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British Graham Land Expedition, 1934-37

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BRITISH GRAHAM LAND EXPEDITION, 1934-37

J. R. RYMILL

Evening Meeting of the Society, 1 November 1937

THIS paper is a narrative of the expedition, describing in a general way our plans and travels, and the country which we were able to explore. The new problems and theories in the realms of geology, biology, and meteorology are being described separately in future issues of this *Journal*. It must be remembered that throughout our time in the Antarctic the expedition's scientists were doing their best to make the most of every opportunity that was offered. Often the general needs of the expedition, such as unloading cargo, building the houses, cooking the meals, and a small share in the maintenance work, made scientific work impossible; this was quite unavoidable with a small personnel such as ours. But even when on watch at sea they could sometimes combine science with seamanship by observing the distribution and habits of ocean birds, or trying to interpret the rock and ice formations on the islands as the *Penola* threaded her way among them. Naturally however they were always delighted when their general duties were done and they were free again to carry on their scientific work.

The exploration of south Graham Land was a problem considered by H. G. Watkins after his return from Greenland in 1931, but he was unable to raise the necessary funds, and was forced to abandon the project. He returned to Greenland, accompanied by Riley, Chapman, and myself, and was drowned there. Thus it fell to the lot of his followers to carry on the work in the south. On returning to England at the conclusion of the Greenland expedition, I immediately set about organizing one to Graham Land. Four of my old companions from the Watkins expeditions agreed to join me: W. E. Hampton, who came as second-in-command and chief pilot; Surgeon Lieutenant-Commander E. W. Bingham, Royal Navy, doctor and in charge of dogs; A. Stephenson, chief surveyor and meteorologist; and Q. Riley, whose jobs were many, as he was commissariat officer, meteorologist, and in charge of the expedition motor boat. The expedition numbered sixteen altogether and was divided into two parties—the shore party and the ship's party. The

four mentioned above were members of the shore party; the others were the Reverend W. L. S. Fleming, chaplain and geologist; Lieutenant I. F. Meiklejohn, of the Royal Corps of Signals, wireless officer; J. I. Moore, engineer and surveyor; and B. B. Roberts, ornithologist. The ship's party consisted of

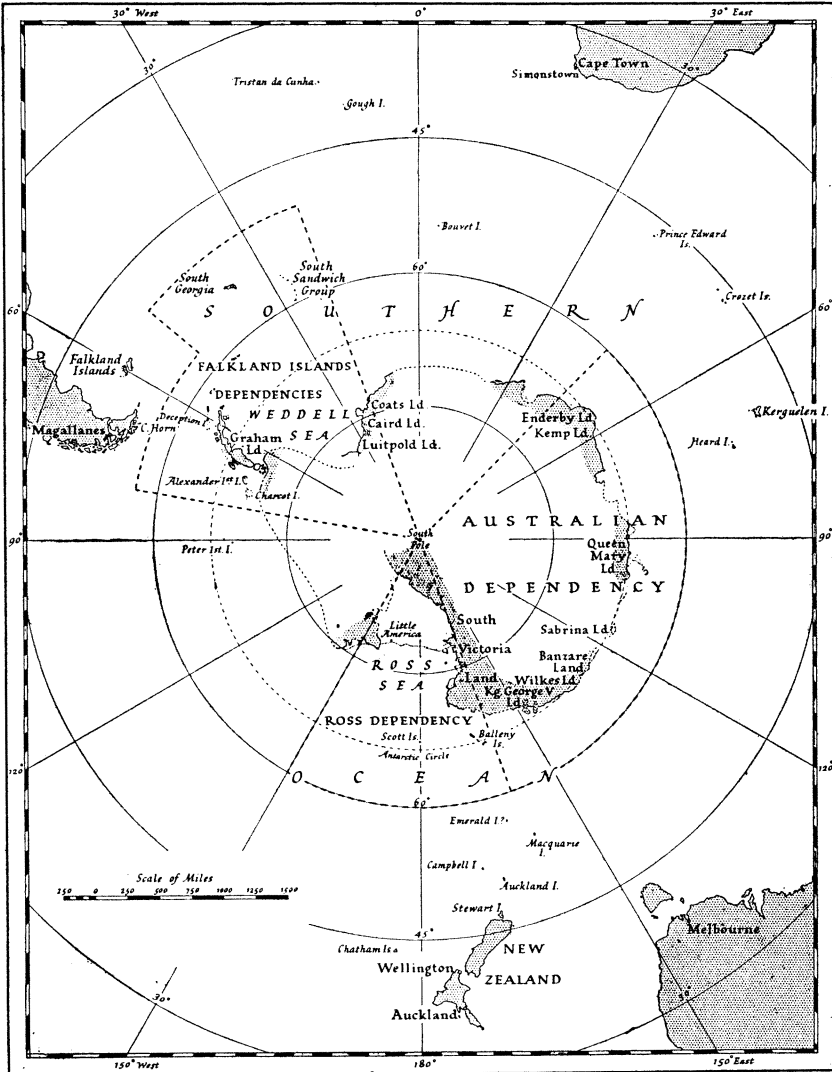


Fig. 1. The Antarctic continent as known in 1934

Lieutenant R. E. D. Ryder, Royal Navy, captain; Lieutenant-Commander H. Millett, Royal Navy, chief engineer; J. H. Martin, first mate; Captain L. C. D. Ryder, of the Royal Norfolk Regiment, second mate; G. C. L. Bertram, biologist; N. Gurney and V. D. Carse, sailors.

The general map of the Antarctic (Fig. 1) shows the position of Graham

Land, on the south side of Drake Strait, directly south of Cape Horn. It can be clearly seen that the part of the Antarctic coast which lies to the south of Australia and South Africa has been well explored, especially the Ross Sea area, where Scott, Shackleton, Amundsen, and Byrd all carried out their work; but this other area in western Antarctica had been left practically untouched, mainly because of the difficulty caused by heavy pack-ice in reaching the coast by ship. The area in which we proposed to work is British territory, and is called the Falkland Islands Dependency.

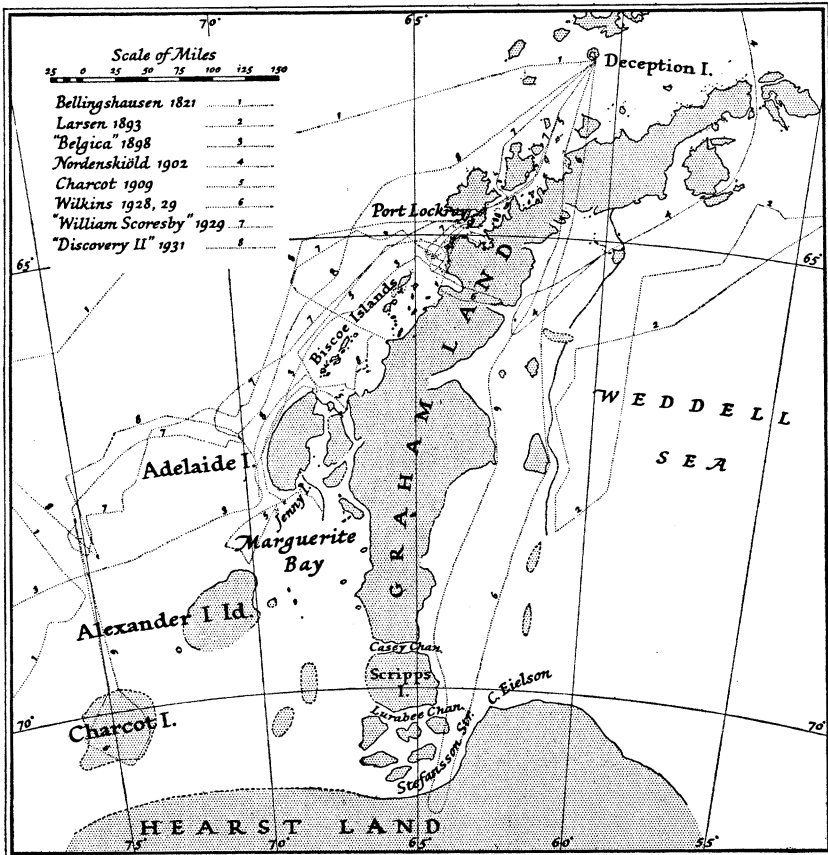


Fig. 2. Graham Land and routes of previous explorers

Apart from the exploration of northern Graham Land no one except the German explorer Filchner, in 1912, had succeeded in landing anywhere on what was thought to be the Antarctic continent or its bordering shelf-ice in the Dependency. Filchner landed in the south-east corner of the Weddell Sea, but was unable to carry out any exploration on land. Apart from this effort, enough ships, including Shackleton's *Endurance*, had failed to penetrate to the southern limit of the Weddell Sea to make it obvious that to try to push south on this side of Graham Land was quite impracticable.

But if one considers the west side, Fig. 2 shows the tracks of the expeditions which have worked along this coast south of latitude 65° . North of this latitude, the coast is easily accessible, and has been known to whalers and explorers for many years. Only two ships have succeeded in penetrating inside the Biscoe Islands; these were Charcot's *Pourquoi Pas?* in 1908 and the *Discovery II* in 1931. Whalers working from Port Lockroy may have come inside the Biscoes, but their reports are too vague to be relied upon.

When aeroplanes became practicable for polar travel, Sir Hubert Wilkins made the first Antarctic flight in 1928 when, in a magnificent effort, he flew from Deception Island 600 miles south, and so penetrated the vast unknown region of southern Graham Land. His route is shown on Fig. 2, and in the *Geographical Review* (xix (1929) 367) he stated:

"At 12.50 I noted in my log 'we are now quite certain that Graham Land is not connected with the mainland continent.' We felt sure of this before, but at this point it could be distinctly shown in a photograph. We named the cape at the north side of the channel Cape Walcott; the channel Lurabee Channel; and the islands to the south the Finley Islands. In a few minutes we could see that the group of islands did not extend very far. They were divided by level, smooth ice. There appeared to be a group of six or more of these islands scattered in a wide strait. We could not clearly define their outlines because we were then flying at 2000 feet, to which height we had descended for observation of the snow surface. Beyond the islands extended a level strait, and farther south a smooth slope, wide and unbroken, reached southward. It was not marked by even a speck or a shadow and would not show on a photograph. We called the strait Stefansson Strait, and the land beyond it Hearst Land."

Again in 1929, while using the Discovery Committee's ship *William Scoresby* as a base, he flew round Charcot Island. Of this flight he says: "From where we first reached land about latitude $69^{\circ} 45'$, longitude $74^{\circ} 55' W.$, Rothschild Island bore 70° true. Far to the east we could see two new islands. . . . In the neighbourhood of the two new islands and south of them we could see a few icebergs fast in the shelf-ice" (*Geogr. Rev.* xx (1930) 374). On the strength of Sir Hubert Wilkins' reports the map took shape as it is shown above.

As has been said, it is impractical to navigate in the Weddell Sea, but Mr. Wordie pointed out that Wilkins' report of Casey Channel, Lurabee Channel, and Stefansson Strait opened up a new possibility for an expedition to work as far as possible down the west side of Graham Land, establish a base somewhere in Marguerite Bay, and then travel by dog sledge through one of these channels, and so explore the Antarctic coast behind the Weddell Sea. Another party from the same base could explore to the west behind Alexander I Island and Charcot Island. This is what we planned to do.

In organizing an expedition the first essential is of course money, and in spite of generous support from the Colonial Office, the Royal Geographical Society, and many private donors our funds were very limited; as a result we had to economize in every possible manner. The greatest expense incurred by an Antarctic expedition is the ship. I proposed to cut this expenditure down to a minimum by buying a small sailing ship fitted with auxiliary power and running it entirely with amateurs—except for the captain and chief engineer,



The "Penola" in Port Lockroy, January 1935



Mount Français, Antwerp Island, from Port Lockroy



The "Penola" in winter quarters at the Argentine Islands



The Argentine Islands base, August 1935



Riley, Hampton, and Rymill in the house at the Argentine Islands

who were naval officers. Therefore the captain, although an experienced and efficient navigator, was virtually an amateur in sail. As we were contemplating a three years' voyage this scheme was naturally a formidable undertaking, and met with a great deal of disapproval and criticism from seafaring men. However I heard no difficulties suggested that I believed could not be overcome, and as it was a question of taking an amateur crew or not going to the Antarctic at all, there was no alternative.

On looking back on the expedition it is apparent that the amateur crew had obvious disadvantages in the beginning while they were still new to ships and the ways of the sea, but later they did their work well and safely under conditions which would have taxed the best professionals. Although educated men cannot be expected to have the same interest as ordinary sailors would have in dull maintenance work during the winter months which our ship spent in the Antarctic, they are far more adaptable to uncomfortable conditions and strange food. In fact I have the greatest respect for the only two members of the ship's party who were not specialists and were therefore called upon to do most of the dull, unpleasant work. If the occasion arose again I would not hesitate to adopt the same system, for judging by results it has proved itself to be a sound one. During the voyage, which lasted for two years and eleven months, this amateur crew, besides carrying out the maintenance work, which is always heavy on an old wooden ship, covered a distance of 26,896 miles: 15,496 under sail alone, 3,040 with engines, and the remainder under a mixture of the two.

Besides the ship our transport consisted of a small single-engined Fox Moth aeroplane, a motor tractor, and sixty-four sledge-dogs bought for the expedition by F. Spencer Chapman in Greenland. Unfortunately these dogs developed distemper on the way to the Antarctic, and all except fifteen died. Dog-sledging was to be our chief form of travel once we established our base, and it was essential to get more. As there was no time to send an experienced man from England to buy them, and there was no chance of getting more from Greenland, a new lot had to be bought hurriedly through an agent in Labrador. Although some of these were excellent animals, many were very poor, some even dying of old age while on the expedition.

At the beginning of September our ship, an old Brittany fishing schooner, rechristened the *Penola* after my home in South Australia, was ready to sail from the St. Katharine Dock, London. Hampton and Stephenson had left some months before by cargo boat for the Falkland Islands with the Greenland dogs and the greater part of our stores, while Bingham was waiting behind to bring on the new consignment of dogs from Labrador, which had not yet arrived.

We went down the Thames on 10 September 1934, and after a good trip through the Channel were soon out in the Atlantic. The amateur crew under the guidance of Ryder and Martin quickly became efficient enough to handle the ship safely, and after calling at Madeira and Montevideo we eventually arrived at the Falkland Islands, taking seventy-nine days for the passage of about 7000 miles from England.

Hampton, Bingham, and Stephenson were waiting for us, and two days

later Hampton and Bingham left with the dogs and a large part of our stores, including the aeroplane, on board the *Discovery II*, which had been lent by the courtesy of the Discovery Committee to carry some of our equipment to north Graham Land, so that when we sailed across the stormy southern ocean we did not have the added danger of being overloaded.

The *Penola* was not ready to leave the Falkland Islands until December 31, and on the first night at sea we had a serious misfortune which was to alter the whole course of the expedition. When we got clear of the islands we met stormy weather with a heavy sea, and Millett discovered that the engines were running out of line. We immediately turned back to investigate the trouble, and on reaching harbour under sail alone Millett found that it had been caused by the engine beds, which were made of unseasoned wood, warping while on the long, hot voyage through the tropics. The fastenings had come loose, allowing the engines a considerable amount of movement. We were now faced with two alternatives: either to carry out repairs in the Falkland Islands, which would mean missing the open season in Graham Land and not getting south until the next summer, or disconnecting the engines and carrying on under sail alone, reconnecting the engines again when we entered the sheltered waters in the channels of north Graham Land, and then carrying out repairs ourselves during the first winter. I chose the latter course, and we sailed again on January 5. The voyage of 900 miles across the southern ocean was uneventful, and we reached Port Lockroy, a harbour discovered by Doctor Charcot in 1904, on 20 January 1935, where we had arranged to meet Hampton and Bingham. They told us that owing to heavy ice the *Discovery II* had failed to reach Port Lockroy on her first attempt, and had left them for a month on Deception Island, an abandoned whaling station 150 miles to the north. They then made a successful attempt to reach Port Lockroy, and *Discovery II* had only left two days before we arrived.

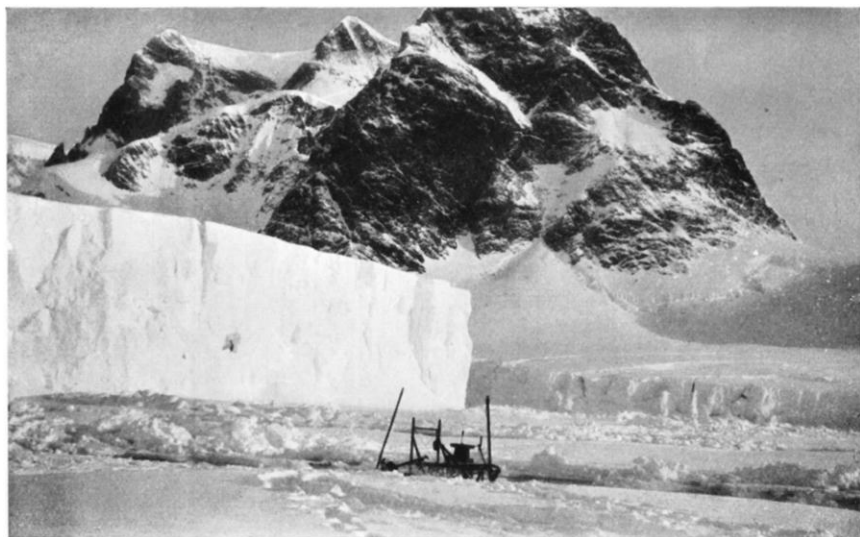
As the *Penola's* engines were in no condition to work in pack-ice or a heavy sea until they had been repaired, I thought that our best plan would be to try to find a site for our base on the mainland somewhere near the north end of the Biscoe Islands. We would most probably find good winter ice forming in the channel behind them, which would allow us to sledge south by this route.

As soon as we arrived at Port Lockroy we made a reconnoitring flight, but found that there was no practical place on the mainland for a base, for the coast is fringed with a narrow belt of glaciers lying at the foot of the mountains, and these terminate along the shore in ice-cliffs 60 to 120 feet in height. For mile after mile the wall of ice is unbroken except at some headland where the rocky cliffs of a mountain spur plunge straight down into the sea. However we found a good place on the Argentine Islands (named by Doctor Charcot) 40 miles south of Port Lockroy, and within 300 yards of the place which we chose for our base site there was a sheltered cove making an excellent wintering harbour for the *Penola*.

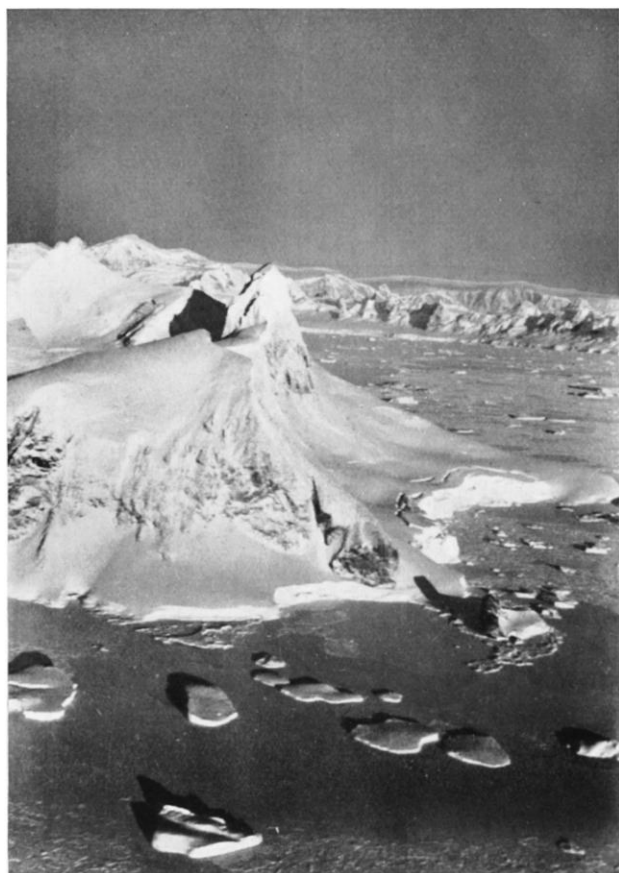
Our house and hangar, which was all one structure, was a new departure for the Antarctic, for we decided on a two-storeyed building. The house consisted virtually of two large rooms each measuring 22 feet by 15½ feet, with a porch in front. The downstairs room served as a workshop, kitchen, and



*View west from
the head of
Beascochea Bay*



Sounding gear in Beascochea Bay



Aerial view of Chavez Island, with mainland in the background

dining-room, with one corner partitioned off to form an office for Meiklejohn's wireless. There was no ordinary heating stove but an Aga cooker, which though insulated gave ample warmth except in the coldest weather, when we used two petrol heaters as well. A ladder resting against an open hatch in the ceiling led to the living-room and sleeping-quarters above. This upstairs room had walls 4 feet high and a steeply pitched roof which gave ample head-space over most of the room. The house had double walls insulated with asbestos-reinforced aluminium foil, a highly reflecting metallic material which proved most satisfactory. Besides lining the walls and roof with it we covered the ceiling of the downstairs room, which made the room much lighter and had a very cheerful modernistic effect.

We soon established the base on the Argentine Islands, and on 28 February 1935 Hampton and I made a flight along the coast to Matha Strait with the idea of seeing if there was any possible sledge route across to the east side of Graham Land. We flew south for 150 miles, but everywhere the central plateau was guarded by a great rock-cliff, making a crossing impossible except perhaps for a short climbing expedition. There was therefore little we could do except local surveying from the motor boat and biological work, until the ice in Grandidier Channel, which lies between the Biscoe Islands and the mainland, froze over. The period of waiting was a long one, but we were all fully occupied: the ship's party with the repairs to the engine beds and the general work of laying up the ship for the winter; while the shore party was kept busy with the scientific work, looking after the motor boat, and handling the aeroplane, which made many short flights, mainly for helping the scientists with their work. Both parties combined in sealing operations, and some ninety seals were killed and stored in an ice-cave for use during the winter.

Bingham, who was in charge of the dogs, spent most of his time while on the Argentine Islands in supervising breeding operations and training puppies. With careful management he succeeded in increasing our pack from the original forty-five which landed in Graham Land to ninety-eight; in fact 56 per cent. of the dogs working in the second sledging season were bred and trained on the expedition.

By the middle of July the new sea-ice between the Argentine Islands and the mainland was bearing well enough for us to sledge on, but was far from solid and might be broken up by any strong wind. If however we could once reach the mainland we believed that the ice in the bays would be good; there would thus only be treacherous going round the points, and a reconnoitring flight of some 50 miles down the coast showed the ice in Grandidier Channel to be bearing well. Our plans at this time were that one party would try to sledge to the north end of Adelaide Island, 140 miles from the base, there to establish a landing-ground for the aeroplane. They would travel over sea-ice close to the mainland and should be able to camp each night in the back of a bay, or on one of the numerous small islands along the coast. Once the landing-ground was established, Hampton would fly 2000 lb. of sledging provisions down to it. This would involve about five flights, and after the second one the sledging party which had established the landing ground would carry the stores on another 70 miles to Jenny Island. Then another party would leave the base, and after combining with the advance one, push on to try to explore

the unknown country south of Marguerite Bay. This journey should be completed before the ice broke up in Grandidier Channel; and then, as the ship's engine beds were now repaired, the whole expedition would be able to move farther down the coast as soon as the ice broke up, and establish a new base as far south as possible.

On August 18 Bingham, Moore, and Martin left to establish this advanced landing-ground for the aeroplane; Ryder and I left at the same time to accompany them for the first 50 miles and leave a depot intended for the return sledge journey, and also to mark out an emergency landing-ground. On August 22, after reaching our objective, I returned with Martin and Moore. Moore was obliged to come back on account of slightly frost-bitten feet, and Martin returned as it was found that the advance party could travel more efficiently in cold weather with only two men in a tent instead of three.

We arrived at the base on August 24, and two days later Hampton and I flew south again. I wished to show Hampton the emergency landing-ground, and we also hoped to make contact with Bingham's party. We picked up his sledge tracks at the depot and followed them south until we neared Pendleton Strait, about 70 miles from the base. Here we found rotten ice and completely open water, and could see from the tracks that the sledgers had wandered about trying to find a way through the maze of islands. It was obviously impossible to sledge beyond this point, and after looking for their camp on the islands we followed the sledge track north again and eventually found Bingham and Ryder camped on a small island 20 miles south of the depot. The ice looked very thin but Bingham signalled to us that it was safe for landing. When we came down he told us that while they were trying to get south the ice was steadily deteriorating in spite of zero temperatures. This was evidently caused by a strong current coming in at Pendleton Strait. The season was too advanced to give us any hope of improvement in the ice conditions, and we had to abandon any idea of getting south of this point. Therefore we decided that Bingham and Ryder would travel slowly northwards, making an accurate survey of the coast and off-lying islands, while Stephenson, Fleming, and I would start south from the base and connect with them. But before the survey could begin we would have to fly a wireless set for time signals down to Bingham's party.

This was done a few days later, and on September 1 Stephenson, Fleming, and I left the base to begin our end of the survey, which was really continuous with that done by Stephenson round the Argentine Islands and mainland opposite. This enabled him to start from a measured base and he was also helped by another base which he had measured in Beascochea Bay, a large fjord some 20 miles south of the Argentine Islands which had already been surveyed during the last week in August.

We worked slowly south, being much hindered by rotten and young ice, which made travelling difficult but interesting. Even in winter we found it impossible to land on the mainland except at one or two isolated places, for the promontories were fringed with narrow glaciers terminating in ice-cliffs in places over 100 feet high. Farther into the bays these narrow glaciers gave place either to broad crevassed ones or to rock-cliffs where the mountains came to the water's edge. The backs of the bays terminated in steep valley

glaciers which flowed down from a large glacier running parallel to and at the foot of the great plateau scarp, and fed by the tremendous icefalls which in places pour over the 4000-foot sheer rock wall of the central Graham Land plateau.

Stephenson determined astronomical positions at frequent intervals, and from these positions took both vertical and horizontal angles with the theodolite. Between these theodolite stations the detail was filled in by plane table. By this means we were able to determine the main outline of the coast and fix the positions and heights of the prominent mountains lying between the plateau edge and the points of the promontories. In addition we were able to fix the summits of a number of islands out to sea, their actual shore-line being difficult to determine in the winter time. Such points as we were able to fix served however as very useful controls for further work in the summer, when two flights were made over the islands and their general distribution sketched in by Ryder; and then when *Penola* eventually motored down the channel between the Biscoe Islands and the mainland, soundings were taken and as much detail of the islands filled in as time permitted.

Our map (see folding plate) covers a very broken-up part of the coast with great bays cutting into the mainland and a multitude of off-lying islands, and we do not claim that it is an accurate map of the whole area. The mainland and islands lying close to the mainland or to *Penola's* route can be considered as accurate on the present scale (1/750,000) and for the rest of the map only the outer limits of the groups of islands have been fixed, the details of the islands themselves being only sketched in from the aeroplane.

We finally met Bingham and Ryder on September 11, and both parties returned to the base four days later with the survey completed. There was now little we could do until the ice opened up enough to allow the *Penola* to work south, and we could establish our new base.

The wood in our old house was too swollen with the damp and too well put together for us to take it to pieces in a fit condition to use again. So on 3 January 1936, after we had freed the *Penola* by cutting the ice out of the creeks, she left for Deception Island to collect the necessary timber from the abandoned whaling station there. While the ship was away Stephenson, Fleming, and I made a short sledge journey into the interior of Graham Land, starting at a point opposite the Argentine Islands. We followed much the same route as Doctor Charcot's party had done in 1909 and were stopped by heavily crevassed country in much the same place. I believe it would have been possible to reach the plateau if this had been the main purpose of the expedition, but the country was so badly crevassed that we would have been certain to have lost dogs and possibly sledges also, a thing which it would have been pointless to risk on a journey of minor importance when all our available transport would be so necessary in the following year.

The *Penola* got back from Deception Island on 27 January 1936 with the wood for building our new house, and all available people immediately set to work cutting the main timbers, while the ship's party prepared for the voyage south.

For the second year which we were now about to spend in the Antarctic a change in the plans for the ship's party and in the personnel was necessary,

for during the winter Roberts had been suffering from recurring appendicitis, and Bingham and I decided that it would be unwise for him to spend a second winter in the Antarctic. Therefore we decided that when we had established our new base the *Penola* would have to return to the Falkland Islands, where Roberts could have his appendix removed. He would change places with Bertram, the latter coming on the shore party and Roberts taking his place in the ship's party.

We now had a year's experience in Graham Land, and from the knowledge we had gained it seemed that the most ice-free time would be March or April. I do not advocate pushing a ship into the Antarctic pack as late in the year as this, but navigating in the pack-ice must not be confused with coasting along west Graham Land, where the dominant wind blows from the north-east and east, tending to carry the ice away from the coast as soon as it breaks out. As this is not until the end of the summer, the later one can leave the better; but there were many other considerations besides the ice for us to take into account in deciding when to leave the Argentine Islands. We knew nothing of the coast south of Adelaide Island except that we expected to find Casey Channel in latitude $69^{\circ} 40'$. Some time would therefore probably be spent in trying to find a site for our base and, when found, a great deal had to be done before the freeze-up. I thought that if we left the Argentine Islands in the middle of February we could reckon on being in Marguerite Bay early in March. Doctor Charcot had reported a possible anchorage for a small ship in a group of islands off the south end of Adelaide Island, and these islands, if they proved safe, would make an excellent place to keep the ship while the aeroplane scouted farther south.

As no ship had, to our knowledge, travelled inside the northern Biscoes, we were keen to make the attempt; but before we could do this it was necessary to make a reconnoitring flight to see what the ice was doing, and also to find sunk reefs and any possible harbours.

The weather after the *Penola* returned from Deception Island was bad for some days, but on February 12 it was a little clearer, and Hampton and Ryder flew south inside the Biscoes. Soon after they started the clouds settled down again, and although they got some 70 miles to the south they saw very little, and when Hampton was forced down until he was flying level with the tops of the largest bergs he decided that it was wise to return. Next day was better. They made a successful flight and found that most of the winter ice had left the channels behind the Biscoes, but that the south side of Matha Strait and the fjords running south from it were still blocked. They also found a possible anchorage for the *Penola* about 70 miles south of the Argentine Islands which made a good place for us to stop the first night.

We set out on February 16, leaving Hampton and Stephenson behind to fly the aeroplane down when they received a wireless message from us to say that we had arrived at Charcot's islands and that flying conditions were good. The decks of the little ship were piled high with cargo, and on top of everything else there were seventy-five sledge-dogs chained in family groups, besides several crates of puppies. It was a beautifully sunny day with a light following breeze, and we reached the anchorage which Hampton and

Ryder had seen from the air after a most successful time surveying and sorting out the many small island groups.

We were held up here by bad weather for four days, but on the morning of the 20th the weather was better; we put out to sea through Pendleton Strait, and three days later rounded Adelaide Island. We were now in the north of Marguerite Bay, where there was very little heavy ice, but a few miles to the south we could see an irregular white line which warned us of the proximity of pack-ice; how heavy it was we could not yet tell. On approaching the islands we followed our usual procedure of stopping the ship and sending a motor boat ahead to sound out the approaches and anchorages, if any. On this occasion, after sounding several places which were too shallow, we eventually found a suitable harbour with just enough water to let the *Penola* in. While entering these little rocky harbours the motor boat, working as a tug, proved most useful for manoeuvring the ship round sharp corners.

As soon as we arrived Meiklejohn started sending weather reports to Stephenson, and he and Hampton flew down to us on February 22, covering the 220 miles in two and a half hours. They came down inside Adelaide Island and found the channel very much narrower than they had expected from the existing map. On the day after the aeroplane arrived there was a strong north-east wind which made flying impossible, but the day after that was bright and sunny, and Hampton and I prepared to fly on what promised to be the most interesting flight which we had yet made, as we hoped to get well beyond Charcot's farthest south along this coast. The brash ice was thick round the islands and we had to taxi well over a mile before we could find a stretch of water clear enough to take off from. As we rose above the bergs we could see Alexander I Island showing up clearly against the cloudless sky. When we reached a height of 2000 feet, we stopped climbing and steered a course for the entrance of Charcot's Nyen Fjord. The pack-ice which we had seen from the *Penola* proved to be last winter's, still breaking out of Marguerite Bay in the form of small floes fairly loosely packed together through which the *Penola* would be able to pass without much difficulty. After flying for a few minutes, we saw a shore lead several miles wide extending south as far as we could see. As we flew on we were surprised to see what appeared to be a great mountain chain connecting Alexander I Island to Graham Land. We could not be at all certain of our discovery for, as so often happens in this region, although the day appeared bright and sunny with a cloudless sky, in the distance there was a thin mist, so thin that it looked only a few shades paler than the clear sky, and was almost imperceptible until one realized that it was blotting out part of some feature that one was actually examining. The mountains appeared to us to be 90 or 100 miles away, and we could see great peaks showing vaguely above the mist which completely blotted out the lower levels. This was the first new land we had seen, but we would have to wait for a clearer view before we could be certain of our discovery.

After following the open land to a position just south of Nyen Fjord, we found that it stopped abruptly at much more solid ice, and a few miles farther on we were flying over ice practically unbroken except for one or two small leads. We decided that the *Penola* could force her way through it, so we circled back and started examining the coast for a base site. We saw that

Neny Fjord was really a glacier-filled valley, with only a small fjord at its mouth, but there was an island about 2000 feet high some 4 miles off the mainland, and the channel between was dotted with small ice-free islands and submerged reefs. The large island and most of the small ones had raised beaches with several good base sites. The safest anchorage appeared to be a crescent-shaped bay on the east side of the large island. After satisfying ourselves that we had found a possible anchorage for the *Penola*, and that she could not get any farther south, we flew back the 60 miles which separated us from her. When we arrived, Hampton took off again with Ryder to show him the position we had chosen, and to let him make a sketch-map of the sunk reefs which were fairly numerous along the coast.

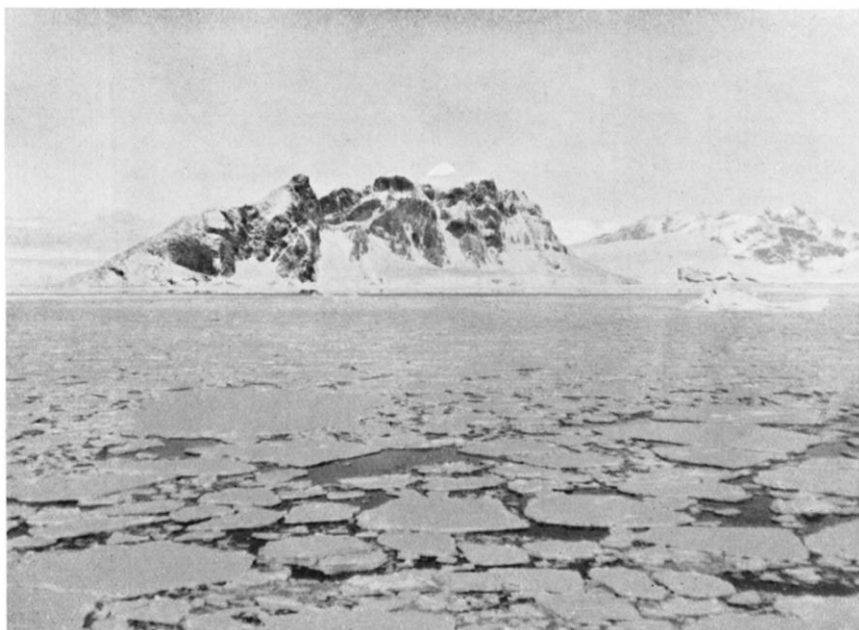
In the evening Hampton and Stephenson took the aeroplane over to a sheltered bay where they could camp until we told them of our arrival. This bay was a most attractive place where the aeroplane could lie safely at anchor while Hampton and Stephenson lived in a tent on shore. The aeroplane carried a small collapsible rubber boat which made it possible for her to work as a separate and entirely independent unit. We were under way by five o'clock the next morning and, after the *Penola* had pushed her way easily through the bay ice, we arrived at the anchorage we had seen the day before. Meiklejohn wirelessly to Stephenson as we were approaching it, and while we were putting out the mooring ropes the aeroplane arrived.

In the morning we cruised round in the motor boat looking for the best base site, and eventually found a good raised beach, facing a reasonably sheltered harbour. The motor boat towed the *Penola* over and we soon had her moored in her new berth. Unloading started at once, and in spite of high winds and snowstorms this was finished in four days; and while the shore party started building the house the ship's party got ready for their voyage back to the Falkland Islands.

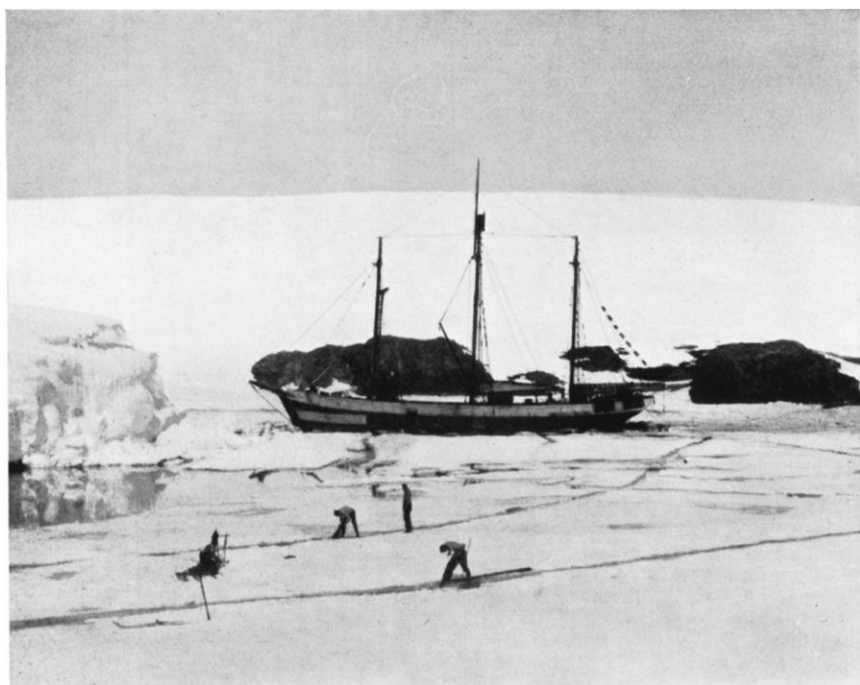
I hoped that by keeping the ship with us for some weeks we should be able to take a large depot of sledging provisions farther down the coast. On March 12 Hampton and I flew south over Marguerite Bay to see if this would be possible. But the ice was still unbroken and showed very little change. The weather during the flight was too bad to let us see anything of our new land and, after flying for a short distance over the pack, we returned.

The season was now well advanced and the snow was beginning to lie. We could only guess the time of the freeze-up, and I reluctantly let the ship's party leave on their long 1200-mile voyage back to the Falkland Islands. They sailed on March 12, while we of the shore party moved into tents and carried on building the house and collecting seals for winter food.

We had seen while flying that the high plateau with its cliffed edge, here about 5000 feet high, still continued, making land travelling impossible except for short climbing parties. There was little we could do in the way of dog-sledging until the sea-ice froze up sufficiently to make travelling possible. In the meantime we hoped to carry out two flights before the aeroplane was changed on to skis for the winter. The first of these would be to the south to get a good look at the new land, and the other to the north to the unknown fjord region east of Adelaide Island. Both of these flights would have to be short, for the plane was already overdue for an overhaul, and it had also



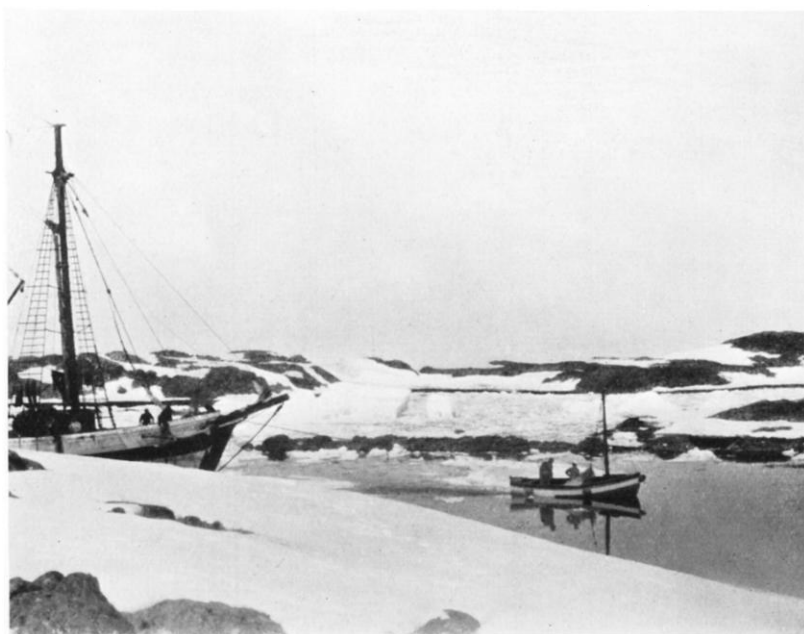
Ice pans in Penola Strait: October 1935 to January 1936



Cutting a channel for the "Penola" with ice-saws, December 1935



Moving from the Argentine Islands to the Debenham Islands, February 1936



“Stella” towing “Penola” into an anchorage

developed a leak in the crank-case which Hampton could not repair until the hangar was built; but he thought it would be safe to undertake two flights of not more than two hours each, which would make it possible to fly out a distance of 75 miles from the base. The day *Penola* left was gloriously fine. Hampton, with Stephenson as chief surveyor, prepared for the southern flight. They took off at 11.20 a.m. and flew out over Marguerite Bay for their allotted 75 miles. From their turning point they had a magnificent view and could see that Charcot's Berteaux Island was really a cape and Cape Pierre Baudin was a point in the mountains behind. South of Cape Berteaux, according to the existing map, the coast should have trended south-east towards Casey Channel; instead of this it formed a big bay, swinging round to the south-west. To the west of the fliers Alexander I Island, a precipitous mass 8000 feet high, extended to the south-east and ahead the two joined, completing the bay. The only sign of a break in the coast was what appeared to be a narrow fjord in the south-west corner of the bay. South of Cape Berteaux this bay was filled with shelf-ice, fed by gently sloping but crevassed glaciers which looked as though they should make a possible sledge route inland. South of this bay they could see ridges 5000 to 7000 feet high stretching away for at least 50 miles. Where Stefansson Strait fitted in we could not tell.

There was not another possible flying day until March 31, when the same two made the flight to the north. To the east of Adelaide Island Charcot had marked two channels; one we had already flown down, and this time Hampton and Stephenson flew up the one farther to the east. After some 30 miles it came to an end in steep rock walls and small branching fjords which finished in glaciers. They turned westwards and soon found a glacier-filled valley running north and south. They flew up this valley at a height of 6000 feet for 25 miles. On either side were mountains between 5000 and 7000 feet, while the glacier beneath them rose to about 4000 feet at its highest point. They eventually came out at one of the fjords leading into Matha Strait and saw the Biscoe Islands in the distance. Here they turned, and arrived back at the base at 6 o'clock in the evening. The sun was just setting and the spray that touched the floats and wings froze almost immediately.

Now that we had completed these two flights we were in a position to work out a rough outline of future plans. Mr. Lincoln Ellsworth had, in November 1935, made a magnificent flight from Dundee Island to the Bay of Whales, and should have crossed the country somewhere to the south of the position which Stephenson and Hampton reached while flying on March 13. During the time Mr. Ellsworth had been in western Antarctica, we were in daily wireless communication with his ship the *Wyatt Earp*, and from the messages which we had received from her and also from those picked up from his aeroplane, we understood that he had confirmed Wilkins' Stefansson Strait and the existence of Hearst Land. I now telegraphed to my home agent, J. M. Scott, in London, asking him if he could let us know any details of Ellsworth's discoveries, and I received a telegram from him saying: "Ellsworth confirms Stefansson Strait but says it is only about 3 miles wide." Stephenson and Hampton had seen large mountain ranges extending far to the south beyond Marguerite Bay, so where Stefansson Strait fitted in was hard to imagine.

The flights had shown us that there was no chance of crossing Graham Land north of the shelf-ice, which was at least 70 miles south of our base. The first thing I had to decide was whether we would try to make one long journey to the eastward, crossing the mountains of Graham Land and then following the coast-line of the Weddell Sea, or whether we would explore the new country to the south, and also try to penetrate to the west behind Charcot Island as far as the western end of the Dependency, and then make a short journey to the eastward to survey some of the east coast of Graham Land without trying to reach the Weddell Sea. If we carried out the long journey to the east, everything else would have to be sacrificed to it, as all the expedition's resources and man-power would be used up in depot-laying and supporting parties. Sledging parties would have to lay a depot at the foot of the mountains in the winter, but we would not be able to make a flight across them to find a sledge route until we had a reasonable amount of daylight in the spring, and if we then failed to find a route our entire winter would have been wasted. But on the other hand, since our discoveries had shown that the whole distribution of land and sea to the south was so totally different from anything that had previously been reported by explorers, it seemed a great pity not to explore it thoroughly and clear up the many controversial points that would be sure to arise. Also to try to carry out the long eastern journey merely because it was our original plan seemed stupid, especially when it meant throwing away a chance of exploring this new and interesting country. We decided to give up any idea of the long eastern journey and planned that, as soon as the ice was safe for sledging, we would put on the shelf-ice about 70 miles south of the base a depot which would be used for crossing Graham Land, and also for a party consisting of Stephenson, Fleming, and Bertram to use while on a sledge journey round the bay. Bingham and I would make a long journey round the north end of Alexander I Island and then behind Charcot Island to the western end of the Dependency.

But before we could undertake this journey we would first have to make a flight round Alexander I Island to examine the state of the sea-ice. For, judging from our experiences not so very much farther north the previous year, this was a place where we might find the ice too thin and broken for sledging. Before we could do anything however we had to wait for the long transition period while the sea-ice was forming. This proved to be unduly long, as there were frequent gales, sometimes lasting for four or five days and often recorded on an anemometer at over 100 miles per hour. By June 1 we considered the ice was safe for sledging, but we decided to fly out over Marguerite Bay and have a good look at it before we started making depots. We waited until the ninth before we had a good day, and then after Hampton had made a short trial flight he, Fleming, and I flew over the bay-ice. We were of course at this time well into the winter darkness and only had a glimmer of twilight for a few hours at midday. The flight had to be short, and in fact it was rather a good effort on Hampton's part to undertake it at all with the difficulty caused by landing on a snow surface in the half light. The flight was very satisfactory as we found Marguerite Bay completely frozen over, with no open water to be seen anywhere. The ice all looked good and solid, with none of the grey patches which are a sign of thin ice. The temperature had been round



Debenham Islands with the "Penola" at anchor, March 1936



Building the second base on Barry Island (Debenham Islands)



Plane being towed into Barry Island



Aerial view of Terra Firma Islands with Cape Berteaux ten miles beyond in the background

about -30° F. for some time, and we now thought that the sea-ice, in spite of the strong off-shore winds, would be as safe as sea-ice ever is.

We left on the first depot journey on June 12. There were Bingham, Stephenson, Riley, Bertram, and myself with dog teams and Hampton with the tractor. All went well at first, but we only made slow progress owing to a very heavy surface and the short period of twilight. The night of June 16, after five days' travelling, found us about 40 miles from the base. The wind got up soon after we went to bed and blew an off-shore gale for thirty-six hours; the ice started to break up and a quick move to endeavour to reach some islands about 4 miles away had to be made. The tractor could not be moved from the camp and, together with the greater part of our depot, had to be left behind. After nine hours of hard travelling over loose ice-pans and high-pressure ridges, we at last succeeded in reaching the islands, where we had to wait for a week before the leads froze together sufficiently to allow us to make an attempt to return to the base. These islands we called *Terra Firma*.

The experience on this depot journey had clearly shown us that we could not go south again until the ice had withstood at least one really strong gale, and that we would have to wait until the snowfall had partly levelled out the worst of the rough ice for, although we had navigated it successfully with light sledges, it would be a very different business to try to get over it at present with heavily loaded ones. Although the ice to the south of the base had broken up so completely, that to the north had shown no signs of going out, and while we were waiting to start our long journey we decided to do the northern survey which we had planned for Stephenson and Fleming while they were waiting for Bingham and me to return from the western journey.

This northern survey would be a most interesting piece of work, as we should verify our previous aerial survey and also explore the complicated fjord system which lies to the north-east of Marguerite Bay. To carry out the survey we decided to work in two parties: Bertram and I with our two teams would make up one party and travel up Laubeuf Fjord, which lies between Adelaide Island and what we now knew to be the mainland, while the other party consisting of Stephenson, Fleming, and Riley, each with a team, would try to cover all the country from the base up to where Bertram and I would begin our work at the south end of Laubeuf Fjord. Each party hoped to sledge about 200 miles, and we expected to be away about three weeks.

We left on July 20, travelled together for the first 15 miles, and then separated, Stephenson's party stopping behind to start their survey, while Bertram and I hurried on to where we would start ours, 50 miles from the base. After being held up for some time by strong winds, we eventually arrived at the south end of Laubeuf Fjord on the sixth day out from the base. We turned to the north and hoped to reach the south end of Matha Strait, so connecting with our survey of the year before. By the night of the second day we had sledged 22 miles and camped just south of the point where the fjord narrowed down to only a few hundred yards wide. This was the sort of place where we expected to find thin ice, and the next morning we went forward cautiously. We were soon out on very rotten ice, and right in the narrowest part we were stopped by completely open water. As we could see well up into Matha Strait, we did not mind turning south again. So thin was the ice where

we turned that a seal who wished to get a good look at us pushed his head up several times through the ice where we had cut into it with our sledge runners.

As we travelled south again the north wind freshened, and by the middle of the afternoon it was blowing a gale. We were stormbound in our tent for three days with the usual 100-miles-per-hour wind, again on the sea-ice, as there was no chance of making a landing up the ice-cliffs; but this time the ice was solid and we had no trouble. The wind died down on August 2 leaving a really good travelling surface, and the dogs, pleased to be moving again, soon covered the 17 miles separating us from the south end of Laubeuf Fjord where we had started the survey. Here we spent a day getting astronomical sights and then sledged back to the base, covering the last 50 miles in two days. Stephenson's party arrived back two days later after a most successful three weeks of surveying and geologizing.

(To be concluded)



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