of work, which has been carried out in East Greenland since 1931, under the leadership of Dr Lauge Koch.

This year's expedition is on a smaller scale than those of previous years, its main object being to bring back the wintering parties to Denmark.

Swedish geologists, including Professor Stensiö and two or three assistants, who propose to carry out palaeontological studies, are accompanying the expedition.

*Dr Charcot's East Greenland Cruise*, 1934.

Dr J. B. Charcot is leaving France for East Greenland on July 1, on board S/S *Pourquoi pas*? The scientific staff of ten includes five naturalists and three ethnologists, some of whom will remain at Angmagssalik for a year's ethnographical and meteorological work after the return of the ship. Dr Charcot is accompanied by Mr L. Wager, a member of the British Arctic Air Route Expedition, 1930–31.

The object is to continue the investigations made by similar earlier expeditions and also to visit Scoresby Sound to bring back equipment left there by the French Polar Year party last year. From Scoresby Sound Dr Charcot proposes to proceed as far as possible along the Blosseville Coast, and to land a party for geological and survey work in the interior. A visit to Mikis Fjord is also planned.

The cruise is expected to last about three months.

*Norwegian Expeditions to East Greenland*, 1934.

Two Norwegian ships will visit East Greenland during the summer of 1934, both leaving Norway at the end of July.

A sealer, M/V *Saelbarden* of Aalesund, will carry supplies to Myggbukta in North-East Greenland, making a call at Jan Mayen on the return journey. A supply ship will also visit the Norwegian meteorological and radio station at Torgilsbu in South-East Greenland to relieve the personnel.

*Dutch Station at Angmagssalik, East Greenland.*

As reported in *The Polar Record*, No. 7, the leader of the Dutch Polar Year party, Dr Van Zuylen, remained behind in Angmagssalik in August, 1933, when the rest of the party returned to Holland.

News has been received from Dr Van Zuylen that he is in good health and that his observations have progressed well during the year. He expects to return to Holland in August or September of this year.

*British Arctic Expedition*, 1934.

A small expedition, led by Lieut. Martin Lindsay, who was a member of the British Arctic Air Route Expedition, 1930–31, left England on April 7, 1934, with the object of making a survey and geological investigation of the large mountain group in East Greenland between Mount Forel, the limit of the inland survey of 1931, and Scoresby Sound. These mountains were discovered by Watkins; and have since, in September, 1933, been seen from an aeroplane by members of Dr Lauge Koch's Three-Year Expedition to East Greenland. The steep mountains, intersected by badly crevassed glacier valleys, which fringe the east coast of this region, have, in the past, made it practically inaccessible from the sea, and the only party which has wintered on this stretch of coast was unable to penetrate far inland. For this reason Mr Lindsay has decided to approach his destination across the ice-cap from the west coast, a distance of 450 miles. On reaching the northern extremity of the unknown mountains, the party will turn south and make for Mount Forel, carrying out as much survey and geological work as possible on the way. From Mount Forel they will return to the British Arctic Air Route Expedition hut, 176 miles away, where provisions have been left for them, and where they have arranged to be met by Eskimos in umiaks, who will transport them to Angmagssalik. There they will be picked up by a trawler, and hope to reach England by the end of August.

For this journey of about 1000 miles, the party has started with three sledges and forty-two dogs; as it becomes necessary, dogs will be killed to feed the others, and the party expect to finish the journey with one sledge pulled by seven dogs. No depôts have been laid, except one at the edge of the ice-cap, and the men will be entirely dependent upon the food they carry. They hope to average about 100 miles a week, travelling for six days, and lying up for the seventh to take observations and rest the dogs.

Mr Lindsay and his companion, Lieut. A. S. T. Godfrey, R.E., who will be the navigator of the expedition, arrived at Jakobshavn, West Greenland, on board S/S *Hans Egede*, on May 20, three weeks late after a stormy passage, followed by adverse ice conditions. Here they joined Mr A. Croft, the third member, who has been in Greenland since October, making preparations for the expedition. During the winter Mr Croft bought forty-three dogs, and engaged two native hunters, who will accompany the expedition on the first stage of their journey. Mr Croft also prospected a route up on to the ice-cap, and made a depôt of $1\frac{1}{2}$ tons of dog food at the edge of the inland ice in Lat. 69° 47′.

The party went by boat from Jacobshavn to a small bay just south of Ekip Sermiat Glacier, whence A. de Quervain started on his crossing of Greenland in 1912. After relaying stores up the steep slopes to the depôt the journey proper began on June 29. The crossing will be made along the parallel of 70° N.

*Mr Bird's Expedition to Jan Mayen*, 1934.

Three men from Cambridge University will carry out natural history investigations in Jan Mayen during the summer of 1934. They are:

E. G. Bird, leader,
C. G. Bird,
R. B. Connell,

and they will be taken to Walrus Gat, on the west coast of the island, on the ship sent out by the Tromsö Radio Company to relieve the personnel of the wireless station. They hope to reach the island early in July, and have arranged to be picked up by a Norwegian relief ship, which leaves Mygg-bukta, East Greenland, at the end of August.

*Cambridge Expedition to Grímsey, Iceland*, 1934.

A small party from Cambridge University will be at work on the island of Grímsey, Iceland, for six weeks, during the summer of 1934, having left Hull for Reykjavik in mid-June.

They include:

D. B. Keith, leader, surveyor, ornithologist,
W. R. Holman, surveyor,
P. F. Holmes, zoologist,
F. W. Jones, botanist.

The party proposed to travel by road from Reykjavik to Akureyri, in the north of Iceland, where a small boat will be chartered to take them across to the island.

Grímsey is a small island, measuring about 3½ miles from north to south, and 1½ miles from east to west, lying on the Arctic Circle 35 miles from the north coast of Iceland. The population numbers about 130, and until recently the island was self-supporting. Owing to its comparative inaccessibility it has seldom been visited, but last year (1933) the Cambridge Expedition to East Greenland spent five days there, making a preliminary survey.

The party proposes to make an accurate map of the island, on the scale 1 : 25,000; and also to study the geological structure. Biological work will be carried out, with a view to tracing the colonisation of animal and plant life, and the ornithological work begun by the Cambridge party of 1933 will be completed. An interesting branch of the proposed programme will be a study of the modern social economy. In many ways the history of Grímsey is analogous to that of St Kilda, and the mode of life, health and education of the inhabitants will be studied, particular attention being paid to the changes which have taken place since the island ceased to be self supporting.

*Cambridge Expedition to Hagavatn, Iceland*, 1934.

An expedition left England on July 17, 1934, to study Hagavatn, a glacial dam and lake situated close to the southern margin of Langjökull, an ice-cap in the west of Iceland, about 30 miles long by 10 broad. Sudden floods occur in the country south of the lake, owing to the occasional bursting of the ice-dam, which is part of a glacier issuing from the ice-cap.

The party, consisting of:

J. W. WRIGHT, Trinity, leader and surveyor,
H. J. SIMPSON, Trinity, surveyor,
S. WHITE, Emmanuel, geologist,

will be at work for six weeks, returning to England in August. They intend to make a detailed study of the region, paying special attention to glacial phenomena, and the causes of the floods. A survey will be made of the ice-cap edge in the vicinity of the lake.

# NOTES ON THE ESKIMO KAYAK

**Professor Mercanton was one of the members of the Swiss Expedition to Greenland, led by the late A. de Quervain in 1912, during which one of the early crossings of the Greenland ice-cap was successfully carried out. In publishing this note, we tender our sincere apologies to Professor Mercanton, and the members of the expedition, for the oversight which caused their names to be omitted from amongst those who have mastered the art of using the kayak.**

BY PROFESSOR P. L. MERCANTON

I have read, with much interest, the article on the kayak and its construction and use, which appeared in the *The Polar Record*, No. 7, the more so since it revives for me old memories of more than twenty years ago. I know you will be interested to hear that the Swiss Trans-Greenland Expedition, led by the late A. de Quervain in 1912, made use of the kayak as often as possible. Six or seven members of the expedition practised the art, though more on the west coast than in the Angmagssalik district. The "juniors" Flick and Gaule had even taken with them from Switzerland their own kayaks, which had been made in Zurich, of canvas, and they had both learnt to turn over and right themselves, after the Greenland manner—on the lake at Zurich. The depôt left for de Quervain, for use on his arrival at the east coast of Greenland, contained four kayaks, with which to complete the journey to Angmagssalik, and in fact, he arrived there by kayak, having threaded his way through the ice-floes.

I, myself, had a kayak made to fit me by the excellent Bethelsen, a hunter of Holsteinborg, with which I made observations of the icebergs near Agto; and also, in company with others, returned from Port-Quervain to Kitsermiut, and from Roede Bay to Jakobshavn in September, 1912. I brought this kayak back to Lausanne Ouchy, and used it for a long time on Lake Leman. I have a profound admiration for this type of vessel, in which it is possible to keep up a speed of from 3 to 4 miles per hour, for hours at a time, without much fatigue. I once brought my kayak safely through a storm which had caused much larger vessels to seek shelter.

Nevertheless, the accident which happened to Watkins should make us careful. The use of the kayak should only be recommended to those who are supple enough to be able to remain for hours sitting in the same position without becoming cramped, and capable of adjusting themselves to the motion of the vessel, as on horseback. I have not forgotten the advice of Ohlsen of Sarfanguak: "One can learn to drive dogs in eight days, but it takes years to master a kayak."

*Admiralty Surveys in Labrador.*

The expedition, on board H.M.S. *Challenger* which, during the last two years, has been engaged upon a hydrographic survey of the Labrador coast between Indian Harbour and Cape Chidley, will continue work in the same region during the summer of 1934. The ship will reach Nain about the middle of July.

A party, consisting of three officers and four seamen, spent the winter of 1933–34 at Nain, carrying out triangulation and coastline work; but up to the time of going to press, apart from news as to the health of the party, no reports of the progress of the work have been received.

Having embarked the wintering party, the ship will continue the survey of the approaches to Nain, and will later take in hand a survey of the approach to Cartwright Harbour. The expedition expects to return to Portsmouth about the middle of November.

*Miss Hutchison's Expedition to Point Barrow*, 1933.

We are now able to publish an account of Miss I. W. Hutchison's Expedition to Alaska and Point Barrow, undertaken in 1933. Brief mention of her journey was made in *The Polar Record*, No. 7.

Miss I. W. Hutchison left England for Alaska on May 3, 1933, with the intention of making botanical collections for the Royal Herbarium at Kew, and also collecting specimens for the Museum of Ethnology at Cambridge. She travelled by way of Vancouver, and Skagway, in south-eastern Alaska, to Dawson, which she reached by river boat; here she spent a week botanising in the Klondyke valley, and then proceeded to Fairbanks in Central Alaska. She finally arrived at Nome, on the south coast of the Seward Peninsula, having completed the last 500 miles of her journey by air. At Nome Miss Hutchison collected some 500 botanical specimens of 200 varieties, and obtained some Eskimo curios from the inhabitants of King Island, who spend the summer at Nome.

As there were no regular sailings from Nome to Barrow, Miss Hutchison eventually secured a passage on M/V *Trader* (10 tons) owned by Mr Ira Rank, of Nome, who traded up this coast with the natives. Two Icelanders, Peter and Kari Palsson, formed the crew, being captain and engineer respectively.

Leaving Nome on August 3, the ship fell in later with the Hudson's Bay Company's derelict, *Baychimo*, which went adrift off Wainwright, on the north coast of Alaska, in 1931. The ship was met with in heavy ice some 15 miles off Wainwright, having, after two years' drifting in the Beaufort Sea, almost returned to the port from which she was lost.

The *Trader* anchored close to the *Baychimo*, and she was boarded at considerable risk, as the party had to meet heavy ice-floes in order to reach her. The valuable cargo of furs had been taken away in 1932, when the derelict was reached by dog team north of Point Barrow. Some natives from Wainwright had also visited the *Baychimo* by umiak, and Miss Hutchison was able to purchase from them several curios from the Eastern Arctic, belonging to a collection which had been shipped out on the ill-fated vessel.

Barrow was not reached until September 3, the *Trader* having been caught in the ice, and held up for sixteen days at Singat, 25 miles south of her destination.

Meanwhile, the unusually bad ice conditions of 1933 had caused a general hold-up of shipping in the Point Barrow district. The supply ship S/S *Holmes* was at that time in a dangerous position in the ice off Seahorse Shoals, but was at last saved by a fortunate change of wind, which enabled a boat belonging to the U.S. Bureau of Education to reach her, and tow her to a position of greater safety. No small trading vessels left Barrow for the east until September 9, about two weeks later than usual, having waited as long as possible in order to secure their supplies from S/S *Holmes*.

At this date the only boat proceeding any distance towards Herschel was the schooner *Hazel*, belonging to Mr August Masik, who had been a member of the Canadian Arctic Expedition, led by Mr Stefansson, in 1918. Miss Hutchison obtained a passage on board this vessel as far as Martin Point, Sandspit Island, some 120 miles west of Herschel, where she was stopped by the freeze-up, and forced to wait six weeks until the sea-ice was safe for dog travel. On November 3, Miss Hutchison left for Herschel where she arrived four days later, Mr Masik having provided dog transport and acted as guide along this difficult stretch of the Arctic coast. At Herschel, Miss Hutchison found that the Royal Canadian Mounted Police had sent their schooner at a very late date in the season in the hope of being able to bring her back; but the vessel had been forced to return without her. From Herschel Miss Hutchison reached the Canadian Anglican Church Mission at Shingle Point, making use of

native dog teams and guides, and after a fortnight's delay waiting for a dog team, completed her journey to Aklavik by sledge, taking three days to cross the Mackenzie delta; she reached her destination on November 27.

Unusually low temperatures were experienced during the winter of 1933–34 in northern Canada, –58° F. being recorded at Aklavik wireless station in January. Owing to this fact the Canadian Airways, which keep up an excellent service of planes every two months during the winter, found for the first time some difficulty in transporting mails. Miss Hutchison had intended to proceed to Coppermine by plane, in the hope of securing a sledge and native guide from there to Cambridge Bay on Victoria Island, but owing to the low temperatures, the plane broke down, and was unable to take off from Aklavik in January. Finally, in February, Miss Hutchison proceeded south to McMurray by the air mail, a journey of three days down the Mackenzie, and returned to England by way of Edmonton.

*Mr Wordie's Expedition to the Canadian Arctic*, 1934.

An expedition, led by Mr J. M. Wordie, of St John's College, Cambridge, left Aberdeen on May 24, 1934, with the object of carrying out geological and survey work in the Canadian Arctic. The venture is a private one, and is the leader's seventh polar voyage.

The personnel of the party is as follows:

J. M. WORDIE, leader.
P. D. BAIRD, surveyor.
C. T. DALGETY, ornithologist.
Lt. W. E. FLETCHER, R.N., navigator.
Sir JOHN HANHAM, botanist.
H. P. HANHAM, zoologist.
Dr T. G. LONGSTAFF, medical officer.
T. T. PATERSON, geologist and archaeologist.
M. H. W. RITCHIE, photographer.

The expedition chartered M/V *Heimen* of Tromsö (129 tons), which was built in 1929 to take the place of the older *Heimen*. Lars Jakobsen, the captain, was formerly captain of the first *Heimen*, which was used by Mr Wordie in East Greenland in 1923, and also by Watkins in 1927. Captain Jakobsen was also with Mr Wordie in East Greenland in 1926. The ship has a crew of ten, and a 160 brake H.P. motor engine.

From Aberdeen a course was set for Disko Island on the west coast of Greenland, where a supply of fuel oil should be picked up. The expedition will then proceed to Ellesmere Land by way of Cape York and Smith

Sound; and July will be spent in investigations of the interior of Ellesmere Land, and in the neighbourhood of Jones Sound. In August, when ice conditions will be at their best, the ship will enter Lancaster Sound, and an attempt will be made to reach Melville Island. The expedition will return at the close of the navigation season, about the beginning of September.

At the time of going to press, the news has been received that Mr Wordie has reached Lat. 74° 30′ N., and that all the party are well.

*Oxford University Ellesmere Land Expedition*, 1934–5.

An expedition, organised by the Oxford University Exploration Club, and led by Dr Noel Humphreys, left England on July 17, 1934, with the intention of spending a year in Ellesmere Land, to carry out investigations in Grant Land, in the extreme north of the island. Of the nine previous expeditions to this region, that led by Captain Nares in 1875 has been the only one sent out by Great Britain. The expedition has the support of the Royal Geographical Society and Oxford University.

The expedition, which consists of the following members:

Dr Noel Humphreys, leader, doctor of medicine, and surveyor.
A. W. Moore, biologist and photographer,
E. Shackleton, organiser and surveyor,
H. W. Stallworthy, Corporal, R.C.M.P., leader of search for Dr Krüger,
R. Bentham, geologist,
D. Haig-Thomas, ornithologist,
Eskimo dog drivers,

chartered the Norwegian sealer, S/S *Signalhorn*, and hopes to reach Disko, on the west coast of Greenland, at the end of July. It is proposed to establish a base at Bache Peninsula, at the former Royal Canadian Mounted Police station, which was closed down in 1933, and comprises a fully furnished Arctic hut and equipment. An attempt to reach this point will be made in August. The party will have their own boat, and, should ice conditions prove favourable, it may be possible to winter further north. If, on the other hand, difficulty should be experienced in reaching Bache, it is planned that the expedition shall land at the nearest accessible place on the coast of Ellesmere Land, and complete the journey to the base by sledge.

The object is an investigation of the interior of Grant Land, with a special view to the geology and mineral wealth of the region. The party, having spent the winter at the base carrying out preliminary depôt-laying journeys, will begin the main sledge journey in the early spring of

1935, and will follow the route taken by Peary as far as Fort Conger, where a depôt of supplies is known to exist. A course will then be set by way of the Ruggles River, for Lake Hazen, where geological and survey work will be carried out, while the route over the United States Range is prospected by the mountaineers of the party. From the summit of the range it is hoped that this party may be able to pick out the best route for the crossing of Grant Land to the north coast; and also fix some of the main topographical features of the country by triangulation. As much time as possible will be spent in the exploration of northern Grant Land, and an attempt will be made to run a double traverse for survey and geological purposes to a fixed point on the northern coast. This journey is planned to occupy about three months.

The party will be picked up by ship in August, 1935.

*MacMillan Expedition to Labrador and Baffin Land*, 1934.

An expedition, under the command of Commander Donald B. MacMillan left Wiscasset, U.S.A., in the middle of June on board S/S *Bowdoin*.

The party included Dr Gross, of the Department of Biology, Bowdoin College, U.S.A., who is in charge of the scientific work of the expedition, Dr Potter, botanist, and Dr Pommerat, geologist. Six undergraduates from the same college accompany the expedition.

The object of the expedition is to make a detailed survey of the flora and fauna in northern Labrador and the interior of Baffin Island. Any collections made during the trip are to form the nucleus of the proposed Bowdoin Arctic Museum, which is to be founded in honour of Admiral Peary and Commander MacMillan.

*Bedaux-Canadian sub-Arctic Expedition*, 1934.

An expedition, for the purpose of demonstrating the possibility of using motor tractors as a means of opening up the little-known territory in north-west Canada, left Edmonton early in July, 1934, for northern British Columbia.

The party of thirty is led by Mr C. A. Bedaux, who is accompanied by his wife; and the equipment includes five caterpillar tractors, an amphibian plane, sixty horses, and several river boats.

*Mr Junius Bird's Investigations in Labrador*, 1934.

News has been received, through the courtesy of the American Geographical Society, that Mr Junius Bird, the archaeologist, and his

wife, left New York in mid-June for St John's, Newfoundland, en route for Labrador, where they will make their base at Hopedale.

Mr Bird, who took part in the Bartlett-Norcross Expedition in 1933, hopes to find evidence of visits to Labrador by the Norsemen as early as A.D. 1000. Besides this he intends to carry out excavations of ancient Eskimo villages on an island in the vicinity, where readily accessible sites have already been noted. Mr and Mrs Bird plan to remain in Labrador until September, 1934.

*Hubbard Alaskan Expedition*, 1934.

News has been received that the Rev. Bernard J. Hubbard, who, in 1933, carried out extensive investigations of volcanic activity in the Aleutian Islands, proposes to continue his work during the summer of 1934. This will be his eighth expedition to that region.

The chief object of the new expedition, which has the support of the National Geographic Society, Washington, will be a survey of parts of the Alaska Peninsula and the Aleutian Islands. The existing map was made twenty-five years ago, and has been rendered out of date by a series of volcanic eruptions, while many large districts are still unmapped. The survey work will be carried out by means of an aeroplane from which aerial photographs will be taken, and a ground survey will also be made with the help of dog teams.

The work will include investigations of the craters of the Katmai and Aniakchak volcanoes; and canoes will be taken in order that soundings and water temperature studies may be made in the crater lakes.

The expedition will return in September.

*Transfer of Reindeer Herds to Canada*, 1929–34.

The reindeer herd, which has been driven east from Alaska for the last five years, for consignment to the Canadian Government, may not, it is thought, reach its destination for yet another year. In January of this year the animals had reached Richards Island, on the eastern delta of the Mackenzie River, but they stampeded westwards to Shingle Point during a blizzard, and, as a long halt is necessary in the late spring for the fawning season, it is feared that the journey may not be completed until the autumn of 1934, at earliest.

Until 1890, reindeer were unknown in North America, but in that year Dr Sheldon Jackson, then General Agent for Education in Alaska, conceived the idea of importing the animals from Siberia, to form a food

supply for the Eskimo, then in a bad state through scarcity of game. In 1891, 16 reindeer were imported from Siberia, to be followed, the next year, by a herd of 171. The success of the scheme is proved by the fact that the reindeer in Alaska now number some 150,000 head, and form the chief means of livelihood for thousands of Eskimo.

Until recently the Canadian Eskimo depended for both food and clothing upon the caribou, but of late years the caribou herds have been depleted by indiscriminate hunting, leaving the natives more and more dependent upon trapping, a precarious form of existence, owing to the fluctuation both in the catch of foxes, and the fur market. In 1926 the Canadian Government, realising that something must be done to provide a more dependable means of livelihood for the Eskimo, decided to introduce reindeer into the country, although a similar experiment had already been tried in Baffin Land without success. The reasons for the failure of former attempts had been lack of suitable forage in the districts selected for the experiments, and Messrs A. E. and R. T. Porsild, experienced botanists, were therefore commissioned by the Government to find a suitable locality to form a Reindeer Reserve. Nearly three years were spent at this work, at the end of which, as a result of the research carried out, the Government decided to put aside a tract of 6600 sq. miles between the Mackenzie River Delta and Cape Bathurst for this purpose, and this district forms the ultimate destination of the herd.

The animals, in charge of Mr Andrew Bahr, assisted by three families of Lapps, left the Buckland Valley in West Alaska in 1929, and the journey has taken five years. Considerable difficulties have been experienced by the herders, and long halts have been necessary, both at each fawning season, and also when weather conditions prevented travelling.

## KRÜGER SEARCH EXPEDITIONS, 1932

We are now able to publish a detailed account of two patrols by the Royal Canadian Mounted Police, stationed at Bache Peninsula, Ellesmere Land, in the early spring of 1932, to search for traces of Dr Krüger, who disappeared during the summer of 1930. A brief report of these fine journeys appeared in *The Polar Record*, No. 6, and we owe permission to publish the following full account to the courtesy of the Commissioner of the Force, Major-General MacBrien.

The detachment at Bache, which was under the command of Corporal Stallworthy, received news that the German expedition was missing in August, 1931, when the yearly supply boat arrived from the south; and plans were immediately set on foot for relief patrols to be made the next spring. Two long patrols were outlined, based as far as possible on the route drawn on a map by Dr Krüger, showing his proposed journey from Etah. This journey led to a considerable distance north of Axel Heiberg Island, to the west of Ellesmere Land.

During the winter of 1931–32 arrangements were made to obtain the services of two natives, one of whom was acquainted with the islands west of Ellesmere Land, and on March 15 three natives arrived at Bache, with five teams of dogs, numbering eighty-six, having crossed from Greenland over Smith Sound, on the ice. Meanwhile a cache had been established on the west side of the divide between Flagler and Bay Fjords, the latter being on the west coast of the island, and opening on to Eureka Sound. The cache contained supplies not liable to destruction by wolves, such as coal, oil, ammunition, canned dog meat and biscuits; and had been depôted in October, 1931, by a party of Eskimos employed at the Bache station, who had been sent to that district to hunt. On their return they reported that game was exceptionally plentiful.

The previous five days having been spent in the hurried construction of a new sledge, and sealskin clothing, a start was made from Bache on March 20, 1932. The party consisted of Corporal Stallworthy and Constable R. W. Hamilton, with seven Eskimos, eight sledges, and 124 dogs, all in good condition. All the sledges except one were new, and all the native-made equipment was good. The patrol rations were based upon sixty days' requirements for seven men, and thirty days for two men, the loads consisting mostly of dog food, tinned meat in 48 lb. blocks,

and frozen walrus meat. The party travelled westwards up Flagler Fjord, and encamped for the night at the entrance to Flagler valley, in a double snow igloo.

The next morning they started west up the valley, following the river bed, which is divided into many small branches. The going for the most part was good, though the sledges had occasionally to be pushed or hauled over narrow strips of gravel. The divide was reached about 6 p.m. and later the cache was reached, and the supplies found in good condition. The party went on through a canyon to the north side of the valley, where igloos were built for the night at the foot of a steep rocky hill over which they had to carry their equipment.

In the morning of the following day, March 22, the party started relaying the loads up the hill, a difficult task, as there was no snow on the hillside, and the surface consisted of loose rock. After all hands had made five or six trips, however, the supplies were all landed at the top, and the dogs and sledges then followed.

For the next forty-eight hours it was a case of packing and relaying, climbing up and down over very steep ground, for about 4 miles; the descent to the river-ice leading to Bay Fjord was about three-quarters of a mile in distance, and took the party twelve hours. The natives let the sledges down the steep gradient by joining the strongest harpoon lines together, and letting each sledge down singly with one man to guide it, while the rest of the party paid out the line, and prevented the sledge from getting out of control for a distance of 200 yards, after which the process was repeated. This performance was carried out twice before the bottom was reached, and proved very strenuous work, the more so as the weather had been unusually mild. At the bottom the surface was found to be good, and after three hours' rapid travelling, the party arrived at the salt ice of Bay Fjord, and stopped to file and polish the sledge runners, which had become badly scored and dented by the passage over the rocks.

The old route from the east to the west coast, used on former patrols, had now become impassable owing to an active glacier which blocks the valley at the head of the river leading into Bay Fjord. This had pressed against the cliffs, and the party were obliged to climb the hills round the north side of the glacier, camping a few miles farther on.

On March 24 the patrol split into two parties. Corporal Stallworthy, with three Eskimos, three sledges and forty-nine dogs, set out to investigate the sea-ice to the north of Axel Heiberg Island, and Axel Heiberg Island as far as Cape South-West, its most southerly point, and Meighen

Island. Constable Hamilton and two Eskimos were to patrol to the Ringes Islands and, if possible, Isachsen Island. Two supporting sledges, driven by two Eskimos, were to accompany Constable Hamilton as far as Cape South-West, where they had instructions to establish a food depôt, and then hunt, if conditions were favourable. It was planned that the two parties should re-unite later at Cape South-West or Bjorne Peninsula, to discuss extending the patrols, if possible.

The two parties having separated, Corporal Stallworthy's patrol crossed to the north shore of Bay Fjord, where the going was slow, both on account of the extra loads on the sledges, and also as the result of a fresh fall of snow. The next day was spent in hunting to provide fresh meat for the dogs; herds of both caribou and musk oxen were met with.

After a day spent in lying up on account of a blizzard, the party continued their journey on March 27, reaching Eureka Sound, on which steady progress was made, and after a night spent a few miles north of May Point on Axel Heiberg Island, Depôt Point was reached on March 29 and an igloo built on the land. It was known that the German expedition reached this point in April, 1930, and the following day a thorough search was made both at Depôt Point, and at the mouth of Mokka Fjord, but without success. Later in the day a small cairn was sighted the other side of the Sound at Blaamenden, but this proved to be an old one, and contained no records. The next day the party searched 4 miles along the shores of Axel Heiberg Island, where it was thought that Krüger's Expedition might have dispensed with part of their load. During the day the party were constantly passing herds of musk oxen.

The dogs were now getting slow. It was found that a prolonged diet of canned meat did not sustain them when working hard in cold weather. On April 2 the party camped a short distance south of Skraeling Point. No less than thirty-five musk oxen were counted at one time from this camp.

The journey was continued early on April 3. The dogs were hungry, although each team had been given 48 lb. of tinned meat the night before. The weather remained extremely cold. The party had hoped to obtain bear meat for the dogs in Eureka Sound, but were now reaching a locality where bears were seldom seen. The Eskimos advised a day spent inland hunting on the west side of Skraeling Point, but on rounding the point the party met with high drift and no visibility, the dogs were tired and not in a condition to travel in a blizzard, and the surface was extremely rough. The party were forced to camp, having only covered 5 miles. Here

plans were discussed, and it was decided to kill musk oxen for the dogs, the food problem having become acute, although these animals are protected. The dogs were then fed and rested, and a high wind having sprung up, the rest of the day was spent in the igloo. Corporal Stallworthy reports that both sides of Eureka Sound are an ideal range for musk oxen and caribou. The land on either side consists for the most part of rolling country, with a fair amount of vegetation, before rising to the height of the ice-cap. No signs of wolves were met with. To the west of Skraeling Point the country was practically bare of snow, rising gradually to the ice-cap, which at this point was some 50 miles inland.

The party left this camp on April 5; the weather was fine, and the dogs stronger. After following the coast for 5 miles, and finding no trace of the missing expedition, they turned north, and reached Schei Island, which was found to be a peninsula, joined to Axel Heiberg Island by a narrow isthmus about 2 miles across. Here a cairn was examined, but found to be an old one, probably built by Eskimos. The going was good as far as Nansen Sound, where the party made camp, at a place where the mouth of an inlet is shown on the map; but this was found in reality to be a shallow bay, only extending inland for half a mile. Here the land rises steeply from the water's edge, and as there was little hope of getting land game for a number of days, three musk oxen were killed to feed the dogs.

The party continued the journey the next day, carrying three feeds of fresh meat for the dogs, and three feeds of tinned food, intending to push on as fast as possible until better hunting country should be reached. They camped near a large iceberg opposite the northern point of Otto Fjord and, without feeding the dogs, continued the next day to the north end of the island, where they arrived at 10 p.m. on April 8, after a good day's march over hard packed snow, the weather still remaining very cold. Lands Lokk appeared to be only a few miles away. The sun was rising at this time at 1.30 a.m. As this would probably be a place the German expedition might have visited, the party went inland and examined the country, climbing a point of vantage for a view. From there, Lands Lokk appeared to be about 30 miles away. Corporal Stallworthy had intended to visit this point, but the natives were of opinion that it would take "three sleeps" to reach it, on account of the bad surface consisting of new pressure-ice. One of the Eskimos, Eetookashoo, who had been with Dr Cook and later with Donald MacMillan in this region, declared it would be a bad year to travel farther north. He had formerly believed that the old polar pack-ice was more or less a fixture at the

north end of Axel Heiberg Island, and was surprised to see new pressure-ice, and sure signs of open water in the distance. Along the shore to the west, several capes could be seen, including one on which was known to be a cairn erected by Peary, and the party set a course for this, travelling on the shore-ice, and occasionally lifting the sledges over the boulders. Cape Norman Hubbard was reached on April 9, at about midnight, and the cairn was located, and visited by Corporal Stallworthy with one native, while the rest of the party pushed on for a few miles, and then built igloos for the night. After a stiff climb to reach the cairn, a note was found dated April 30, 1930, stating that Dr Krüger had visited Lands Lokk, and had called at this cape on the way to Meighen Island, having apparently changed his original intention of travelling north-westward from this point.

The finding of Dr Krüger's note at last gave the party something to go on, and turning south on April 11, a course was set for Meighen Island. The question of dog food was still a problem, and it was necessary to obtain as much game as possible before crossing Sverdrup Channel, between Axel Heiberg Island and Meighen Island, where there would be no prospect of hunting. The party made good progress for the first 40 miles, but the next day, on approaching Cape North-West, rough pressure-ice was encountered, which grew steadily worse as they proceeded. It was necessary to travel on the shore-ice, as it seemed probable that the German expedition had taken this route, if the ice conditions had been bad, and also, the party had to climb the land from time to time, and look for game. There are a number of capes in this locality, and Corporal Stallworthy was unable to decide which was Cape North-West, and the map gave little information. Meighen Island, at a distance of 60 to 70 miles away, was sighted at a number of points during the next few days, in which the party covered some 50 miles; but the rough ice appeared to stretch all the way across Sverdrup Channel, as far as could be seen, and gave promise of an even worse surface than that met with at the north end of Axel Heiberg Island. Cape Levvel was reached on April 16, the surface having remained consistently bad, while the only game obtained had been one caribou. By this time all the dog food was exhausted, so it was decided to give up the attempt to reach Meighen Island, but to make for the cache at Cape South-West, and try to find a district where game was more abundant, in the hope of saving the dogs. The loads were no longer very heavy, but the party had been travelling eighteen to twenty hours a day since leaving Cape Norman Hubbard, and hunting inland on

foot, and had had very little sleep. The dogs were in a very bad state, and some of them had to be carried on the sledges at the end of marches. Several large islands were passed in the neighbourhood of the 80th parallel; and approximately where North Fjord is shown on the map, the party discovered a large peninsula, with several small islands to the south. From a point at about 1500 ft. on the peninsula, the Fay Islands were located, both the Ringes Islands, with what was believed to be Cornwall Island to the south. The whole area seemed to consist of very rough ice, except to the south, where the surface appeared to be smoother.

Skruger Point was reached two days later, and on April 20, after forty-three hours almost continuous marching, the party were only about 15 miles from Cape South-West. During this journey, the spare sealskins, mitts, and footgear were fed to the dogs, who had previously been given the remainder of the bacon and edible pemmican. Although the cache was in sight, the party had not the strength to reach it without a rest, so an igloo was built and six dogs killed to feed the others. The next day, the party decided to leave the heaviest equipment, and travel light to the cache, which they took sixteen hours to reach, although the going had improved considerably. At Cape South-West a note was found from Constable Hamilton, stating that he had experienced similar conditions, and had been forced to return from Cornwall Island. Thinking the dogs of Corporal Stallworthy's patrol might be short of food, he had only made a short stay at the cache, and had used some bear meat which had been placed there by the natives after his patrol had gone. He reported that game was scarce in that district, and that the supporting teams had not remained there long, as there was no hunting.

Two days were spent at the cache, resting and feeding the dogs, and on April 25 the party set out on a hunting expedition east of the Cape. A cairn was found, with a record placed there by Inspector Joy on his patrol in 1927 from Bache Peninsula to Amund Ringes Island. No trace was found of the German expedition, and Corporal Stallworthy is of the opinion that they did not penetrate as far as this point.

There had apparently been little wind in this district, and the surface was quite soft, as is very often the case along the south coast of Axel Heiberg Island. The dogs tired quickly, and, after about 12 miles, the party turned inland, where open rolling country appeared to give promise of game. While the teams rested, the natives went after some caribou which had been sighted, and brought in seven, which kept the dogs in food until April 28, when the patrol set out again eastwards. The surface

was very soft, and the dogs were forced to plunge along in deep drifts. On April 30 the party reached Glacier Fjord, and built an igloo, the dogs being once more in a bad state, and on May 2, five more dogs had to be killed to feed the rest. The party separated, and hunted in different directions, but all their efforts merely resulted in a total bag of two caribou. Fortunately, on May 4, one of the natives managed to kill a large seal, and from that time onwards seal meat was more plentiful; while on May 5, a large bear was killed. Plenty of food having now been obtained for the dogs, a party was sent back to the igloo west of Cape South-West to retrieve the equipment left there on April 21.

The whole party set out on May 18, from Ulvingen Island, at the southern end of Eureka Sound, carrying three feeds of seal meat for the dogs, and covered 20 miles over Eureka Sound, where the going was good. Stor Island, which was passed during the day is, in Corporal Stallworthy's opinion, placed too far north on the maps. On reaching Bay Fjord, the next day, good progress was made, and the dogs seemed to be regaining their strength. It had been planned that the patrol should return by way of Beitstad Fjord, but there appeared to be deep snow on the ice-cap, so it was decided to return by way of the rocky passage to Flagler Fjord, taken on the outward route. On entering the river bed at the head of the fjord, the party found practically no snow, and were soon sledging over mud and then through about 10 inches of water, owing to the thaw. The next day, the loads were relayed until a better surface was reached. Before reaching the glacier at the head of the valley leading to Flagler Fjord, the party entered a deep canyon, where they had considerable difficulty in negotiating frozen waterfalls, from 6 to 10 ft. high, and at one place were delayed three hours while the dogs were hauled up singly. Soon after this they picked up their old trail and descended to the Flagler Valley. The station at Bache was reached on May 23, the patrol having occupied sixty-five days, and covered approximately 1400 miles.

Constable Hamilton had meanwhile experienced very similar conditions.

Leaving Corporal Stallworthy on March 24, at Bay Fjord, he set out for the Arctic Islands, west of Axel Heiberg Island, with three sledges, and forty-seven dogs, and made good progress, though stormy weather made is necessary to keep within shelter of the land. The next day travelling conditions were again favourable, and the party camped that night at Stor Island. A herd of musk oxen was seen, but the only game obtained

was one Arctic hare. On the morning of March 26, they crossed to Raanes Peninsula, and left a depôt of pemmican for the hunting teams returning from Cape South-West, but soon after they ran into a blizzard, meeting at the same time with deep snow and very rough ice, which retarded their progress considerably; the distance covered that day was only 25 miles. The next day they were forced to lie up on account of the weather; but were able to proceed on March 28, and travelling over rough ice and deep snow reached Ulvingen Island that evening, and built an igloo. On March 29, Hyperit Point, on the south-east coast of Axel Heiberg Island, was reached, and a search made for traces of Dr Krüger, but without result. Hunting at this point only yielded one caribou, and the dogs were found to be losing stamina through lack of fresh meat. The party arrived at Cape South-West on April 3, having travelled on the shore-ice through deep soft snow for most of the way, in order to search for traces of the German expedition. The land passed on the way was low and rolling, with plentiful vegetation, but no signs of game were seen.

Constable Hamilton and two natives left Cape South West for Cornwall Island on April 4, a search for traces of the Krüger expedition at this point having yielded no result. The following day, after a difficult journey over rough ice and deep snow, in a dense fog, the last of the pemmican was fed to the dogs. Cornwall Island was reached on April 7, with the dogs in a bad state, and no sign of game. After a short rest Constable Hamilton decided to leave one sledge and those of the dogs which were unfit to travel, and proceed himself, with two sledges, to the most northerly point of the island, which was reached after eight hours of very slow going. No game was found, nor any signs of the Krüger expedition, although there was a cairn placed on a high hill by Inspector Joy on one of his patrols, which could be seen for a long distance before reaching the island.

The following day after consultation with the natives, Constable Hamilton decided to turn back, as one of the natives who was an experienced hunter stated that it was unlikely any game would be found if they went on. On the return to the rest of the party it was found that four dogs had died. A course was set immediately for Cape South-West, which was reached on April 12, five more dogs having been lost on the way, and one small bear the only game killed. At the cache, however, enough bear meat was found to feed the remaining dogs, these supplies having been placed there by the supporting party of natives before their return to Bache. The 50 miles to Glacier Strait were covered in twenty-four hours, the men walking by the sledges through deep snow encourag-

ing the teams; and on the west side of Glacier Strait, they reluctantly killed three musk oxen, in order to save the dogs, which without this meat would probably have died. At noon on April 14 the party again resumed their journey, and camped that night at the north-west end of Bjorne Peninsula, where another unavailing search was made for the missing expedition. Skirting the peninsula, they met with very deep and soft snow, with patches of rough ice, and five more dogs died during the march. The following day only a short distance was covered, as the dogs were unable to proceed through the soft snow. The party therefore made camp, and killed four musk oxen, and having fed the dogs, spent a day in camp, resting and drying footgear. On April 18 a start was made in the direction of Hoven Island, but a blizzard made it necessary to camp, and delayed them until April 21, when the island was reached, and two bears killed for food. The next day, travelling conditions improved, the dogs were stronger, and in the evening a camp was made about 10 miles from the head of Baumann Fjord, on the west side of Ellesmere Land. On April 23 the party entered the river bed, which is the entrance to the land crossing between the west and east coast of Ellesmere Land, and three days later reached Mackinson Inlet on the east coast. No signs of the Krüger party were seen, although it was known that Dr Krüger had asked questions about this route before leaving Bache in 1930. After two days spent in camp, the journey was continued on April 29, and following the east coast of Ellesmere Land the party reached Boger Point, and thence, travelling by way of Paine Bluff, Cape Isabella and Fram Haven where supplies were picked up, reached Bache on May 7, having covered 943 miles and been away forty-nine days.

As a result of these search patrols, it is assumed that Dr Krüger, having visited the north end of Axel Heiberg Island in April, 1930, hunted down the west coast of the island for dog food, and probably crossed to Meighen Island. There, it is thought, he and his party in all probability perished during the winter of 1930–31, as with starving dogs they would have no provisions and no means of transport. Those with experience of this region assert that it would be impossible to exist there without having made adequate preparations.

# THE EXPLORATION OF THE GRAHAM LAND REGION

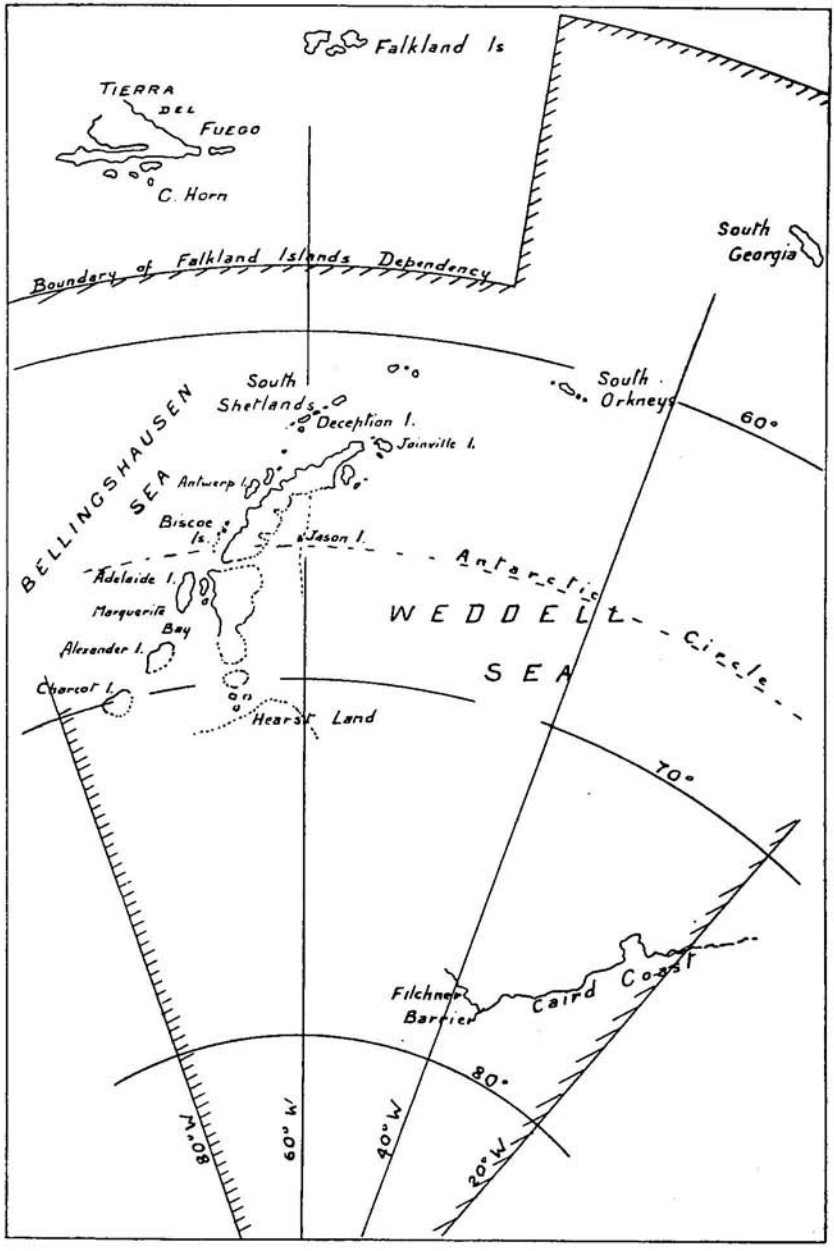
BY HUGH ROBERT MILL

The sector of the Antarctic regions between the meridians of 30° and 90° W. is still largely unknown, and offers a particularly attractive field for exploration. It was the scene of the earliest discovery of land south of the Antarctic Circle, of the earliest and also of the latest economic exploitation of the South Polar regions and it is the only part of the Antarctic where very large areas have been seen from the air but never visited on the surface either by sea or land. It is appropriate that a concise summary of the exploration of this region should be put together, in view of the expedition now being organised by John R. Rymill with the active support of the Royal Geographical Society, the British Government, the Discovery Committee and the Polar Institute.

In this article I give an outline first of the voyages of discovery in Bellingshausen Sea and the west of what has been appropriately called the West Antarctic Archipelago, then a similar sketch of exploration in the Weddell Sea, and finally of the aerial reconnaissance of the whole archipelago.

There is no profit in discussing the possible discoveries by Dirk Gerritsz or the sealers who frequented the islands of Tierra del Fuego and South Georgia more than a hundred and twenty years ago because, in the absence of definite data as to positions, the exploits of the pioneers can only be traced by means of conjecture and they serve no purpose now except to whet the weapons of controversy.

We need not go back further than February, 1819, when William Smith in the brig *Williams*, trading between Buenos Aires and Valparaiso, discovered the South Shetlands in 60° S. In October, 1819, he saw them again and in January, 1820, Bransfield in Smith's ship surveyed the chain of islands and discovered Trinity Land to the south-east, separated from the South Shetlands by Bransfield Strait. American sealers flocked to the islands, making their headquarters in the crater harbour of Deception Island. The name of Palmer Land or Palmer Archipelago commemorates one of the most intelligent of these early explorers. For these discoveries and for others north of the Antarctic Circle the reader is referred to *The Siege of the South Pole*, where references to original sources of information




Falkland Islands' Dependency

will be found. For discoveries in this region south of the Antarctic Circle, however, the original authorities will be cited in this article.

The Russian expedition under Bellingshausen was at sea from 1819 to 1821, carrying out general instructions to supplement Captain Cook's explorations in the Southern Ocean by endeavouring to reach a high latitude where Cook's course had been more to the north. The only full description of the cruise was published in Russian in 1831. A German translation, much condensed, was prepared by H. Gravelius for the Dresden Geographical Society (Leipzig, 1902, pp. 203); but the full English translation produced under the supervision of F. Debenham has not yet found a publisher.

On January 21, 1821, Bellingshausen reached his farthest south, 69° 53′ S. in 92° W., and, following the edge of the pack to the eastward, discovered on January 22 Peter I Island, the first land ever seen in the Antarctic regions proper, in 68° 57′ S., 90° 46′ W.; and on January 29 when in 68° 43′ S., 73° 10′ W., he sighted Alexander I Land about 40 miles to the southward on a perfectly clear day, allowing its mountainous nature to be plainly recognised. On February 2 Bellingshausen was compelled to cross the Antarctic Circle northward in 76° W., and he saw no more land until two days later he reached the South Shetlands and met American sealers.

From January to March, 1829, Foster in the *Chanticleer* was engaged in geo-physical work in Deception Island, but went no farther south than 63° 43′ in 61′ 45° W.

Bellingshausen's work was unknown to John Biscoe who, when nearing the end of his circumnavigation of the Antarctic regions, sighted land in 67° S., 70° W. Charles Enderby, head of the firm for which Biscoe was engaged on a voyage in the *Tula* combining discovery with sealing, presented Biscoe's log to the Royal Geographical Society, and this is the ultimate authority on the voyage. The relevant portion is printed in the *Antarctic Manual* (R.G.S. 1901, pp. 329–335). The island which Biscoe sighted on February 15, 1832, and believed to be the most southerly land yet discovered, he named for Queen Adelaide. The body of the island lay 3 miles to the east of the ship which was stopped, presumably by ice, in water more than 250 fathoms deep. The only description of the island is that it contained very lofty mountains "about 4 miles in extent" rising from a field of snow and ice "about 4 miles in extent" sloping gradually to the sea, apparently as a much crevassed glacier, and terminating in ice cliffs 10 or 12 feet high. Biscoe thought that it was a group of huge per-

pendicular cliffs closely beset by sea-ice. His mind was strongly prejudiced in favour of all Antarctic ice being marine in origin, and he was apparently unfamilar with the nature of glaciers. On February 16, while on a course north-west from Adelaide Island, Biscoe saw high mountains to the southward in very clear weather and estimated them to be about 90 miles distant. These might well be on Alexander I Island. For three days, February 16–18, Biscoe ran to the east-north-east along the north-western side of a chain of small islands (the Biscoe Islands). He described them as of "exactly the same appearance as Adelaide Island," but added that "they had no mountains on their tops." To one of these, Pitt Island in 65° 20′ S., 66° 38′ W., which seemed to join the mainland, he sent a boat which brought back a report that it contained "an excellent harbour for shelter, although a rocky bottom." Beyond these islands to the eastward a mountainous mainland appeared very imposing in clear weather. On February 21 Biscoe pulled in to this mainland, landed and took possession of it in the name of King William IV, and named the highest mountain Mt. William; its latitude was fixed as 64° 45′ S. The landing was made on what we now know as Antwerp Island, though Biscoe, like Palmer before him, took it to be part of the mainland which later received the name of Graham Land. Biscoe saw no seals on these coasts and moved farther north in search of them.

No precise details are preserved of Biscoe's second voyage with Rea in 1833.

In February and March, 1839, the *Peacock* and *Flying Fish* of Wilkes's expedition cruised to the westward of 90° W. They reached 70° S., 105° W. and 68° S., 95° 44′ W. where ice stopped them.

While sealers may have visited the Bellingshausen Sea in the interval there are no new discoveries to notice until the German whaler *Grönland* was the first steam vessel to approach the west coast of Graham Land. Her master, E. Dallmann, went as far as 64° 45′ S. in January, 1874, and on January 9 found a large inlet or strait leading eastward which he named after Bismarck, dut did not explore. He thought that it might lead through to the Weddell Sea. His private log was published at Hamburg in 1882 in the *Verhandlungen* of the Verein für wissenschaftliche Unternehmung.

The next expedition, also a commercial venture, was from Norway in 1893 when C. J. Evensen, in the whaler *Hertha*, after passing the parallel of 64° S. on November 7, reached 69° 10′ S., 76° 12′ W. on November 20, meeting very little ice despite the early date. On November 22 he came

nearer Alexander I Island than any previous navigator, and found it closely surrounded by pack-ice. On November 30 the *Hertha* was back in the South Shetlands and proceeded to the Weddell Sea. During her stay on the west side of Graham Land she passed between some of the Biscoe Islands and the mainland for the first time, and cruised in sight of the islands for some time. I am not acquainted with any detailed account of the cruise of the *Hertha*, and Charcot could not get any precise data from Evensen in a personal conversation. (*Pourquoi Pas?*, p. 108.)

A. de Gerlache in the *Belgica* reached the South Shetland Islands on January 20, 1898, in bad weather. He discovered and explored the Gerlache Strait leading from Hughes Gulf to Bismarck Strait between 64° and 65° S. and 61° and 64° W., proving that what had been taken as the west coast of Graham Land is really a group of large islands which he named Liége, Brabant and Antwerp, Biscoe's Mt. William being recognised on the last-named. The coast east of these islands was named Danco Land, while Bismarck Strait ran eastward into a cul-de-sac called Flanders Bay. On February 12 the *Belgica* left Gerlache Strait and proceeded southward along the coast of Graham Land as near as the ice and numerous icebergs permitted. She passed to the west of the Biscoe Islands, of which little was seen on account of fog.

The Antarctic Circle was crossed southward on February 15 nearly in 69° W. Turning southward an attempt was made to reach Alexander I Island, but the ship was stopped by pack-ice when 20 miles north of the land, which was clearly seen. Arctowski saw high land to the east which seemed to him to be the southern end of Graham Land, or at least the edge of a wide strait. The position would not show the southern end of Fallières Land on an easterly bearing, and possibly the southern end of Adelaide Island was seen. Arctowski lays stress on the fact that Alexander I Island rises from a broad ice-foot of confluent glaciers and disputes F. A. Cook's description of the island. (See *Antarctic Manual*, p. 496.) The edge of the pack was reached in 70° 20′ S., 85° W. on February 28. Entering a gap torn in the pack by a furious gale the *Belgica* worked her way to 71° 31′ S. on March 3. Here she was beset, and drifted about with the ice for thirteen months. The drift covered an area in latitude between 71° 30′ S. where the depth was 210 fathoms, and 70° S. where the depth was 1000 fathoms, and in longitude between 80° 30′ W. and 102° W. at which point she recovered freedom of motion on March 14, 1899, and thence a straight course was made for Punta Arenas.

De Gerlache gives a popular account of the voyage in *Quinze mois dans*

*l'Antarctique* (Brussels, 1902); but there are clearer maps in Lecointe's *Au Pays des Manchots* (Brussels, 1904), while F. A. Cook's *Through the First Antarctic Night* (London, 1900) is important for its medical details on wintering in the ice.

The expedition of J. B. Charcot in the *Français* was planned in 1903 with the object of exploring and surveying as much of the west coast of Graham Land as possible. On February 3, 1904, Charcot left the South Shetlands and spent a whole month amongst the islands forming the west side of Gerlache Strait, much harassed by ice, fogs and bad weather. He got as far south as the northern end of the Biscoe Islands and named one Pitt Island, though it was obviously not the Pitt Island of Biscoe, but nearly in the same latitude. Early in March he went into winter quarters at Wandel Island (about 65° S.). The *Français* put to sea again on December 25, 1904, when the ice in which she was frozen broke up, and she proceeded in bad weather with much loose ice to the south-west, sighting the Biscoe Islands. On January 10, 1905, he crossed the Antarctic Circle and sighted Alexander I Island at a distance. On January 15 Loubet Land, supposed to be attached to Graham Land, was approached within a few miles, the approximate position given being 67° S., 71° W. Damage to the ship then made a return northward necessary, and the ship lay for more than a month at Port Lockroy in Wiencke Island to carry out repairs.

Charcot organised a second expedition in the *Pourquoi Pas?* He reached Port Lockroy on Wiencke Island on December 27, 1908, and during January, 1909, he explored to the southward, finding conditions more favourable than was the case in the *Français*. He identified Biscoe's Adelaide Island, but found that it was 70 miles long in place of Biscoe's estimate of 8 miles, and its ice-cliffs were 100 ft. high instead of Biscoe's guess of 10 ft. It became clear to Charcot that the land where the *Français* was nearly wrecked in 1905 and which had been named after President Loubet was really the west coast of Adelaide Island, the longitude found in 1905 being in error. In his new map Charcot moved the name Loubet Land to the part of Graham Land east of Adelaide Island and separated from it by a strait containing a group of smaller islands. Charcot followed this strait for 40 miles from its southern end, and later had a good view of it from the north. From the south end of Adelaide Island he found the great Marguerite Bay sweeping to the east and south, and he named its eastern shore Fallières Land. Charcot discovered a small mountainous island, named Jenny Island, close to the south-east end of

Adelaide Island, and he thought that it might afford winter quarters for a ship, though there might be a risk of the island being blocked by ice for several years in succession. Charcot thought it possible that Biscoe mistook the size of the island, which he named after Queen Adelaide, on account of being at a greater distance from it than he supposed, but we have some difficulty in accepting this. Charcot's map shows a small island to the west of his Adelaide Island, and it might be worth while for the next explorer to consider whether this could possibly be the Adelaide Island of Biscoe. Marguerite Bay was much encumbered by ice but good views of the coast were obtained, and on January 22, 1909, the *Pourquoi Pas?* succeeded in coming within 2 miles of Alexander Island.

Charcot wintered at Petermann Island (*ca.* 65° S.) from February 3 to November 26, 1909, and on being released the *Pourquoi Pas?* proceeded north to Deception Island. The ship left Deception Island on January 6, 1910, steering south-west and, after Alexander I Land had been seen again, the peaks of a new discovery, Charcot Land, were descried on January 11. The land lay in 70° S., 75° W., about as far to the south-west of Alexander I Island as that was to the south-west of Adelaide Island, and all three are charted as approximately equal in size. Charcot continued to coast the pack to the westward passing close to Peter I Island, seeing it for the first time since Bellingshausen discovered it in 1821. He proceeded westward nearly along the 70th parallel to 124° W., whence on January 22, 1910, he turned back toward Punta Arenas.

The popular account of this voyage is contained in Charcot's *Pourquoi pas? dans l'Antarctique* (Paris, 1910) translated as *The Voyage of the "Why Not?" in the Antarctic* and provided with an index (London, not dated). An account of the voyage appears in the *Geographical Journal* for 1911, vol. XXXVII, p. 241, with excellent maps though on rather a small scale.

From 1910 onwards the seas south of the South Shetlands have been frequented by many whalers, mostly of Norwegian nationality. They work in small powerful vessels of about 120 tons, based either on a shore station, such as South Georgia, or on a factory ship which either remains in some secure harbour like Deception Island or Port Lockroy, or else is kept at sea at a safe distance from dangers of ice or uncharted coasts. The whalers, like the sealers of a hundred years earlier, are habitually reticent as to any discoveries they may make, and unfortunately it is impossible to give a systematic statement as to how far they have penetrated in various seasons to high latitudes. Mr Gordon Hayes quotes in

his *Conquest of the South Pole*, p. 250, an interesting report of two gunners named Beckman and Mathisen in charge of whale-catchers. These men in February, 1924, found the channel between the Biscoe Islands and Graham Land quite free from ice and steamed to the south of Adelaide Island, one of them passing along both its eastern and western sides. Both reported that Fallières Land turned sharply to the east at its southern extremity, suggesting that a channel might extend through to the Weddell Sea.

On January 17, 1927, the whale-catcher *Odd I* reached Peter I Island, having made a direct passage from the south end of Gerlache Strait, and she circumnavigated the island for the first time in a clear sea.

The main body of Graham Land traversed by the meridian of 65° W. runs northward from somewhere in the neighbourhood of 70° S. to the Antarctic Circle, where it bends sharply to the north-east and terminates at 55° W. in 63° S. It separates the Bellingshausen Sea on the west from the Weddell Sea on the east.

Having outlined the explorations which have been made on the side of the Bellingshausen Sea and Bransfield Strait we must in turn sketch the explorations made on the east or Weddell Sea side.

The shores of the Weddell Sea are very difficult of access on account of the heavy pack-ice which presses against the land and drifts northward and eastward on its western side; while there is a sort of circular movement which keeps the northern part as a rule full of ice, though clear water is usually found in the extreme eastern portion.

Dumont d'Urville in February, 1838, discovered Joinville Island at the extreme north, and south of it Louis Philippe Land which is now recognised as the east coast of the Trinity Peninsula. In December, 1842, and January, 1843, James Clark Ross made some discoveries in the same region, including Erebus and Terror Gulf. The ships could not get farther south than 65° S., and were extricated from the pack with great difficulty. Ross named Mt. Haddington on what he took to be the mainland.

The next vessels to visit this part of the coast were whalers from Dundee and Norway in 1892–3; but they also failed to get farther south than 65° S. and, finding no "right whales," they filled up with seal blubber and skins. In the following season three Norwegian ships returned under the direction of a German company, and the *Jason* after sealing round Seymour Island in November, 1893, succeeded for the first time in reaching the east coast of Graham Land. Her captain, C. A. Larsen, discovered high snow-covered land in 66° S., 60° W., on Decem-

ber 1, 1893, and named it after King Oscar II. Two days later he crossed the Circle, and proceeded southward along a flat ice-barrier which was fast to a mountainous coast which appeared to run continuously from north to south. To the loftiest part of this the name of Svend Foyn Land was given. Larsen was stopped by an ice-pack in 68° 10′ S. on December 6. Larsen's voyage is dealt with most fully in Aagaard's *Fangst og Forskning i Sydishavet* (Oslo, 1930).

The Swedish Antarctic Expedition under Otto Nordenskjöld on board the *Antarctic*, commanded by C. A. Larsen, tried to get south off the coast of Oscar II Land in January and February, 1902, but the ice conditions were so bad that it could not get near land nor penetrate farther than 66° S., which was reached on January 19, 1902. On February 12 winter quarters were established on Snow Hill Island in 64° 25′ S. In the following year the ship could not reach this position and was sunk after being crushed in the pack. Nordenskjöld's party had thus to spend a second winter in their hut. They were rescued by the Argentine ship *Uruguay* which reached Snow Hill Island on November 8, 1903. Nordenskjöld made a sledge journey southward on the ice-barrier in front of Oscar II Land, reaching 65° 50′ S. on October 19, 1902. Later he explored the scene of Ross's landing, and showed that Mt. Haddington was situated on a large island separated from the east coast of Trinity Peninsula, and now called Ross Island. For details see O. Nordenskjöld, *Antarctic* (Stockholm, 1904), translated as *Antarctica* (London, 1905).

Many attempts have been made to navigate the Weddell Sea farther to the east. The first success was due to J. Weddell who in a fortunate season found the sea so clear of ice that he sailed easily to 74° 15′ S. 34° 17′ W., where, with no ice in sight, he turned back on February 20, 1823. Full details are given in J. Weddell's *Voyage towards the South Pole* (London, 1825).

Dumont d'Urville spent the months of January and February, 1838, in trying to get south near Weddell's meridian, but was baffled by heavy floes and was inclined to doubt the truth of Weddell's achievement. Ross, however, by coasting the pack to the eastward, was able to get round it and reached 71° 30′ S., 14° 51′ W., on March 5, 1843. (See J. C. Ross, *Voyage to the Antarctic Regions* (London, 1845), vol. II.)

American sealers before 1830 had spoken of a long coast-line running north and south about 45° W. which they called New South Greenland; but subsequent explorers have searched for it in vain. It was probably the east coast of Graham Land, the longitude an error.

W. S. Bruce in the *Scotia* made the next attempt to penetrate the Weddell Sea between the tracks of Weddell and Ross; but he was stopped by a very heavy pack in 70° 25′ S. on February 22, 1903. After wintering in the South Orkneys Bruce returned the following season. This time the pack gave little trouble and, on March 6, 1904, Bruce discovered Coats Land, entirely buried in ice but rising to a great height. He was able to approach within to 2 miles of the ice-cliffs and at his farthest point was in 74° 1′ S., 22° W. Details of the work of the *Scotia* are given by three of the staff in *The Voyage of the Scotia* (London, 1906), and by R. N. R. Brown in *A Naturalist at the Poles* (London, 1923).

W. Filchner in the *Deutschland* entering the Weddell Sea from the north-east sighted a new coast beyond Coats Land which he named Luitpold Land. It was high and snow-covered: a party landed and went inland for some distance, reaching a height of 975 ft. above the sea. The farthest point, named Vahsel Bay, was reached on January 30, 1912, and its position fixed as 77° 45′ S., 36° W. An attempt was made to establish a winter base on the ice fast to the land; but this failed. The ship was beset in the pack on March 6, 1912, and drifted helplessly for more than eight months, first in a north-westerly direction, then northerly, then about 65° S., easterly and finally northerly, until the dense pack broke up and the *Deutschland* became free again in 63° 37′ S., 36° 34′ W. on November 6, 1912. In June when in 70° 27′ S., 44° W., a sledge trip was made westward over the floe-ice to the position of the legendary New South Greenland, but no sign of land was seen. Filchner has described his voyage in *Zum sechsten Erdteil* (Berlin, 1922).

Shackleton in the *Eudurance* also attempted to make a landing in the south of the Weddell Sea and was frustrated in a similar way. On January 9, 1915, having entered the north-east part of the Weddell Sea, he cleared the pack in 69° 47′ S., and had a quick run to 72° 34′ S. when Coats Land was sighted in 16° 40′ W. and followed south-westward to beyond the *Scotia's* farthest where the continuing land was named the Caird Coast. It apparently ran on to join Luitpold Land on the south-west. The farthest point was reached on January 19, 1915, when the *Endurance* was beset in 76° 34′ S., 31° 30′ W. She was drifted with the ice first towards the south-west, then on a course at first nearly parallel to that of the *Deutschland*, but more than 100 miles farther west. The drift finally became northerly between 47° and 53° W. The ship was crushed in August, 1915, and sank, but the party continued on the floe, drifting northward until the ice broke up, and the boats were launched on April 9,

1916, in 62° N., the drift having lasted for nearly fifteen months. Full details of the expedition of the *Endurance* are given in Shackleton's *South* (London, 1919), and in Worsley's *Endurance* (London, 1931).

No crossing from the Bellingshausen to the Weddell Sea has ever been made by land, nor by sea save round Joinville Island, so that the discoveries on the western side were only connected with those on the eastern by the astronomical observations of different explorers. These were not always highly skilled in the use of delicate instruments, and the conditions of visibility and refraction often tinged the best technical work with error. Chronometers, after years of rough voyages, were subject to errors of rating which make many of the assigned longitudes more uncertain than in ordinary navigation.

G. H. Wilkins in the course of a few aeroplane flights has done much to confirm and bind together the work done by explorers in ships on both sides of Graham Land. On December 20, 1928, Wilkins left Deception Island in an aeroplane at 8.20 a.m., flew southward nearly on the meridian of 61° W., crossing Graham Land from Hughes Bay on the north-east to the west coast in 64° S. To do this the plane had to rise to 8200 ft. to clear the land. The centre of northern Graham Land was described as a narrow flat plateau nearly 8000 ft. above sea-level and sloping down very steeply on each side. Wilkins flew on to the south above the eastern edge of the Nordenskjöld ice-barrier, parallel with the mountainous coast of Oscar II Land, recognising some of the mountains, capes and islands charted by Larsen and Nordenskjöld. On the Antarctic Circle he saw a depression running from west to east, which he called Crane Channel, but the phtographs he took suggest that this is not a strait of the sea but two valleys filled with glaciers. The interior farther south was no longer a high plateau but a stretch of mountainous country, and at 12.30 p.m. it was seen to terminate in Casey Channel, apparently bounding Fallières Land on the south. The south side of this channel was formed by a large island called Scripps Island, and south of that there appeared to be a very broad channel, Stefansson Strait, broken by half a dozen islands called the Finley Islands. In the farthest south there seemed to be a slope of snow rising gently from an ice-cliff coast with some nunataks showing in the north-east. Wilkins called this stretch Hearst Land, and believed it to be part of the Antarctic continent. At 1.0 p.m. he was over this land at a height of about 2000 ft. and estimated the position as 71° 20′ S., 64° 15′ W. Here he turned and flew back direct to Deception Island, where he arrived at 6.20 p.m. The weather was clear and excellent photo-

graphs were obtained. A second flight covering the northern part of the same region was made on January 10, 1929. Full details are given in the *Geographical Review* for July, 1929. Unfortunately it was impossible to see any of Charcot's definite discoveries from the air.

In the following season, with the aid of the Discovery Committee's vessel *William Scoresby*, Wilkins pursued his explorations by air. On December 28, 1929, an attempt was made to reach Charcot Land by a flight from a point about 150 miles distant; but thick weather allowed of no observations of value. On December 29, however, clear skies enabled Wilkins to fly southward from the edge of the pack in 68° S., 75° W., with Alexander I Island in sight, right to Charcot Island, which he flew round close to the coast. He estimated it to be 60 miles in diameter and about 40 miles north of the coast of Hearst Land, which presented the same appearance as the portion first seen south of Graham Land. Two other islands were seen at a distance to the eastward.

The final flight of the season was made on February 1, 1930, due south from the edge of the pack in 70° S., 101° W. On this occasion Wilkins reached 73° S. and saw nothing except pack-ice and icebergs. He conjectured that the pack was fast to land to the southward.

Intensely interesting as the results of air reconnaissance always are in polar regions, they must be taken rather as suggestions for future exploration on the surface than as a basis for definite mapping. It would appear from experience in other parts of the Antarctic that aeroplanes can be of the utmost importance in scouting for exploring ships or discovering positions for possible winter quarters on land. When, but not until, machines are available which can land on and take off from a rough surface of land or ice they will become available for all the purposes of exploration. Meanwhile astronomical observations, without which no useful mapping is possible, must be made from the surface.

Very little experience of exploration by land or over ice in West Antarctica is available to guide future explorers. Nordenskjöld's sledge-journeys from Snow Hill Island were the most extensive, and Charcot's from Wandel Island and Peterman Island extending to the Graham Land coast were of some value. The only other attempt by the winter party of Cope's abortive expedition of 1921–22 was defeated by the impossibility of crossing the plateau from the shore of Andvord Bay, Danco Coast, in 64° 48′ S. (See *Geographical Journal* (1923), vol. LXII, pp. 174–193.)

In conclusion it may be noted that no ships have been able to navigate the Bellingshausen or the Weddell Sea (though three have drifted as

prisoners in the ice) between the months of April and October inclusive.

The only high latitude attained as early as November was by Evensen in the Bellingshausen Sea in 1893. On the Weddell Sea side Larsen made the highest latitude on the Oscar II land coast on December 6, 1893.

With these exceptions the Antarctic Circle in those seas has never been crossed before January, and that month and February have always been found the most favourable.

In the Bellingshausen Sea the only ship which reached a high latitude as late as March 3 was the *Belgica*, and she was frozen up in the floe. In the Weddell Sea, however, Ross and Bruce made their highest latitudes as late as March 5 or 6 and returned, though the *Deutschland* was beset on March 6 and the *Endurance* six weeks earlier.

## ANTARCTIC REGIONS

*British Graham Land Expedition*, 1934–37.

A national expedition, led by Mr J. R. Rymill, and supported by the Government, which has subscribed £10,000 towards its cost, will leave England for the Antarctic on September 1, 1934. The Royal Geographical Society has contributed £1000 towards the expedition funds, and other subscribers include Lord Leverhulme, Lord Luke, Mrs Patrick Ness, Lord Wakefield and the Corporation of London.

The personnel of the expedition will number fourteen, and will consist of the following, five of whom were members of the British Arctic Air Route Expedition, 1930–31:

*Shore Party:*

J. R. RYMILL, leader, second pilot, surveyor.
W. E. HAMPTON, second-in-command, first pilot, engineer.
Surgeon Lieut.-Commander BINGHAM, R.N., doctor.
W. L. S. FLEMING, chaplain, geologist.
I. F. MEIKLEJOHN, Royal Corps of Signals, wireless officer.
J. I. MOORE, engineer, surveyor.
Q. RILEY, meteorologist.
B. B. ROBERTS, surveyor, ornithologist.
A. STEPHENSON, chief surveyor, meteorologist.

*Ship's Party:*

Lieut. R. E. D. RYDER, R.N., in command of ship.
G. C. L. BERTRAM, biologist.
J. H. MARTIN.
Lieut. (E) H. M. MILLETT, R.N.

The fourteenth member of the party has not yet been selected.

The expedition has purchased a three-masted topsail schooner, the *Navaho*, equipped with two 50 H.P. Diesel engines, and a small deck engine of 10 H.P. for auxiliary work. The ship, which has been renamed *Penola*, is 112 ft. long and 24 ft. beam, with a carrying capacity of about 200 tons, and was built in France in 1908.

It is planned that both survey photographs and reconnaissance shall be undertaken from the air, and the expedition has a De Havilland Fox Moth aeroplane, capable of carrying three persons, or two with an Eagle III survey camera. The expedition is taking six sledges as well as spare parts to build more if required, and sixty-six dogs, which have been carefully selected in West Greenland by Mr F. Spencer Chapman.

An advance party, consisting of Mr Hampton and Mr Stephenson,

left England for the Falklands by trading steamer in mid-July, with the dogs, and as much as possible of the equipment, including the aeroplane. The rest of the party will follow six weeks later, on board the *Penola*, which they will sail themselves. They will pick up the advance party at Port Stanley.

The *Penola* will leave the Falkland Islands at the end of October, and will be accompanied by R.R.S. *Discovery II*, to assist in the transport of stores, as far as Deception Island. After a preliminary aeroplane flight over Bransfield Strait towards Graham Land to observe the ice conditions, the ship will proceed south to Wilhelmina Bay, on the west coast of Graham Land, as soon as the ice is open. Should the ice conditions delay further progress until later in the season, an attempt will be made by aeroplane to find a route across Graham Land to the east side, and a reconnaissance journey by dog sledge may be made down the east coast of Graham Land, attempting to reach a point near Foyn Island. Meanwhile another flight will be made south, to ascertain the condition of the ice in the direction of Marguerite Bay.

The sledge party having returned to the ship, the whole expedition will proceed south, as soon as the ice is open enough, probably about the middle of February, 1935, and establish a base as far south on the Graham Land archipelago as possible, or even in Hearst Land. If a good wintering place can be found for the ship, she will be frozen in for the winter, otherwise it will be necessary for her to return to winter in Deception Island or at Port Lockroy.

The base will consist of a two-storied hut, built with a double thickness of boarding packed with insulating material. A hangar for the aeroplane will be attached to the house. After a winter at the base, the party hope to spend the season of 1935–36 in exploring the unknown region south-west of the Weddell Sea, using both dog sledge and the aeroplane. The party will again winter at the base, and the second sledging season, 1936–37, will be spent in exploration to the west of the base as far as the end of the Falkland Islands Dependency, Long. 80° W. A journey northwards, up the east coast of Graham Land, to connect up with the reconnaissance journey is also planned.

The scientific work of the expedition will be under the general supervision of Mr Fleming, who is himself a geologist. Mr Stephenson is chief of the several surveyors in the party; and if the flying conditions are good a certain amount of aerial survey will be undertaken, controlled where possible by ground stations. The biologist, Mr Bertram, of the

ship's party, will attempt what he can in the way of investigations of marine life, together with the movements of tides, currents, etc. He will be assisted by Mr Roberts, whose special line will be ornithology. The meteorological observations will be jointly undertaken by Mr Stephenson and Mr Riley, while the important subject of glaciology will be attended to by Mr Fleming. It will be noted, however, that the first object of the expedition is exploration, and the specialised sciences will have to be fitted in as conditions allow.

The expedition will return to England in May, 1937.

*Byrd Antarctic Expedition*, 1933–34.

Our last issue went to press before the Byrd Expedition had actually landed, and the record of events may be taken up from the arrival at the Bay of Whales of the *Jacob Ruppert* on January 17, 1934. Our account of the expedition is much facilitated by the kind permission of Mr August Horowitz, editor of the *Little America Times*, a privately printed publication brought out in New York, to make use of the information in his paper.

The expedition found the sea-ice in the Bay of Whales still filling the bay to its entrance, but a landing party which visited the former camp found everything, including the aeroplanes, left from the 1928–30 expedition, intact and serviceable.

The unloading of the ship was rendered specially arduous from the long distance between it and "Little America," and more especially as a large pressure ridge blocked the route and had to be surmounted by bridges at its western end. This meant that the material had to be hauled round two-thirds of the bay before reaching the camp. The tractors were especially valuable during this operation. On several occasions the break-up of portions of the bay-ice held up the unloading operations.

In due course the wooden ship, *Bear of Oakland*, arrived and the *Jacob Ruppert* returned to New Zealand. After unloading, the *Bear* started on a cruise to the eastward on February 6, and after much trouble with pack-ice the vessel reached 75° 20′ S., 148° 15′ W., when impenetrable ice prevented further eastward progress. This position was found to be well outside the continental shelf, a depth of over 4000 metres being recorded by the echo-sounding apparatus which had been at work throughout the cruise.

Returning to the Bay of Whales on February 15, the *Bear* was sent northward to meet the R.R.S. *Discovery II* which, through the courtesy

of the Discovery Committee, was bringing a new doctor, Dr L. H. Potaka of New Zealand, to replace Medical Officer Dr G. O. Shirey, who had been forced to return home in the *Jacob Ruppert*. The meeting took place on February 21 at 72° S., 171° W. The *Bear* returned to the Bay of Whales on February 25 and stayed only a few hours, as the bay was rapidly freezing. She returned from the Ross Sea along the 180th meridian and met with very little pack-ice, though stormy weather prevailed throughout the fourteen days of the return voyage.

Meanwhile the whole party had been re-establishing and adding to the former camp which, large enough for the first expedition, has now become almost a village, four new structures having been put up parallel to the old ones and connected with them and each other by tunnelling through the snow. The occupants of the camp consist of fifty-four men besides Rear-Admiral Richard Byrd, the leader, and Dr Thomas C. Poulter, second-in-command. Accounts of the equipment will make strange reading for the survivors of earlier expeditions, for "Little America" has electric light and power, a radio broadcasting plant, tractors, aeroplanes and dog teams for transport, repair shops, a library and science hall, a dairy with three cows and a young bull calf, born on the way down and named "Iceberg," a mess hall seating twenty-eight men, and a variety of other structures and underground habitations. There are about 180 dogs and two Manx kittens. The station is also a United States Post Office.

On March 5 the first tractor party under the command of Harold June left to establish a depôt 100 miles south. They returned on March 10 after laying the depôt, having covered an average distance of 50 miles a day. A second party of tractors and dog teams left the camp on March 16 with a meteorological hut, equipment and instruments. On this occasion one of the aeroplanes crashed during the take-off, and was damaged beyond repair, but no casualties resulted.

The hut was erected 120 miles south of the headquarters, and, as in the case of the Watkins Greenland Ice Cap station, supplies were insufficient for more than one man to remain in the hut for the winter. Admiral Byrd took on this duty and the rest of the party returned to headquarters on March 29, having experienced frequent temperatures of − 60° F. The minimum temperature experienced by Admiral Byrd up to May 25 was − 72° F., but with considerable variations, since within forty-two hours the thermometer from its lowest reached a maximum of 10° above zero. This was during a blizzard which damaged some of his instruments.

The health of the winter party has been excellent so far, although there was a case of acute appendicitis upon which Dr Potaka performed a successful operation. Active preparations for the spring and summer flights and sledge journeys are now in progress at the base. It is expected that the two expedition vessels will leave New Zealand in December to return to the Bay of Whales.

*Plans for Mr Lincoln Ellsworth's Antarctic Expedition*, 1934.

Following upon his unlucky attempt to fly across the Antarctic in December, 1933, when, it will be remembered, his plane was irreparably damaged as a result of the unforeseen break-up of the ice in the Bay of Whales, Mr Lincoln Ellsworth has lately published plans for another Antarctic venture.

For this new attempt he proposes to make his base at Deception Island, 600 miles south of Cape Horn, and 1350 miles north-west of the head of the Weddell Sea. His ship S/S *Wyatt Earp*, which he will use again, is at present at Dunedin, New Zealand, and Mr Ellsworth proposes to join her there in September, 1934: the plane, which is at present undergoing repairs at Los Angeles, will be shipped out to New Zealand on a tanker. The personnel of the expedition will be the same as before.

Leaving Dunedin about the middle of September, Mr Ellsworth plans to arrive at Deception Island by November 1, and to make the flight about the middle of the month. He is taking floats as well as skis for his plane, so that if he finds it impossible to get into Deception Harbour on account of the ice conditions he will be able to take off outside. The route to be followed on the flight is by way of the west coast of the Weddell Sea to its head, and then eastwards in a straight line to the Ross Sea, a total distance of 2800 miles. By means of this flight Mr Ellsworth hopes to discover whether a channel exists dividing the Antarctic into two parts, and he also hopes to be able to determine the relationship of the mountains of east and west Antarctica.

On arrival at the Ross Sea, Mr Ellsworth and his pilot, Mr Bernt Balchen, will await the arrival of the *Wyatt Earp*, which will pick them up about a month later.

*The Work of R.R.S.* Discovery II.

The R.R.S. *Discovery II*, under the leadership of Dr N. A. Mackintosh, has completed her programme of work for the season 1933–34, and will shortly undergo her annual refit in South Africa. The most important

work undertaken during the season has been a close inspection of the South Pacific ice-edge on passages to and from New Zealand and the Straits of Magellan. A zig-zag course, extending some 200 miles north of the ice-edge, was taken on both these passages, and complete series of observations on the biological and hydrological conditions in this little-known sector of the Antarctic were obtained, together with many echo soundings. In response to an appeal from Admiral Byrd, a doctor was taken south from Wellington and transhipped to Admiral Byrd's vessel, the *Bear of Oakland*, in Lat. 72° 1′ S., Long. 171° 26′ W. After her return to the South Atlantic, the *Discovery II* continued her work in the Falklands area and, before reaching South Africa, carried out observations extending to 64° 30′ S., 45° 0′ E., in order to obtain data on the complex movements of water in the region lying to the south of the Cape of Good Hope.

*Consul Lars Christensen's Antarctic Cruise*, 1933–34.

Consul Lars Christensen left Cape Town on December 20, 1933, on board the whaling factory ship *Thorshavn*, on his third voyage to the Antarctic. The object of the cruise was an inspection of the whaling ships of his company, to be followed by exploratory work, as far as conditions would permit. A large scientific programme was carried out, which included meteorological and hydrographical work by Captain Mikkelsen and Nils Larsen (formerly captain of the *Norvegia*), and oceanographical observations in charge of Mr Jakhelln.

Having inspected two groups of factories, the *Thorshavn* made for Lars Christensen Land, to the east of Enderby Land, which was reached on January 9, 1934. Several corrections were made to the existing maps, and it is stated, as a result of the observations made, that the Douglas Islands, supposed to be situated in approximately Lat. 67° S., Long. 65° E., do not exist.

The expedition then proceeded to Lat. 66° 40′ S., Long. 86° 45′ E., where the Cirrus Avion seaplane was transferred to a small whale-catcher, which then made its way about 30 miles south through the pack. In Lat. 65° 22′ S., two flights were made by A. Gunnestad and Nils Larsen, and during the second, which lasted about forty-five minutes and covered about 80 miles, the two officers are stated to have seen a new line of coast, stretching westwards for some 150 miles, beyond the Barrier ice. The new land, which is situated between Princess Ragnhild Land and Crown Princess Martha Land, has been named Princess Astrid Land,

after the two-year-old daughter of the Crown Prince of Norway. The new coast-line was reported to have gently sloping contours, and to be entirely covered by ice.

Consul Christensen completed his trip by making a circumnavigation of the Antarctic continent, in the course of which he reached Lat. 71° 44′ S., Long. 134° 11′ E., in a part of the Ross Sea, east of King Edward VII Land, which is practically unexplored. A flight was made in Lat. 72° 08′ S., but with no result.

The expedition skirted the pack-ice as far as a point near Peter I Island, afterwards setting a course for Montevideo, which was reached on February 27, the cruise having lasted seventy days. During the latter part of the voyage a new bank was discovered south of Cape Horn, and named Sars Bank.

## ANTARCTIC WHALING, 1933–34

Eighteen factory ships were operating during the whaling season of 1933–34, working, with only one or two exceptions, under the quota agreement drawn up in 1932. The total production of the season is stated to be in the neighbourhood of 2,400,000 barrels of whale oil, worth some £4,000,000, although about 1,800,000 barrels of whale oil still remain unsold from last season.

Interesting observations on the movements of whales were made by factory ships during last season. It is reported by the *Vestfold* fleet that the whales have ceased their eastward migration, which, during the last few years, has carried them gradually from the South American sector, through the Cape sector, towards the Australian area. Research into whaling conditions made by scientists on board the *Thorshavn* proved that the best whaling grounds lie due south of the Cape between 35° W. and 105° E. On the other side of the Antarctic continent whales were found to be scarce, and no new whaling grounds were discovered. For these reasons the whaling fleets did not proceed as far to the east as in previous years, the farthest they went in that direction being due south of Kerguelen. It was reported by the *Skytteren* group of catchers that whereas previously most whales had been found near the ice-barrier, in the 1933–34 season they were more numerous in the open sea, 300 miles to the north.

Unusually stormy weather was experienced by whalers all over the Antarctic during the season of 1933–34, though from a whaling point of view the season was most successful. During November and December gale succeeded gale, and severe damage was sustained by several whalers. In November, 1933, the *Berea*, a catcher belonging to the *Tafelberg* whaling fleet, was lost with all hands, probably having capsized in an attempt to bring a whale alongside. The *Southern Princess* (15,000 tons) had her tiller broken in a gale, whilst in a dangerous locality, surrounded by numerous icebergs; the repairs were effected at sea, after twelve days' arduous work in gales and high seas. Two catchers belonging to the *Hektoria* had their propellers severely damaged and were forced to put in at Kerguelen, where there is a 7 ft. rise and fall of the tide, thus enabling the catchers to be drawn up on the beach, and carry out their repairs there, rather than return to Cape Town. One of the most skilful

and intrepid re-fits, however, was that carried out on board the Norwegian whale-catcher *Rokk*. The vessel stripped all the blades of her propeller through striking a piece of submerged ice, and having sent out distress signals, was towed back to the factory ship by another whale-catcher. Water was then pumped into the catcher's forecastle to tip up her stern, while at the same time the factory ship *Vestfold* (14,500 tons) was heeled over by pumping all the oil into the tanks on the port side. Strong steel hawsers were then passed under the stern of the damaged catcher, and made fast to the deck of the mother ship. The *Vestfold* then pumped all her oil into the tanks the opposite side, gradually heeling over to starboard and taking the catcher's stern with her. When the catcher's stern was out of the water, the new propeller was fitted, though operations had to be abandoned at one point owing to a sudden gale, and the whole manœuvre repeated when the storm subsided. The repairs took ten days. Both the *Rokk* and a sister catcher, the *Fjord*, had their bridges carried away in these storms, and narrowly escaped foundering.

In January, 1934, the weather improved, though another casualty was reported in February, when the British whale-catcher, *Shoma* (341 tons), was wrecked off South Georgia in a gale, and the Norwegian crew of twelve drowned in their efforts to reach the land.

It was reported that there was less pack-ice met with during the Antarctic summer of 1933–34 than in the previous two seasons. The pack-ice was well down towards the continent late in the season, in March, but icebergs were sighted daily by the *Skytteren*, until above Lat. 50° S. The *Skytteren* began whaling on November 1, 1933, 2000 miles south of the Cape, and worked slowly eastwards as far as Enderby Land. The vessel then turned back and finished work on February 20, 1934, at the original starting point.

# POLAR INSTITUTIONS THROUGHOUT THE WORLD

[At a time when the opening of a new and permanent headquarters for polar research brings the name of the Scott Polar Research Institute before the world, it seems fitting that accounts of the other institutions connected with work in the polar regions should find a place in these pages. The following article, compiled from facts furnished by the institutions concerned, may, it is hoped, serve to show the steady strides being made all over the world towards a better knowledge of the Polar regions, as well as the pleasant spirit of co-operation between all those who are taking part in the work.]

*The Arctic Institute of the Soviet Union.*

The following notes on the work of the Arctic Institute at Leningrad have been received from Professor R. Samoilovitch.

The size of the territory of the northern part of the U.S.S.R., the different characteristics of its natural wealth, its climatic peculiarities, its economic usages, the difficult approach of many of its districts, and, finally, the almost complete absence of means of communication, together with the specific navigation conditions of the waters that wash it—all these involve the use of special methods for studying the European and Asiatic parts of the Soviet Arctic.

In this vast area, occupying all the Eurasian coast, we are interested, partly because of the wealth of its natural resources, but mainly because along its shores it is possible to maintain constant communication between the west and the east.

Until recently studies of this remote region were effected chiefly by expeditions, but they are now carried out under a permanent organisation, with regular and permanent bases in the Arctic.

Means of transport, too, have changed as a result of the permanent organisation. In contrast to the previous methods, when ships travelled passively along with the ice-drift, ice-breakers and ice-breaking steamers are now used, while on dry land, side by side with dog-teams, aeroplanes, aerosleighs and power transport generally are employed.

The famous expedition of the ice-breaker *Krassin*, that went to the rescue of the members of the *Italia* expedition, showed in a particularly realistic manner the value of ice-breakers capable of wrestling with the ice.

Thanks to the use of such ice-breakers, and also to reconnaissance service from the air, the Kara Sea, reckoned fifteen years ago as impassable, "with icy sacks," now offers its sea route from western Europe to the mouth of the Rivers Ob and Yenisei.

The establishment of these northern observatories and radio-stations on islands and archipelagos that appeared unapproachable or barely approachable (Hooker Island in 1930, Rudolph Island in Franz Josef Land in 1932, Cape Chelyuskin in 1932) has also been shown to be the object of reorganisation of transport means in the Arctic.

After the noted *Sibiriakov* Expedition which, in 1932, went for the first time in one year the whole way along the northern shore of the Union, a special fixed administration for the chief control of the Northern Sea Route was organised, and is associated with the Soviet National Commissars of the U.S.S.R. One of the duties of this administration is to plan out the northern sea route from the White Sea to Bering Strait, to organise its transport, to keep it working effectively and to guarantee the safety of craft sailing on it.

The charter for this administration also lays down the conditions under which the economic development of the route, which has vast possibilities, shall be carried out.

In order to carry out these comprehensive plans, it is of course necessary to begin with a thorough scientific exploration, both on sea and on land, of all this enormous region. Precisely with these objects, the Arctic Institute, founded by a statute dealing with the Institute, and confirmed on November 30, 1930, was made the central authority for scientific investigation, and attached to the Chief Administration of the Northern Sea Route. The Arctic Institute, however, came into existence long before the passing of this statute.

The Institute developed from the work of scientific men who from their great interest had begun the work of the exploration and study of both the nearer and of the more remote North. In accordance with the statute, the Institute now "develops plans for scientific research work for studying the natural resources of the polar regions of the U.S.S.R.; it invites conferences and promotes research in geology, geomorphology, hydrology, hydro-biology, initiates geodetic and topographical work, zoological, botanical and geophysical investigations, studies ways and means of communication (communication by water, overland and by air) in the Arctic, it studies matters connected with reindeer and dogs and trade, encourages anthropological and ethnological research and the comprehensive study of the polar regions."

The training of young investigators for the arctic regions, in conformance with the statute, is a special duty of the Institute.

Before dealing in detail with the constitution of the Institute, I take

the liberty of mentioning those forerunners, thanks to whose work the present Arctic Institute was organised.

In January, 1919, on the initiative of a group of scientific workers, amongst whom was the author of the present article, there was formed, in connection with the Supreme Economic Council, an educational "Commission on the Study of the Arctic," the task for which was, as is seen from its name, the study of northern territories. At first the Commission had a limited scope of work, e.g. the north of the Union was still occupied by foreign armies. In March, 1920, this Commission, by decree of the Presiding Council of the Supreme Economic Council ("BCHX") was organised as the "Northern Scientific-Industrial Expedition" with extremely wide scope of action. In fact, this was the Scientific Research Institute, the tasks of which was the systematic study of natural wealth in the northern region. Having prepared a plan of work for 1921, this scientific institution equipped twenty-three different expeditions for the study of the North. The field of their labours was the Kola Peninsula, Novaya Zemlya and the district of the River Pechora. In the same year the systematic study of the double island of Novaya Zemlya was begun. In the course of a series of years the geological structure of this island was studied, also its trading possibilities, in particular the trade in "golets" (? a species of Goby) and investigations of bird markets and other subjects for inquiry which extended with every year. On the Kola Peninsula, systematic geological work helped in the discovery of a series of useful minerals. In the Khiva region, tundras were discovered with exceptionally rich dykes of apatite. In the Karelia a beginning was made with the systematic exploration of the occurrence of feldspar and mica. On the island of Vaigatch, polymetallic ores were found. On the Pechora, in the region of its mouth, coal was found. In 1924 a visit was paid in a small boat on a cruise round the southern extremity of Novaya Zemlya along its eastern shore, and in 1925 in a sailing motor-boat, *Zarnitsa* (fifty tons displacement), the survey round the whole of Novaya Zemlya was completed. In that year the "Arctic Scientific-Industrial Expedition" was given the new name of the "Institute for Arctic Study," remaining, as before, connected with the Supreme Economic Council. In 1927 an expedition was again accomplished to Novaya Zemlya, whose duty it was, however, to investigate the sea between Novaya Zemlya and Franz Josef Land, which the expedition on this boat fortunately accomplished. At the same time tasks were carried out on the northern spurs of the Gateway of Timan and Kara. Besides this, in virtue of the Soviet-German undertaking, the

Novaya Zemlya Expedition achieved a hydrological section between the north-western part of Novaya Zemlya and Cape Barents on the island of Nordruk in the archipelago of Franz Josef Land.

1928 was an important year in the history of the Institute. At the command of the Government of the day the Director of the Institute, the author of this article, was appointed head of the expedition on the ice-breaker *Krassin*. Successful operations in this ice-breaker were accomplished which not only saved the members of the *Italia* Expedition, but—what is particularly important—gave an impetus to the further development of scientific research and public work in the northern Arctic. In the Council of People's Commissaries a special "Arctic Commission" was founded, among the duties of which was the regulation of opportunities of co-operation in the study of the Soviet Arctic.

Throughout the year 1929, on Hooker Island, in the archipelago of Franz Josef Land, the erection of the first regular scientific-industrial polar station by the expedition was going on under the direction of Professor Schmidt, on the ice-breaker *Georgi Sedov*. This task was carried out with success.

At the same time, according to the decision of the Government of the U.S.S.R., there was carried out by this expedition an act of incorporation of the archipelago of Franz Josef Land with the U.S.S.R., with the solemn hoisting of a flag on Cape Flora.

In 1930 an expedition to Pacific Bay on the ice-breaker *Sedov* was again equipped, for the relief of those who wintered at this station, and for the erection of another building, for radio installation. The expedition had, besides this, the task of going to the farthest north island of the archipelago and building there a polar geophysical station. Besides the general scientific work executed by this expedition, at the head of which was once more Professor Schmidt, with the deputies, R. L. Samoilovitch and V. Y. Weise, it discovered a whole series of new islands that received the names of Serge Kamenev, Schmidt, Samoilovitch and Voronin. Then came the discovery of a new island—Weise Island—situated between 79° 30′ and 79° 42′ N. and 77° 05′ and 76° 06′ E., the existence of which was some years ago predicted by Professor Weise. On this journey to Severnaya Zemlya a party, under the leadership of Comrade Ushakov, was taken which remained for the space of two years in the archipelago and whose work has already been mentioned in the pages of *The Polar Record*.

In this year the "Institute for the Study of the North" had accomplished its immediate work, but new activities arose, and it was re-

named "The Soviet Union Arctic Institute." Its fresh duties included co-operation with others who were carrying out analogous work elsewhere.

The first Director appointed to the Arctic Institute was Professor Schmidt, and his deputies were Professors R. L. Samoilovitch and V. Y. Weise. A Scientific Council with the usual powers for this kind of organisation was formed, attached to the Directorate of the Institute.

With the setting up of the Chief Administration of the Northern Sea Route after the cruise of the *Sibiriakov*, the first thing to be done was to consolidate what it had done and make closer investigation of that route. In 1931 an expedition was organised on the ship *Lomonosov*, under the direction of A. F. Laktionov, to Franz Josef Land, for the relief of those who wintered there at the polar station in Pacific Bay and in the Kara Sea, where deep-water investigations were carried on for hydrological purposes. In Novaya Zemlya, trade and geological expeditions were continued. At the head of the latter was M. M. Ermolaev. Exploration from the southern shore of Matotchkin Shar discovered the existence of vast sulphide regions in the central part of Novaya Zemlya. Work of a geomorphological nature was also carried out in the region of the lower Lena. There remains to be mentioned the fact that, in 1931, the Arctic Institute took an active part in the international expedition in the airship *Graf Zeppelin* to the Soviet sector of the Arctic. The author of this article was leader of the scientific section of this expedition. This flight showed the possibility of using ships of this type, not only for scientific research work, but also as a means of transport.

In 1932 an expedition in the ice-breaker *Russanov*, under the direction of the author, effected the relief of the winter occupants in Severnaya Zemlya and built a permanent station on the Chelyuskin Promontory, at the same time carrying out hydrological and hydro-biological work in Vilkitski Strait.

The *Malygin* relieved the winter party on Franz Josef Land, and, in connection with the International Polar Year, a still larger north polar station was built on Rudolph Island.

In the region of the north-east U.S.S.R., the geologist S. V. Obrutchev carried out investigations from an aeroplane in the district of Chukotski, making a survey and producing a general description of the country. Important modifications to the existing maps of the region were made. To the south of it, in the Anadyr country, research by several parties, begun in 1931, on the complex study of the Anadyr-Chukotsk country was continued.

In the western region, in Russian Harbour, in the north-west part of Novaya Zemlya, a polar station was established in connection with the International Polar Year; in its programme were included glacial and geophysical research. In this region, under the direction of Ermolaev, the depth of the ice covering the northern part of Novaya Zemlya (250–300 metres) was measured with the help of seismic methods, the limits of the glacial cap were accurately determined, systematic meteorological and aerological observations were taken, and extremely interesting researches on the broadcasting of sound waves were carried out.

In 1933 the Arctic Institute again took part in scientific work in the expedition on the *Tcheluskin*, under the leadership of Professor Schmidt. This steamer, of ordinary construction, was sent to the Bering Strait, but was wrecked in the disaster of February 13. All the members of the expedition were marooned on the ice, but with fine courage and discipline they were rescued, thanks to the wonderful work of the Soviet airmen.

In this year, for the first time, the Chief Administration of the Northern Sea Route ordered a whole fleet of ships, three vessels, in the mouth of the River Lena, and they fortunately arrived with an important cargo. On the return journey these ships were obliged to remain for the winter at Samuel Island in the eastern part of the Taimyr.

In the summer of 1933 the geologist Obrutchev finished his flights over the Chukotsk Straits, and in a short time the results of his work will be published with a special chart of all this region.

In 1934 numerous parties were again sent out by the Arctic Institute, the author of the present article being made the Director. Geological investigations of Novaya Zemlya will be finished this year, and our knowledge of the region of the lower Lena has been greatly advanced, in particular with regard to the Karaulak mountains and Chukotsk Straits, where at the present time five separate geological parties are at work.

Such operations on common lines, conducted by the Institute and its predecessors, have constituted their activities for fifteen years, from 1919 to 1934.

Perhaps the main results of this work can be summed up as follows:

The navigation of the Northern Sea Route in one season was of exceptional significance not only for our northern borderlands, but also for the whole U.S.S.R.

In the western part of this route the northern part of the Kara Sea, which before the work of the Arctic Institute was a blank area, has been discovered and mapped.

In the same part of the Kara Sea a series of new islands has been discovered.

The regime of the Kara Sea, in particular the regime of the currents and ice, has been studied and has given valuable information.

In the central part of the Northern Sea Route there is now on the chart the vast archipelago of Severnaya Zemlya with its islands, Bolshevik, Komsomolets, Otyabskoi, Revolyutsii and Tsioner.

Systematic scientific work in the eastern portion of the Arctic Sea Route has been begun in the almost entirely unexplored seas, Laptev, East Siberia and Chukotsk.

On the whole northern shore of the Union and on the islands of the Arctic Sea, stations have been set up. At these stations, namely in the Pacific Bay, on Hooker Island (Franz Josef Land), in Russian Harbour (Novaya Zemlya), on White Island, at Cape Chelyuskin, on the Island of Sagastyr, on the Medvezh ("Bears'") Islands, on North Cape and on Cape Dezhnev (in Wellin), and also at eleven stations built previously, scientific researches are carried on, directed by the Arctic Institute. Polar stations equipped with radio installations ensure constant communication from our boundaries with Finland, Norway and Alaska.

Exploration has been directed towards reporting on local resources in different regions of the Northern Sea Route. At the mouth of the River Chatang and in the Bay of Nordvik liquid petroleum has been discovered; beds of coal have been studied in Bulun; outcrops of coal seams have been found in the basin of the River Kolyma and in the Chukotsk peninsula.

In Novaya Zemlya there have been discovered deposits of copper, zinc and asbestos.

In Chukotsk deposits of tin were discovered, also of copper, arsenic and nickel.

The possibility of developing other local industries such as fishing, fur trade, reindeer, etc., has been investigated from Novaya Zemlya to the Bay of Chelyuskin.

By a series of expeditions carried out jointly with the Academy of Science of the U.S.S.R. from 1920 to 1929, the Chibinsk apatite deposits were studied and proved to be of great value.

New supplies of raw materials for the ceramic and abrasion trades were found in the Karelia district.

Beds of coal were found in the basin of the River Pechora; polymetallic ores were discovered on the island of Vaigatch.

Much survey work has been done, largely from the air, and large areas have been mapped.

In 1933 the Arctic Institute organised at the State Russian Museum the first Polar Exhibition in the U.S.S.R., which was held from February 18 of this year to May 23. During this period 32,893 persons visited the exhibition, included in this number being 209 excursions (of which ten were excursions of foreigners). Many exhibits in the Polar Exhibition were then transferred to the Arctic Museum.

The results of the work of the Institute are brought out regularly in the publications of the Arctic Institute, which come out in the form of *Proceedings of the Institute, Materials for the Study of the Arctic,* with various reports and maps. Besides this, the Arctic Institute has its own monthly organ, the *Bulletin of the Arctic Institute.* Articles by scientific workers of the Arctic Institute, or of foreign investigators, when too large for the *Bulletin,* are printed in reports of a non-periodical nature. In order to popularise the idea of polar research and to acquaint the vast toiling masses of the Union with the work effected in the Arctic and for the education of cadres of future Soviet polar explorers, a Polar Library will be published.

The constitution of the Arctic Institute is as follows: the Director and his two deputies with a scientific secretary from the administration under which are the following sections: Geological, Hydrological, Industrio-biological, Geophysical, Geodetic; Publishing Department, Museums, Library, Laboratories and Workshops.

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|---|---|
| Total number of scientific collaborators in the Institute | 98 |
| Number of those in winter quarters ... ... ... | 127 |
| Technical assistants ... ... ... ... ... | 40 |
| Total | 265 |

*Grønlands Styrelse, Copenhagen.*

The present Danish administration of Greenland finds its origin in the missionary work started by Hans Egede amongst the Greenlanders at the beginning of the eighteenth century, when the Church first took in hand the work now carried out by the Government. Greenland is now fully recognised as a colony under Danish sovereignty; the judgment passed at the International Court at The Hague on April 5, 1933, having given to Denmark all rights over the country she had administered so ably for two centuries.

The *Grønlands Styrelse* (*Greenland Administration*) is the Government Department responsible for the affairs of the colony, and is the direct means by which Denmark has achieved such a high standard of living for the native population under her rule. The following facts have been furnished by Herr Daugaard-Jensen, the Director.

About 15,000 of the population of Greenland are to be found on the west coast, between Cape Farewell and Lat. 75° N., as this stretch of country provides the best living conditions, and is more easily accessible to ships than the east coast. For this reason most of the Danish colonisation has taken place in the western settlements, where the population is now of mixed Eskimo and Danish origin. For the purposes of government, the west coast of Greenland has been divided into two parts, over each of which a *Landsraad* (Country Council) is elected. The position of this assembly, which, however, is only of an advisory nature, is somewhat similar to that of a European Parliament, and the members have a say in all questions of vital importance to the country. The *Landsfoged* (Danish Governor) is chairman of these assemblies; but through its own representatives, elected by popular vote, the native population has a decided influence on the administration of the country. The proceedings of the *Landsraad* are published to all the native inhabitants, who thus are able to take a lively interest in all that affects the government of their country.

West Greenland is sub-divided into thirteen *Sysler* (Districts), each with a *Sysselraad* (District Council). The duties of this body are mostly of a practical nature, such as the inspection of schools, care of sanitation, and public welfare. The members of the Council consist of Danish officials, and Greenlanders, who are elected by vote, and measures are taken to prevent the Danish members from being in the majority at any of these councils. The Chairman of the *Sysselraad*, who is chosen by the votes of the Council itself is also in charge of the *Sysselret* (District Court) composed of both Danes and Greenlanders, which has jurisdiction in both civil and criminal cases.

West Greenland is further divided into sixty-five parishes, each consisting of one village, or group of small settlements. In each parish the inhabitants elect a *Kommuneraad* (Parish Council), which consists of three to five members, and has the charge of public order, social relief work, the care of the sick and orphans, and in fact the general welfare of the community.

The Greenland administration has the monopoly of all trading in

Greenland; and real necessities, such as building material and hunting implements, are sold to the natives at the lowest possible prices, while food is also obtainable in cases of famine due to scarcity of game, though care is taken not to let the Eskimos become dependent on imported foodstuffs for their living; but to live whenever possible by hunting. The import of alcohol is subject to very rigorous restrictions, and alcoholic drinks are practically unobtainable for the natives.

Besides supplying the country with European products, one of the chief objects of the Royal Greenland Trading Department is to assist in the disposal of the products of the country, and to promote its natural resources. There are fourteen large trading centres on the west coast as well as about fifty smaller trading posts. The Royal Greenland Trading Department has its own fleet, consisting of a number of modern steamers and motor ships, specially constructed for ice work; and smaller boats manned by native crews ply between the smaller trading centres on the coast.

Of recent years, simultaneously with the decline in seal and whale hunting, originally the main livelihood of the natives, a fishing industry has developed, which, carried on on modern lines, brings comparative prosperity to the country, especially to the people of South Greenland. Sheep farming in South Greenland is another important resource which has developed greatly of recent years. Mention must also be made of the Cryolite mine at Ivigtut, run by a private company, which pays a yearly concession to the Greenland administration, and thus adds to the wealth of the country. Coal found in North Greenland is sufficient to meet the needs of the whole population.

Great attention is paid by the Government to the education and health of the natives. All Greenlanders have been baptised; and are now educated in all the usual subjects by native teachers, who are trained at the seminary at Godthaab. There are ten hospitals on the west coast of Greenland with accommodation for 230 patients, nine Danish doctors and ten Danish nurses. There are, further, a large number of native midwives trained partially in Denmark, who are competent to advise on health and sanitation in their own particular settlement.

It will thus be seen that the principal object of the Danish Greenland administration has been to improve the standard of living of the local population, and avoid in so doing the detrimental influences to which a primitive people so easily succumb, when in touch with European civilisation. For this reason it has been thought advisable to make

Greenland a "closed country," but those, explorers and others, whose business in life has led them past the official barriers, know, with gratitude, the kindness and ready assistance which the Danish Greenland administration gives to all those who have a lawful errand in their country.

*Scoresby Sound Committee, Copenhagen.*

Since 1924 the work of the *Grønlands Styrelse* has been supplemented by that of the Scoresby Sound Committee, which was formed privately, in that year, under the Chairmanship of the late Vice-Admiral C. F. Wandel. The object of the Committee was to establish a new native settlement at Scoresby Sound, East Greenland, and to transfer there a number of natives from Angmagssalik, which was becoming overpopulated; using private means to procure a vessel and erect and fit out the new settlement.

By the spring of 1925 the settlement was ready for occupation, and about a hundred natives were taken to their new quarters, where a thriving settlement has now been established for nine years. Although the objects of the Committee had now been attained, it remained in operation in order to supervise the development of the settlement. From 1927 to 1929 a study of the animal life of the Scoresby Sound district was carried out by Mr Alwin Petersen; and in 1932 the Committee, now under the Chairmanship of Captain Ejnar Mikkelsen, sent out an expedition, under his command, to explore the Blosseville coast, and erect a number of houses between Scoresby Sound and Angmagssalik; thereby making it possible for natives to travel from one settlement to another. Houses were also built at Kangerdlugsuak to accommodate fresh settlers from Angmagssalik, and a large programme of scientific work was carried out. Apart from the ship, which was lent by the Government, the cost of these expeditions was defrayed privately.

The objects for which it was founded having now been attained, the Scoresby Sound Committee will now, in all probability, cease to exist, the more so, since its Chairman, Captain Ejnar Mikkelsen, has now become Inspector of the East Coast of Greenland, which debars him from the Chairmanship of a private committee.

*Norges Svalbard-og Ishavs-undersøkelser, Oslo.*

Since 1906 Norway has been engaged upon a systematic exploration and expansion of Spitsbergen, which, together with the neighbouring islands and Bear Island, forms a part of that sector of the Arctic known

as Svalbard; and in 1928 the State Institution called the *Norges Svalbard-og Ishavs-undersøkelser* (*Norwegian Scientific Exploration of Svalbard and the Polar Regions*) came into being. The Institution is under the Directorship of Dr Adolf Hoel, who has kindly supplied the information given below, and who, with the eleven members of his staff, is responsible for most of the Norwegian work in the Arctic. The Institution has, since June, 1934, been housed in the buildings of the old University Observatory at Oslo, and has a large library of both Arctic and Antarctic books, as well as a fine collection of maps and photographs.

The *Norges Svalbard-og Ishavs-undersøkelser* undertakes the official topographical survey of the islands, the hydrographical survey of the adjacent waters, as well as geological, botanical, zoological, and archaeological investigations of the region. The meteorological observations, however, come under the Norwegian Meteorological Service, and the special fisheries research is in the hands of the Fisheries Board at Bergen. In connection with this work of exploration, expeditions are sent out almost every year by the Institution, to Jan Mayen, East Greenland and occasionally Franz Josef Land, as well as to Svalbard; the personnel consisting for the most part of members of the staff of the *Norges Svalbard-og Ishavs-undersøkelser*, who are also, as far as possible, responsible for the working up of the results. The scientific results of these expeditions are published in the publications of the Institution, *Skrifter om Svalbard-og Ishavet*, which contain papers written in English, French and German; and in the *Meddelelser*, which are made up of shorter papers, and accounts of expeditions, in Norwegian. The Institution also published maps and hydrographical charts.

Since the annexation of Jan Mayen by Norway in 1929, survey and exploratory work generally on the island has also been carried out by the *Norges Svalbard-og Ishavs-undersøkelser*; and Norwegian scientific work in East Greenland also dates from that year. The two Norwegian meteorological and radio stations in East Greenland, Torgilsbu (Lat. 60° 32′) and Myggbukta (Lat. 73° 29′) at present functioning, are under the direction of the Institution. The geological work of the *Norges Svalbard-og Ishavs-undersøkelser* includes excavating for coal in Bear Island and at King's Bay, Spitsbergen; and in 1933 it was commissioned by the Norwegian Government to plan and erect a new radio station and lighthouses in Ice Fjord, Spitsbergen.

Finally, the *Norges Svalbard-og Ishavs-undersøkelser* exists as a storehouse of information for those who wish to conduct expeditions to the

regions under its jurisdiction; and is always ready to give advice to those from other countries engaged on similar work. It is advisable to get into touch with this Institution before engaging upon any work of this nature in the Norwegian Arctic possessions, and those who do so are sure of an unfailing courtesy and ready assistance.

*Northwest Territories Administration, Canada.*

The history of the Northwest Territories of Canada is practically as long and in many respects as interesting as that of any other part of North America. There are two phases of its history worthy of special mention—first, that British claims were firmly established by right of original discoveries and have been maintained continuously by exploration and occupation—second—in addition to the duty of caring for the native inhabitants—the principal motive in solving the mysteries of these northern regions was the desire to give to the world a better knowledge of their geography and natural history.

The Northwest Territories of Canada as a political unit came into existence on July 15, 1870, when, by an Imperial Order in Council, Great Britain transferred to the then recently federated Dominion her adjacent possession, at that time known as "Rupert's Land" and the "Northwestern Territory," and specified that the combined area should be known as "The Northwest Territories." A second Imperial Order in Council of July 31, 1880, confirmed the transfer of all Great Britain's Arctic islands to the Dominion of Canada.

In 1869 a measure, entitled "An Act for the Government of Rupert's Land and the Northwestern Territory when united with Canada," was passed by the Parliament of Canada and in 1875 there was passed the "Northwest Territories Act," which provided a more permanent form of Government for the Territories.

Step by step, as circumstances demanded, the further organisation of the Northwest Territories was effected. This process involved the creating of various districts, the boundaries and forms of administration of which were revised from time to time to keep abreast of development. In 1898 an area on the extreme western edge of the Territories and north of British Columbia was, on the discovery of gold therein, set aside and established as Yukon Territory.

In 1905, out of the southern portion of the Territories the Provinces of Alberta and Saskatchewan were formed, their northerly boundaries being fixed as the 60th parallel of north latitude. The form of govern-

ment in force in the Territories up to 1905 was discontinued and in its place provision was made for the appointment by the Governor in Council of a Chief Executive Officer, to be known as the Commissioner of the Northwest Territories, who should administer the Government of the remaining territorial area north of the organised provinces and east of Yukon Territory, under instructions from time to time given him by the Governor in Council or the Minister of the Interior. Provision was also made for the appointment of a Council of four, subsequently six members.

The Commissioner in Council has power to make ordinances for the Government of the Territories respecting direct taxation within the Territories in order to raise revenue, etc., establishment and tenure of territorial offices, and the appointment and payment of officers, maintenance of prisons, municipal institutions, licences, solemnisation of marriages, property and civil rights, administration of justice, and generally all matters of a local nature.

The administration of Canada's Arctic possessions also includes regular explorations by qualified scientists of the Government Service. Permission is also granted to scientific institutions of international reputation to send fully equipped expeditions into the Northwest Territories, accompanied by a Government representative. Complete reports of all discoveries, scientific data, etc., are submitted to the Northwest Territories Council and made available to all Departments of the Government of Canada.

*Deutsche Seewarte.*

At the close of this article brief mention must be made of two Institutions, both of them situated at Kiel, Germany, at which polar work is carried out.

The *Deutsche Seewarte*, though existing mainly for the purpose of carrying out oceanographical work all over the world, has, nevertheless, added its quota to the sum of polar knowledge, by its hydrographic work in high latitudes. An expedition, on board the survey vessel *Meteor*, visited the Greenland Seas during the summer of 1933, and many useful investigations were made. It will also be remembered that the success of the First International Polar Year in 1882–83 was in a large measure due to Professor Neumayer, then Director of the *Deutsche Seewarte*, who saw the scheme carried through after the death of Weyprecht, its originator. In the same way, the *Deutsche Seewarte* was responsible for

the inception of the Second International Polar Year in 1932–33. It will thus be seen that this Institution, without specialising in the investigation of the polar regions, has the acquisition of greater knowledge of the seas in the far north much at heart.

*The Archiv für Polarforschung.*

This Institution, also situated at Kiel, is, as its name suggests, exclusively polar in aim. A journal, *Polarforschung*, is published twice a year, in June and December.

# RECENT POLAR BOOKS

The following books, recently published, have come to our notice:

AAGAARD, BJARNE. *Den Gamle Hvalfangst.* Kapitler av dens Historie. Oslo: Gyldendal Norsk Forlag, 1933. 10 × 6½ in. Pp. 166. Illustrated.

BEHRMANN, W., DRYGALSKI, E. von, and GEISH, W. *Handbuch der Geographischen Wissenschaft.* Edited by Fritz Klute. Australien und Ozeanien in Natur, Kultur und Wissenschaft. Potsdam: Akademische Verlagsgesellschaft Athenaion, 1930. 11½ × 9 in. Pp. 300. Illustrated.

BECKETT, J. A. *Iceland Adventure.* The Double Traverse of Vatnajökull by the Cambridge University Expedition. London: Witherby, 1934. Illustrated. 8*s.* 6*d.*

ELTON, CHARLES. *The Ecology of Animals.* (Methuen's monographs on Biological Subjects.) London: Methuen & Co., 1933. 7 × 4 in. Pp. viii + 98. 3*s.* 6*d.*

GREENE, Major W. HOWE. *The Wooden Walls among the Ice Floes.* London: Hutchinson & Co., 1933. 7½ × 10 in. Pp. xxix + 298. Illustrated.

MACMILLAN, D. B. *How Peary reached the Pole.* The Personal Story of his Assistant. Boston: Houghton, Mifflin Co., 1933. Pp. 306. $3.

We have much pleasure in announcing the forthcoming publication of the Scientific Results of the German Greenland Expedition, Alfred Wegener, 1929–31, No. IV, as follows:

GEORGI, HOLZAPFEL and KOPP. 1. Abschnitt: *Die Beobachtungen.* 2. Abschnitt: *Die Diskussion der Beobachtungen.* 3. Abschnitt: *Zusammenfassende Betrachtung der Hauptprobleme.*

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