

E.A.C.

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**EXPEDITION TO THE STEENSTRUPS AREA
OF EAST GREENLAND 1971**

GENERAL REPORT

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E.A.C.

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E.A.C.

EXPEDITION TO THE STEENSTRUPS AREA OF EAST GREENLAND, 1971

in association with

THE UNIVERSITY OF LONDON GRADUATE MOUNTAINEERING CLUB

This report gives details of the plans, preparations and achievements of the above-named expedition which travelled by boat to the east coast of Greenland in the summer of 1971.

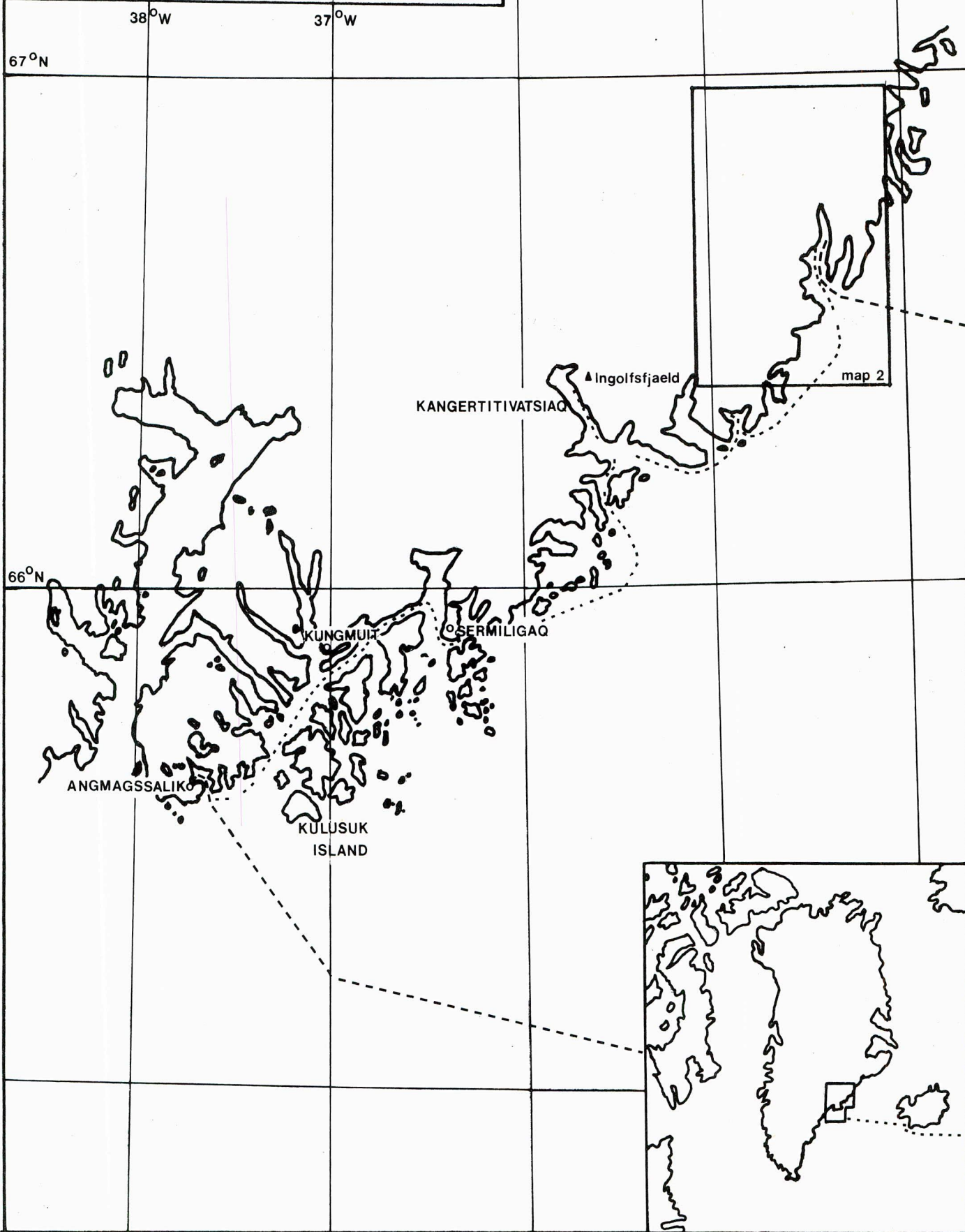
LIST OF MEMBERS

Joint Leaders	Michael Tuson	39	i/c Nautical Matters
	James Webster	24	i/c Land Based Operations
Members	Philip Anfield	21	Diving
	Stephen Chadwick	24	Mountaineering
	Robert Coulter	23	Botany
	Colin Grime	25	Mountaineering
	Janet Grime	23	Food
	Tony Mercer	27	Mountaineering
	Stephen Olivant	23	Mountaineering
	Stephen Poulton	24	Mountaineering
	Michael Rutland	25	Doctor
	Christopher Wood	21	Diving
Home Representative	Richard Grover		

ANGMAGSSALIK REGION

EAST GREENLAND

SCALE - 1:1,164,000



MAP 1

INTRODUCTION

J.W.

The first seeds of the expedition were sown in February 1970, when Michael Tuson purchased m.v. Provider which was an old Scottish fishing boat then lying, in a forlorn state, on a mud berth at St. Csyth, Essex. The ship had to be given a new name, due to registration regulations, and in July 1970, after months of painting and fitting out, Michael and I sailed the renamed Ice King to the Lofoten Islands with a party of climbers. This expedition proved that the ship was capable of such ventures and our thoughts turned to a more elaborate plan in 1971. Two venues suggested themselves - Spitsbergen or a return to East Greenland which Michael had visited in the 1968 and 1969 University of London Graduate Mountaineering Club East Greenland expeditions. I was also on the 1968 expedition. The lure of the still unclimbed Ingolfsfjaeld, together with the probability of better weather on land and more favourable winds at sea, encouraged us to risk the pack ice off the East Greenland coast and return to the area around the Steenstrups glaciers.

It seemed logical to make a further attempt on Ingolfsfjaeld. John Coote, who had attempted to climb the mountain with Michael Eston on the 1968 University of London expedition, lived a few miles from me in Birmingham and was the only person who could provide first-hand information on the south and east faces of the peak. Since we were using our own boat, there would be no difficulty over transporting our climbing equipment. The 1969 University of London expedition had looked east from Steenstrups Nordre Brae to some interesting mountains running inland from a fjord known as Tasilaq. These would provide a second climbing objective after we had finished climbing in the Ingolfsfjaeld area. Information gleaned from maps and aerial photographs indicated that Tasilaq should provide suitable shelter for the boat and a glacier running into the west side of the fjord appeared to provide easy access inland to the mountains we planned to climb.

We intended to widen the scope of the expedition beyond mountaineering, but we were anxious to avoid burdening ourselves with an overambitious scientific programme which we might be unable to fulfill. Michael's association with the Aquatic Club and the fact that two of the members, Christopher Wood and Philip Anfield, were anxious to join the expedition suggested that diving work be included in the programme. Marine specimens were collected for the North Atlantic Research Association and the Natural History Museum. The 1969 University of London expedition had made a botanical collection on behalf of Dr. Geoffrey Halliday of Lancaster University but, unfortunately, part of this had had to be abandoned and we felt that it would be fitting to make further collections around Ingolfsfjaeld and then in the Tasilaq area. A collection was made also for the Natural History Museum.

Having decided on our aims, we were pleasantly surprised to experience little difficulty in finding personnel. We considered that a total of eleven or twelve people would be a suitable number and ended with twelve: Michael Tuson as skipper of Ice King, myself in charge of land

operations, six other climbers, two divers and two, very hardworking, general assistants.

Our plans had crystallised by early January and it was possible to arrange several week-ends in Wales which gave the seven climbers a chance to get to know each other and to discuss detailed plans and equipment. At the same time, everybody helped with further fitting out, repair and painting work on the boat and, during a trip to Belgium and Holland over Easter, had the opportunity to experience travel in a small boat.

PLANS AND PREPARATIONS

M.T.

With the numbers of the expedition that we had, it was possible to allocate to individuals the various tasks that had to be done and this section is not intended to cover items about which a report is to be made on their use during the expedition. It is necessary, however, to comment on some of the administrative problems, with particular regard to obtaining permission to visit Greenland and to insurance requirements.

It was in January that we first wrote to the Ministry for Greenland in Copenhagen requesting permission to visit the area but, due to the postal strike, nothing was heard until the end of March and it was during this period that we learnt of two unexpected conditions which would have to be met before permission would be granted. The first was that we should have to indemnify the Danish Government against expenses which they might incur for 'search and rescue' operations in connection with the expedition (the sum mentioned was DK100,000 - approximately £5,000) and the second was that they required a certificate from the Department of Trade and Industry to the effect that the boat was suitable for the voyage. Inquiries regarding this second point indicated that the cost of the survey required was beyond our means. However, we assured the Ministry for Greenland that the Ice King complied with the regulations applicable to a boat of her type and, eventually, they agreed that they had no jurisdiction over British registered vessels in any case.

We were not, apparently, the only expedition having problems regarding insurance; the Ministry were in a quandary as a result of various rescues they had had to undertake in the two preceding years which had proved expensive and, not yet having decided on any definite long-term solution, were asking for insurance sums of up to DK1,000,000 (for our expedition the sum was raised to DK250,000). Representations were made at various levels by the different expeditions and we were having problems in meeting the original figure with a premium that we could afford. Lloyds' premiums appeared to be assessed on the basis of 10% on the sum assured, but then there was a reversal of opinion and we managed to arrange cover for £15,000 at a premium of £20 per head; this we accepted post haste.

The only other problem we encountered concerned health clearance at Angmagssalik. We had omitted to get a certificate signed by a Danish

consular official in Keflavik, our last port of call, and whilst this is a requirement laid down in the Danish Government's 'Order on travels to and in Greenland', in previous years when we had arrived by air, we had never been asked for this certificate. In this instance, having our own doctor, we were examined in turn and his clean bill of health was accepted.

DESCRIPTION OF THE BOAT

M.T.

The Ice King started life in 1934. She was built in Lossiemouth on typical Scottish fishing boat lines with an almost straight stem and rounded stern. She is of timber construction, $1\frac{1}{2}$ in. planking on 7 in. x 3 in. hardwood frames at approximately 14 in. centres. She remained in the fishing fleet at Buckie under the name 'Provider' until 1959 when, due to increased requirements by the White Fish Authority, she failed to satisfy the regulations for boats of her size and was sold. During the following ten years she had four owners who endeavoured to convert her for private use and she was fitted out below decks and gutted again more than once. In 1970, when she came into her present ownership, she was virtually bare down below other than the engine, a Lister six-cylinder JP6 with a 3:1 reduction gear to the shaft and a 40 in. propeller. Fuel capacity was 300 gallons in two tanks. Above the deck line considerable work had been carried out by the previous owners; the main fish hold had been covered with a deck house which was large enough to hold a navigating area comprising chart table and radio in addition to the wheel house, saloon and skipper's cabin. The previous wheel house had been removed and replaced by a removable hatch ventilating the engine room. The original bulwarks had been removed and the whole deck covered with ply and glass fibre, together with stanchions and a rail fitted down each side - this, while offering less protection from seas coming aboard, also prevents any build-up of water on the deck.

In 1970, adequate accommodation for ten persons was built below and further furnishing improvements were made in 1971. The main items installed particularly for the expedition were a 70-watt Sailor radio telephone with direction finding equipment, the fuel capacity was increased by a further 250 gallons, spare batteries, a cage to protect the propeller against ice and some additional protection to the bows on the water line in the form of a steel stem piece and plywood fastened on the outside. These items were in addition to the normal equipment one would expect on a boat of this size and type (compass, log, echo sounder, life rafts and distress gear, etc.).

We had purchased all the Admiralty charts which were available but the coverage of the east coast of Greenland is minimal and our endeavours to obtain the Danish charts of the area were abortive. However, when we subsequently managed to borrow the appropriate one in Angmagssalik, the maps from the Geodetic Institute in Copenhagen, coupled with the verbal advice of Neils Underberg, skipper of the Ejnar Mikkelsen, the local KGH trading boat, proved of more use.

As tenders, we had two Avon inflatables, one 12 ft and one 9.5 ft and a 10 h.p. Mercury outboard. Our air cylinders for diving were charged by a Reavell 4.5 cu.ft. compressor, belt driven from the main engine.

The Ice King left her moorings in the early hours of Saturday 10th July, bound for Greenland. Everybody had arrived in time and the boat was packed from stem to stern with provisions for the two month long expedition.

The sea was kind for the first three days, which was a relief to those of the crew who were not experienced sailors or any sort of sailors. The routine was set with four-hour watches, interspersed with two-hour dog watches. This system meant that each person was on watch either six or twelve hours each day. Sleep was broken into short stretches and one or two of the party tended to be tired and seasick.

South of Peterhead, three warships appeared on the starboard bow like a scene from a film but without the music. On rounding North Ronaldsay, the wind rose and, with it, the sea and after leaving the shelter of Orkney, the Ice King headed into the North Atlantic and battled her way to the Faroes. At one stage, three porpoises provided an escort; three flashing green, submarine ghosts breaking the surface and leaping in unison, they provided much compensation for being seasick.

At night the bow wave produced sparkling phosphorescence in the churning water and the wooden boat creaked and groaned in a terrifying manner as the wind increased to a gale. There was a great impression of speed, even at five knots. The sea crashed on the bridge roof but, at the helm, the sense of exhilaration was tremendous and steering the boat over giant waves was like a boyhood dream.

A night in the Faroes was bliss after the battering gale. A good meal at the seaman's hostel in Torshavn and a good sleep refreshed the crew. The journey to Iceland was smooth, and, true to its name, the first landfall was a giant ice cap. The boat hugged the rugged South Coast and eventually tied up in Heimaey in the Vestmann Islands. There we were given more fresh fish than we could eat.

Steve Poulton, the twelfth member of the expedition, appeared as planned after flying from England.

Leaving Heimaey the same afternoon, the sea stayed calm and the sun shone. Ten killer whales came close to the boat, their high black dorsal fins cutting wickedly through the water. Later, an Icелander said they were harmless and that divers could swim right up to them; however, he had drunk several glasses of whisky!

On the morning after leaving Heimaey, the engine overheated and stopped, and it refused to start since two of the six cylinders had filled with water through a crack in the cylinder head. Removing the cylinder head was a novel experience but luckily the crew could sunbathe as the boat drifted with the sails hanging limp. The crack in the head was filled with haematite and the engine fired. An unscheduled stop of four days was made in Keflavik. By a miracle, a new cylinder head appeared from England. Icelandic hospitality and cream pancakes were worth sampling.

In the Denmark Strait, the first ice was encountered dramatically in thick fog at the very instant the Captain was demonstrating how to reverse the boat in an emergency. Twenty-four hours of daylight helped in spotting icebergs. Greenland appeared like magic when the Ice King burst through the curtain of fog. The scene was impressive and inspiring, a continuous ribbon of mountains, sun, blue sky and massive icebergs. Navigating through the ice proved easy - a relief in a wooden boat. Greenlanders in a red motorboat escorted us and gave a friendly wave.

The Ice King tied up at Angmagssalik seventeen and a half days out from England. The quay was lined with round-faced Greenlanders; seal skin kayaks and a pile of polar bear skins set the scene, together with the mournful, haunting howl of the huskies. The first stage was successfully over.

THE INGOLFSFJELD AREA

J.W.

Kangertitivatsiaq (originally Kangerdlugssuatsiaq) lies some 130 km. north of Angmagssalik and penetrates 36 km. north west into the coastal mountains. A long mountain ridge, of which Ingolfsfjaeld is the highest point, rises from near the northern corner and the magnificent Glacier de France discharges into the head of the fjord. Mountain ridges, with glaciers filling the intervening valleys, rise steeply from the south-west side.

We sailed from Angmagssalik at midday on Wednesday, 28th July, and arrived at Kangertitivatsiaq at 0500 the following morning. Our journey north was without serious incident; ice conditions were reasonably good and our echo-sounder warned us of an unexpected shoal in Kangertitivatsiaq in time for evasive action to be taken. Future navigators should note that this rock shoal lies in the centre of the Narrows about halfway up the fjord and it is best passed by keeping to the north-east shore.

We had heard in Angmagssalik that the 1st Croation Mountaineering Expedition had arrived in the area about two weeks earlier and feared that they would have climbed the easiest route up 'our mountain'. The Yugoslavs had pitched their shore camp at the foot of the valley which led from the fjord to the southern approaches of Ingolfsfjaeld. As soon as we had dropped anchor, everyone started the task of ferrying our equipment ashore in the two rubber boats and a shore dump was established just above the Yugoslav camp. Hard work on the previous day sorting out food and equipment paid off because, in a short time, all was ashore and we had made up eight loads of essential equipment for the base camp. By this time, we had awoken those Yugoslavs who were residing at their shore camp and learnt that they had climbed the north-east ridge of Ingolfsfjaeld. This was one of our two proposed routes and we gathered that they considered it far easier than the alternative south ridge. We decided that it would be futile to repeat a climb made only one week earlier and so a summit attempt via the south ridge became our goal. Back-packing up the pleasant valley was simple and endangered only by rubber straps flying off one member's pack frame. After lunch, we headed north out of the valley floor and trudged up steep moraine to

find an ideal base camp site at the foot of the glacier which lies below the superb south-west face. While Mike (R), Steve (O), Robert and I levelled off sites for the four tents, Tony, Colin, Steve (C) and Steve (P) set off to reconnoitre a suitable route. In the meantime, we navvies returned to the boat for the night. Mike (T) had taken Ice King up the fjord to the 1969 ULGMC base camp and collected some valuable equipment which had been abandoned when they were lifted out by helicopter.

The following day, Mike (R), Steve (O) and I climbed back up to base camp with more supplies while Robert and Janet settled in at the shore dump and started work on the botanical collection. Meanwhile, some test dives were made from Ice King in order to check the behaviour of the diving equipment in arctic conditions.

Up at base camp we spent the next three days in the routine of climbing, fixing ropes and moving up equipment. We reached the first bivouac ridge and hoped to be in the right position for a light-weight summit attempt by Tony and Colin. It was not successful because we had underestimated the length of route outstanding. They succeeded in fixing a further 490 metres of rope to the second bivouac ridge but had to retreat off the Great Tower leading from this to the summit ridge. The repulse led to a reappraisal of the situation and we decided to carry climbing equipment and food and water for five days, up the fixed ropes to the second bivouac ridge so that Tony, Colin, Steve (C) and Steve (P) could try to push a new route up the Great Tower and thence along the summit ridge.

At this stage (Thursday, 5th August), Colin and I returned to the shore in order to collect the additional climbing equipment (which included about 60 pegs generously donated by the Yugoslavs) and find out news about the boat. The latter was not encouraging. They had set off north, together with three unemployed members of the Yugoslav expedition, in order to make some preliminary exploration in our northern climbing area, but had been forced to retreat by brash ice which had calved off the end of Steenstrups Nordre Brae and was blocking Ikerssuaq. After a sociable night spent in Tugtilik (Watkins' Fjord), where they entertained some Greenland fisherman as well as a Danish botanical party who were spending two weeks in the fjord, they returned to Kangertitativatsiaq where further diving work was carried out.

Colin and I walked back up to the base camp on the Thursday evening, but that night the weather broke and on Friday the face was shrouded in cloud. In the afternoon the rain eased off and the clouds started to disperse, so we planned to start climbing the following morning. Chris, Philip and Janet came up from shore dump with more food and I returned with them to the boat for the night, in order to bring up extra essential stores such as tobacco and a bottle of whisky. My hopes of a peaceful night's sleep on Ice King were shattered at about midnight when an enormous iceberg started to disintegrate a short distance from the boat. Faced with a line of ice approaching at 4 knots, we were even more disturbed when we found that exceptional spring tides had left the boat just aground and most unwilling to move from her



INGOLFSFJÆLD - FROM THE SOUTH-WEST

Photo. Michael Rutland



◀ ON THE SOUTH-WEST FACE

Photo. James Webster

DIVING IN KANGERTITIVATSIAQ

▼ Photo. Michael Tuson



perilous position. Eventually all was well and with those on board staving off ice with broomhandles, boathooks and spars in the best Shackleton style, we moved to clearer water. I decided that life on dry land, even if harder, was more peaceful and returned to base camp early on Saturday morning.

At base camp, preparations were advanced for the final assault. Mike (R), Steve (O) and I were to carry heavy loads of equipment, water and food up to the end of the fixed ropes and then return to base camp while Colin, Tony, Steve (P) and Steve (C) followed us up the ropes and started the final climb (estimated at four days work) after bivouacking the night on the second bivouac ridge. By midnight, this logistical operation was complete and wearily we three porters jumared down the fixed ropes.

Two days later the attempt was abandoned (see Climbing Detail) and on Tuesday, 10th August, we started the task of removing climbing equipment from the face and carrying it back to shore dump. On Wednesday, Mike (T) sailed on a second visit to Angmagssalik with Chris, Philip, Steve (P), Mike (R) and Colin - Steve (P) in the hope of returning to England by air, as he had four weeks holiday only, and Mike (R) in order to attend upon Colin, who was suffering from a virus infection. We cleared the remaining equipment from the face and, by Friday night, everything was at shore dump and organised for the rather different climbing we envisaged in the northern area. Ice King returned on the Saturday morning. Colin was fully recovered and Steve (P) unsuccessful in his attempt to find a suitable flight.

There was no time for reflection on the past sixteen days, equipment was loaded on board and we sailed down the fjord wondering if we would find a way through the ice that had repelled Ice King a fortnight earlier. Our thoughts lay in the unknown area which awaited us.

THE INTERMEDIATE PERIOD

P.A.

(Wednesday, 11th August - Sunday, 15th August)

When the Ice King returned to the base camp in Kangertitvatsiaq after the diving, we found all the others there, except Tony and Chad who were still busy taking down fixed ropes. Most of the climbers were in surprisingly good spirits considering that Ingolfssfjaeld had beaten them, but Colin was not too well after the final assault and was in the able hands of Doc who used the foredeck as his 'theatre' and soon had him on the mend.

One of the purposes of our return was to take Steve (P) to Kulusuk where he was hoping to catch a plane to Iceland and from there to fly back to England to return to his job. When we had loaded, we set off for Kulusuk ('we', this time, being Mike (T), Steve (P), Doc and patient, Robert, Chris and myself). We were to go to Kulusuk by the inland route but, by some cunning navigation, a longer way round a large island was found. What I remember about that trip is doing an early morning watch with Doc and passing the hours discussing various aeroplanes that could do 2000 or 3000 m.p.h., whilst all the time we chugged on at $6\frac{1}{2}$ knots.

We arrived at Kulusuk on Thursday morning and Steve immediately went to find out about a plane only to be told that he would have to wait until it arrived in order to book a ticket. In the meantime, we all enjoyed the luxury of the local sauna bath and showers, a real treat!

Feeling beautifully clean, we walked up to Kap Dan, a nearby village, which we found full of Americans 'doing' Greenland on a one-day charter flight from Iceland and the locals were busy selling their beads and souvenirs. When most of the tourists had gone, we stayed behind in search of seal skins and were invited into a Greenlander's house which was surprisingly comfortable. The bargaining proved difficult due to the usual language problems and to complicate matters further, we were joined by an Italian architect with whom we tried to converse in French. However, no suitable bargain could be arranged so we started on our way back towards Ice King. On the way, we found that the Ejnar Mikkelsen had arrived at Kap Dan with the supplies and coal for the winter.

As we walked back to Kulusuk, the plane took off for Iceland and we thought 'there goes Steve' only to find when we got back on board, that he had not been allowed on to the charter flight and so was still with us. Unfortunately for Steve, this meant that he lost his job. So it was anchor up and off to Angmagssalik once again, with our Italian friend who wanted a lift there.

Friday morning was spent buying all the stores and fuel needed for the remainder of the trip. Chris and I wanted to go diving in the incredibly clear water at Angmagssalik but we had to leave at lunchtime to go to Kungmuit, a village along the fjord from Angmagssalik that Mike and James had visited previously. There we hoped to find some seal skins to buy and, when we arrived, we had a reception committee of about 50 people, mainly children, standing on the jetty waiting eagerly to see who we were. As we looked around the village and at the fish drying racks and the huskies, we had crowds of babbling children at our heels - especially when we produced our Polos. Meanwhile, the village headman and several locals whom Mike and James had met before, were on board being entertained with whisky. We haggled for a baby seal skin and managed to barter it for several tins of tobacco.

Eventually we left Kungmuit, along with some salmon from the local fishermen, and this was cooked in wine and served with vegetables by two of the crew's Cordon Bleu chefs - a fine end to the day. We arrived back in Kangertitivatsiaq on Saturday morning and were packed and off towards the North by lunchtime. We left behind the beautiful fjord of Kangertitivatsiaq and were soon rolling about in the open sea on our way northwards.

I slept after lunch and the next thing I remember was being rudely awakened by the anchor chain clattering out of the chain locker by my head. We had stopped in Watkins' fjord for the night. Immediately Tony and Chad were off to try their luck at fishing in the salmon lake above the fjord, where Chris and I had failed on our previous visit; sadly they, like us, only caught the stones on the muddy bottom. Another crowd went off to take advertising photographs on an iceflow and the day was finished by another large meal with wine.

Next morning, James, Colin and I were up with the 2 a.m. sunrise and we were soon leaving Watkins' fjord for the North, but, after a few miles, we found ourselves in thick coastal fog and had to go very slowly for fear of colliding with the ice - ice which, being white, conveniently hides in the fog! After a while we were joined by a non-too-healthy Janet and then we were entertained by James sending a telegram to Angmagssalik Radio for the Lancashire Evening Post. Due to bad reception, he had to dictate every word, letter by letter, which was rather tedious for him.

Eventually, we emerged from the fog and saw a glacier on the coast; we went into lengthy discussions as to whether it was the North or South Steenstrups Glacier - in the end we decided that it must be the North Steenstrups or South Webster Glacier.

As we went into Tasilaq Fjord, the ice became thicker and thicker, so that a certain amount of nudging and pushing was now necessary to make any headway. To those below it sounded quite frightening - ice scraping along the sides of the boat, bangs and crunches and, worst of all, hearing the engine going into reverse and waiting for the crash. No serious crashes occurred and we got safely into the fjord and gradually nearly everyone dragged themselves out of bed to see what was going on - everyone that is except Chris, the expedition's chief 'dosser' who stayed below all the time. We anchored near the snout of a glacier, well into the fjord and, after breakfast, various things happened. Chad, Tony, Doc and Steve (P) rushed around madly collecting their gear and then set off up the unnamed glacier to establish a camp at the top. Mike (T), Rob, Jan and Chris, more leisurely, rooted out skis, etc. and followed them up after lunch on a day return trip, taking more supplies up to camp.

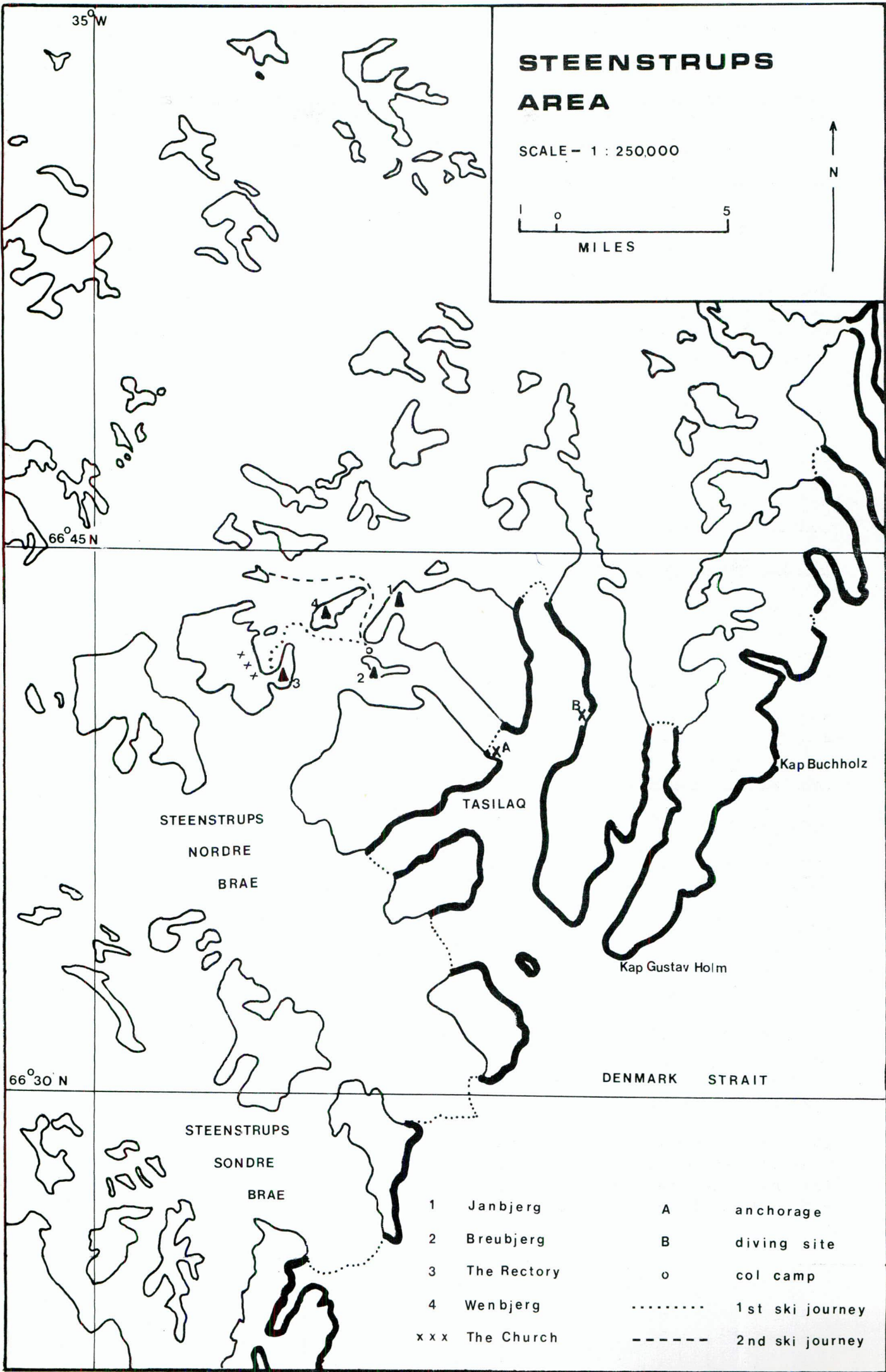
Meanwhile, Oli made a point of sunbathing now that he was inside the Arctic Circle. When the others had gone, James, Colin, Oli and myself cleared up and spent the rest of the afternoon devouring food supplied at frequent intervals by Colin and taking things easy. Slowly we developed the art of 'festering' which put us in good form for our next few days on board whilst the others were up the glacier.

THE NORTHERN AREA

J.W.

To the north of Steenstrups Nordre Brae Glacier lies Ikerssuaq (Greenlander for The Great Strait), running off which are three arms - Vestre Tasissaq, Tasilaq and Ostre Tasissaq. Mountains shelve into Tasilaq at relatively easy angles and a glacier discharges at its head. We chose an access route which ran up a gently sloping glacier on the west side of Tasilaq. Large areas of lateral moraine lie at the foot of this and shelve into the fjord; these have formed a bay around the retreating glacier and thus there is a good anchorage, with easy access ashore. The fjord lies on a winter sledging route and there is a small refuge cabin close to the shore $1\frac{1}{2}$ km. south of the bay.

The glacier is split at a height of 500 metres by Breubjerg. The southern arm becomes relatively difficult with a large icefall, while the arm on the northern side of Breubjerg continues to 800 metres at which point it steepens and the final slope up to the Col (1075 metres)



is protected by some large crevasses; these were avoided without great difficulty. The glacier is snow covered from a height of 900 metres.

From the Col, access to all the peaks to the north-east of Steenstrups Nordre Brae is easy; the main hazard lies in the enormous crevasses, many of which are invisible on the surface. The peaks are separated by easy angled snow covered glaciers. In 1971 the snow was in good condition and neither snow shoes nor skis were needed for shorter glacier treks. For longer journeys skis were ideal as they speeded up travel and provided better weight distribution over the snow bridges. Most peaks call for mixed snow and rock climbing. As a general rule, snow fields extend higher on the north faces and this can provide an easy way of gaining height before embarking on the rock.

Ten man days of light-weight food (mainly in heat-sealed polythene bags) were left on the Col. The dump was placed below a conspicuous boulder, approximately 30 metres up the stable scree slope which forms the southern side of the Col.

Diary of events in the Northern Area

Sunday, 15th August

0930 anchor Tasilaq.

Tony (M), Steve (C), Steve (P) and Mike (R) ascend the glacier and establish a camp on the snow col at the head of the glacier.

Mike (T), Janet, Chris and Robert establish a food dump on the glacier and return to the boat.

Monday, 16th August

Tony (M), Steve (C), Steve (P) and Mike (R) set off on an ascent of Janbjerg.

James, Mike (T), Janet, Chris and Robert bring further supplies up to Col camp.

Tuesday, 17th August

James, Janet, Mike (T), Robert and Chris blizzard bound at Col camp.

Tony (M), Steve (C), Steve (P) and Mike (R) return to Col camp after ascent of Janbjerg.

Wednesday, 18th August

James and Janet climb Breubjerg.

First skiing trip by Mike (T), Chris and Robert, including ascent of the Rectory.

Thursday, 19th August

Unsuccessful attempt by Tony (M), Steve (P), Mike (R) and James to climb the Church.

Mike (T) and Robert carry out botanical collection around Col camp.

Steve (C), Chris and Janet return to Ice King in order to relieve Colin, Steve (O) and Phil who come up to the Col camp.

Friday, 20th August

Colin and Steve (O) climb Wenbjerg.

Second skiing trip by Mike (T), Steve (P) and Phil.

Saturday, 21st August

Col camp blizzard bound.

Mike (T), Phil and Robert descend to shore in afternoon but bivouac for the night as Chris, Steve (C) and Janet have moved Ice King to shelter in the lee of the mountains on the east side of Tasilaq.

Sunday, 22nd August

Col camp dismantled; Tony (M), Steve (C), Steve (O), Mike (R), Steve (P) and James return to Ice King.

Diving work and botanical collections made by Mike (T), Phil, Chris, Steve (C), Robert and Janet from Ice King.

Monday, 23rd August

Equipment dried, packed and stowed away in preparation for the return to England.

HOMEWARD BOUND

R.C.

I do not usually like getting up at about 4 o'clock in the morning but, looking back on it, I quite enjoyed those early hours. There was something dream-like about the boat moving slowly through the thin sea ice which had formed. It threw up small waves and splinters as the boat pushed through and all was clear, calm and peaceful. But the peace of the fjord did not last long and soon the boat was moving out into the cool East Greenland current which contained larger icebergs, as she headed across the Denmark Strait in a bitter north-east wind. I cannot say much about the next section of the crossing because, like eight others, I decided it was best to stay in my bunk as long as I could and hope that the two Mikes and James could manage on their own while the weather stayed rough. Fortunately it began to ease, although weather reports sounded ominous all around us and, without noteworthy incident, we arrived in Reykjavik.

The major task in Reykjavik was, in the opinion of some, to take off the propeller cage as soon as possible; but in the opinion of the others, it was to keep the propeller cage on, so that we could spend as long as possible enjoying the dance halls and other assets of the peripheral 'Western civilisation'. This is not all that fantastic because everywhere seemed to close for the night at about 11.30. There was nothing else of importance except, according to the locals, the Houses of Parliament. All the Stevens and Mike Rutland must have heard about the absentee night life in Reykjavik, so they took the first plane out to Glasgow as soon as they could and thus got home before everybody else.

The remaining eight of us were entertained most nobly by the Lister agent, Fridrik Gunnarsson. First, he ferried us all to the swimming pool - no doubt to get us clean. Before anyone can have a swim in Iceland they shower beforehand, which was necessary. The swimming pools are heated by the natural springs and into the pool we went. Although it was lovely and warm in the water, there was a cold wind blowing about on top and so swimming was not all that enjoyable. There was one round, deep pit to which the water first comes from the spring. Here the temperature was about 45°C and this was getting on towards being unbearable for some people; Tony put a toe in, yelled and rushed out to the safety of the showers. The others sat and wallowed for some time and then, having more money, decided to have a sauna bath. Swimming is very popular in Iceland; it is part of the curriculum at schools and it is rumoured amongst the children that if they do not pass their swimming test, they will be held down a year from the next class. There are probably a great many more swimming pools per head of population in Iceland than in any of the London boroughs.

The next day all eight of us went round to the Gunnarssons' for lunch; this was beautiful Iceland lamb and the first fresh meat we had had for a month and a half. Thinking back to the menu now makes my mouth water. How he ever got ten people round his tables seems impossible but crushed and drinking contraband beer, we had a wonderful meal. Thanks Fridrik.

We left Reykjavik and sailed round the south coast of Iceland. The main non-event of this part of the trip was passing within about half a mile of Surtsey, the volcanic island which was born in 1966. From what we could see of the great grey mass, there was a slight bit of smoke but nothing quite as flamboyant as we would have hoped, unfortunately.

The next stop was the Orkney Islands; please excuse my concentrating on the stops, but one wave looks very like another and we got used to them all on the way out. We arrived in the vicinity of Orkney at midnight and it was my luck to be on the 4 to 8 watch. At about midnight the engines were cut and we wallowed around off the west coast until light because the channels are badly lit. Light was at 4.30 a.m. and that was one of the most fantastic sunrises I have ever seen. It came up with a brilliant red and the alto-cumulus clouds glowed like a red ruby. Unfortunately, it quickly passed to a paler red and then a golden yellow as the sun rose completely. We sailed down the channel towards Kirkwall with its conspicuous cathedral. Moored against the quay at

Kirkwall, the Ice King was recognised by the locals as the old 'Provider' who frequently fished those regions in the older days. Civilisation in Kirkwall means speaking an understandable tongue and drinking beer. The Orkney Islands are only latterly British and the cathedral is still part of the diocese of Narvik and somewhere else. James told us a lengthy tale about Magnus fighting Magnus who was the son of Magnus, and that's how we had a first King Magness in Crkney and the cathedral was named after his nephew Madness. The tale was much better when James told it and, more surprisingly, more authentic according to the guide book of the cathedral.

A walk to Scapa Flow, and we were back on the boat for 2 o'clock and off. Time was pressing for Colin and Janet. The next passage was fairly easy, there were navigation lights all down the east coast of Scotland and you only had to be a dab hand with the stop-watch to work out if it was flashing every 15 seconds or flashing every $14\frac{1}{2}$ seconds to decide approximately where you were.

Coming in to Eyemouth all we had to do was to keep the green lights one above the other and, looking at the rocks either side showing above the water, we could see why these leading lights were so important. We were in a hurry to get in because pubs close early in Scotland, and, because of the dead low tide, we hit mud going in to the harbour - emergency! Colin, Janet and Chris are ferried by Phil to the first pub where they order a gallon of beer. Phil comes back and picks me up while the boat backs into more open water. The tides rise, we roll off, fail to find Chris and the others and make our way to another pub. The first three manfully drink their gallon in the twenty minutes before closing time and struggle out, bottles of liquor and Export are bought and the party wends its way back to the boat. The last of the expedition and personal whisky and beer is drunk. Meanwhile, down below, Tony sleeps quietly.

The next morning was the second major departure - Tony and I hitch-hiking (Tony to Preston and myself down to London) to pick up a van to meet the boat when, and if, she arrived at Burnham. The Grimes', with all their luggage, overloaded Janet's father's car and made their way to Barnard Castle. While Mike, James, Chris and Phil brought the boat down the east coast of England, I managed to get home for a decent wash and some clean clothes. Quite respectably, I drove the van on Tuesday morning to arrive in Burnham, by strange coincidence, just at opening time. A pint or two later, the boat sailed majestically up the Crouch, turned and moored magnificently by their decrepit pier. Unloading started and boxes and boxes came out to rest on that pier. Chad joined us and took a load in his car. After a drink at the Anchor the rest of us somehow bundled into the van, or Chris' friend's car, and we set off for London.

The end of a wonderful experience and never-to-be-forgotten summer.

CLIMBING DETAIL

1

Ingolfsfjaeld

T.M.

Our intention was to climb the south ridge of Ingolfsfjaeld but, after making a close inspection of the lower section of this ridge from the top of a small glacier at its southern end, we realised that the problems of passing the many gendarmes (the largest, situated two-thirds of the way along the ridge, was named the Great Tower) made this route impracticable. We chose a line which crosses the side of the south-west face and terminates on the south summit ridge at the base of the Needle (60-metre gendarme just beyond the Great Tower). This left only two steep faces on the final 900 metres of the summit ridge.

The lower part of our route comprised easy climbing on broken rock, the route being chosen for its least line of resistance and quick height gain.

From the start of the second big depression slab (between the first and second bivouac ridges) the climbing became more serious, although the sound granite gave very good friction.

At the end of this slab, we tried a crack system running directly up the left-hand side of the Great Tower but were repulsed by a high horizontal band of rotten rock - a number of such bands occur on the lower parts of the route. On the later summit attempt we took another crack system on the left which led us into the upper part of the face and some very serious climbing.

We had climbed for 1675 metres and estimated that 450 metres of sustained high grade climbing would have brought us to the summit ridge. At that point, a further 900 metres of climbing up the summit ridge lay ahead and from observation and past experience on the mountain, we had no doubt that it would not be easy.

Our plan was to fix ropes until we reached the point where a more lightly equipped climbing party could push ahead for the summit. Such a party should be reasonably confident that it could retreat down the route to the top of the fixed ropes, should the route become impassable or the weather deteriorate. Having experienced the difficulties on the Great Tower, we realised that we should want to fix rope as far as the Needle, but we had insufficient fixed rope to do this, and would have no time left for the climbing and scientific programme in the Northern Area. For these reasons, the ascent was abandoned.

A future party may be interested to note that the Yugoslavs reported a pool of water on the summit, the height of which was recorded as 2,500 metres. They left abseil pegs in place on the north-east ridge, approximately at 45-metre intervals.

The South-West Route

There is a valley and a river on the north-east side of Kangertitivatsiaq, 66° 23' north, 35° 45' west.

Ascend this valley for 6 km, past waterfalls at first, to lakes which lie at the foot of the glaciers flowing down from the south-east side of the valley. The south ridge of Ingolfsfjaeld is directly above; climb loose moraine to the foot of the retreating glacier which lies below the south-west face. Flat areas in the moraine, beside the stream which flows out of the glacier, provide suitable tent sites.

Climb lateral moraine on the true left bank of the glacier, then move onto the glacier itself once the angle eases; soon the whole of the south-west face will come into view. On the right a small glacier comes down from a col and joins the main glacier.

Beyond this point take the second small ridge on the left which has a steep snow bank leading up to it. This is really the bottom right-hand end of the south-west face.

- (i) 90 metres. Steep snow ramp to foot of rocks. This length may alter depending on conditions.
- (ii) 45 metres. Grade IV steep slabs on good rock to
- (iii) 165 metres. A scree filled depression.
- (iv) 60 metres. Grade III on the left a steep gully and cracks (loose) lead to open scree and broken slabs.
- (v) 245 metres. Climb these slabs to the bottom right-hand corner of the first of the two big slab depressions. (Lunch time ledge).
- (vi) 300 metres. Grade III and IV. Diagonally leftwards to the col on the ridge at the top left corner of the slabs. (First bivouac ridge.)
- (vii) 490 metres. Grade III and IV. From the col ascend the second big slab depression to the ridge at its top left-hand corner. (Second bivouac ridge.)
- (viii) 120 metres. Traverse left to the third crack system - a curving crack with a cave at 30 metres marks this.
- (ix) 90 metres. Grade V and VI(a). Up the cracks to an obvious traverse cut left to a large block belay in a superb situation.
- (x) 30 metres. Grade IV with A2 moves. Steep slabs capped by an overhang at 12 metres lead to a terrace and horizontal band of broken rock.
- (xi) Traverse left along this terrace and around the corner. The upper parts of the climb can be viewed clearly from here. The proposed route ascended 120 metres diagonally right to the top of the obvious grey coloured buttress.

Equipment

1130 metres of fixed rope were used. This was 9 mm. soft polypropylene which was chosen for its light weight and low stretch properties and proved excellent. An additional 900 metres would enable a party to fix

rope on the whole climb as far as the Needle on the summit ridge.

Normal alpine equipment was sufficient for the rock climbing. No snow or ice was encountered on the route. Generally, the rock cracks were not suitable for nuts but, in a few places, medium to large nuts (especially the Moac type) were useful.

2

Janbjerg

T.M.

Marked as Point 1500 on the map, although its recorded height was 2100 metres (6865 feet), this stood out as the first mountain which should be climbed from Col camp.

From Col camp, head northwards contouring round the glacier for $2\frac{1}{2}$ km. to a small glacier that leads onto the south-south-west ridge. Climb the ridge easily for 300 metres to a prominent 45-metre crack, Grade III. Above this, pleasant slab and crack climbing for 210 metres, Grade II to III, brings you to a prominent ridge (rather loose) and this leads to the small summit of Plymbjerg (1875 metres). Abseil 15 metres into a narrow col then climb the opposite wall and cracks for 20 metres, Grade IV, to a shoulder. A 300-metre snow ridge, which is the most exhilarating part of the route, leads to a false summit. The real summit of Janbjerg lies only two rope lengths beyond.

After experiencing difficulty on the first line of descent, the party returned to the false summit and bivouacked in a snow hole. The following day they descended in bad weather conditions from the false summit down the large icefield on the west face to its bottom south-west corner, then contoured round the glacier to Col camp.

1ST SKI JOURNEY - JANBJERG

Photo. Michael Tuson





JANBJERG - SUMMIT PARTY

Photo. Michael Rutland

The whole climb took thirty-three hours, but would have been very much quicker without a bivouac and slow descent due to the blizzard.

3 Brekjerg

J.W.

The mountain was climbed by gaining the main north-west ridge via a subsidiary ridge on its west side and then following this ridge to the summit, 1700 metres (5600 feet). Two subsidiary summits have to be climbed on the way. The route provides mixed scrambling and Grade II climbing. The rock is reasonably sound if the ridge is adhered to strictly. There is badly shattered rock around the gendarmes between the first and second summits.

Descend via the second and first summits to a col on the ridge 150 metres below the first summit. Continue down the ridge or follow a snow and ice sculoir on the north side of the ridge directly down to Col camp.

Climbing time, including descent, was $10\frac{1}{2}$ hours.

4 The Rectory

M.T.

There was no intention when Chris, Robert and I set out, to climb a peak; Chris and Robert are not experienced mountaineers and the object was to assess the advantages, or otherwise, of using skis to cross the glaciers

which were well covered with snow and to make a reconnaissance of the ground immediately beyond the peak (Wenbjerg) across the main glacier from Col camp. We were climbing the subsidiary glacier to the west of Wenbjerg, a region of large but negotiable crevasses, on skis with skins; these were perfect, as the snow was getting soft in the blistering sunshine and there was not a breath of wind. We decided that, by curving round to the left towards the Church, we should gain height and be able to see far to the north. On reaching the snow plateau below the Church, a subsidiary peak which had seemed quite impressive from the main glacier, revealed an easy line of approach; from the col between it and the Church, where the skis were left, a steep snow slope rose between a rock ridge and the main peak, which descends from the north-west to this snow in two stages of easy boulder scrambling. By the time we came to descend this snow, the sun had disappeared behind the Church and the slope had become icy, causing some minor problems as we only had one pair of crampons.

5 Attempt on the Church

J.W.

The mountain we called the Church lies some $6\frac{1}{2}$ km. west of Col camp. From the obvious steep ice couloir which separates it from the adjoining peak, a long and relatively level ridge (the Nave) runs in a south-easterly direction to the summit (the Church Tower). The Rectory, climbed by Mike (T), Chris and Robert, lies close by.

From Col camp, an easy glacier walk past the south-western end of Wenbjerg leads to the 450-metre ice couloir at the north-western end of the Church. The bergschrund was crossed on the true right-hand side and provided 30 metres of Grade III ice climbing on hard ice. Beyond this traverse out into the centre of the couloir to avoid hard and steep ice on the edges. In the centre, sound, glacier ice makes front pointing simple; some crevasses can be crossed without difficulty. Climb this for 300 metres, then the angle eases and the final 120 metres to the col (1900 metres) are simple. From the col, a spectacular snow ridge leads to the first gendarme (2020 metres), at which point the ascent was abandoned. It was late in the evening as we had been delayed in the couloir, also we were short of food. A second gendarme lies a short distance beyond the first and the summit was estimated to be 1500 metres further along the snow ridge. No great difficulties were apparent.

The descent was accomplished by abseiling down the couloir amidst a superb display of Northern Lights, the final free abseil across the overhanging bergschrund made a magnificent finish to the climb.

6 Wenbjerg

C.G.

This is an attractive pyramidal mountain which lies north-west of Col camp.

Wenbjerg has four ridges and the north-west ridge was chosen for the first ascent. The ridge was reached by walking from Col camp across snow covered glaciers round the south and west sides of Wenbjerg. Access to the ridge was by a low col at its foot. Easy scrambling for 300 metres, keeping to the better rock on the ridge crest, led to a brèche from which

a 12-metre knife-edged snow arrête ran up to a steep snow field 120 metres long - Grade II. More scrambling for 150 metres on the ridge crest ended at another 6-metre snow arrête. Above was a steep rock buttress which gave one 23-metre pitch of Grade IV climbing in a crack and chimney. Easy scrambling followed to the summit at 1950 metres (6,400 feet).

The ridge was about 900 metres long and vertical height gained was 600 metres. The descent required one abseil down the Grade IV pitch. The steep snow was avoided by rocks on the true left.

Total climbing time, including descent, was 14 hours.

7 Second Skiing Journey

M.T.

A late start and doubtful weather prevented us from going as far afield as we would have wished; the area to the north-east of Janbjerg and Wenbjerg opens up vast possibilities for future ski/mountaineering expeditions and some peaks which are much larger than the map indicates are visible across miles of snow covered glaciers. After proceeding about 5 km.north-east, we curved round to the west, crossed to a nunatak approximately 7 km.north of the Church and we could see right across the Sekstjernen to the Champs Elysées Glacier which we had traversed in 1969. The return was by the same route, the 7 km being covered in 45 minutes.

DIVING REPORT

C.W.

The object of the diving programme in these northern latitudes was prompted by some work which Philip and I had done off the coast of Lundy Isle in 1969 and 1970. There we had collected seaweed samples at various depths on behalf of Dr. D.E.G. Irvine of the Polytechnic of North London who was making a survey of marine growth around the whole of the North Atlantic, and it seemed that the expedition would be an ideal opportunity to help him in his work as there had apparently been no samples gathered from this region, other than by dragging. Dr. Irvine provided the necessary equipment for preserving the specimens which we obtained.

To collect a true sample of the marine growth we used half metre quadrants and brought up all matter growing within the square in nylon net bags. The programme was to collect at three depths in two areas and we achieved this, making a total of six dives in all. The first two were of an experimental nature to discover what problems might arise in diving in water of low temperature. It was necessary in choosing the sites to avoid areas where glacial streams were discharging into the main fjords, as this reduced the visibility due to moranic material suspended in the water and also the general flow curtailed much in the way of growth. The second problem was that, away from these areas, the fjords were incredibly deep. We did find two suitable sites, one in each area, and collected samples in each at approximately 45 ft, 30 ft. and 15 ft. In both areas, the streams feeding the site were no longer fed by glaciers and relatively good conditions were encountered.

The water temperature varied from 6°C to -2°C and the dives were necessarily of short duration, never more than thirty minutes. We found that wet suits consisting of a jacket with attached hood and trousers up to the shoulders gave us a thickness of 6.5 mm of neoprene over the trunk - these, together with gloves and bootees, covered all parts of the body and no discomfort from the cold was felt. However, the standard hood leaves a gap over the forehead above the mask and caused headaches during the period of the dive which was spent at any depth where the water was colder. Life jackets of the Fenzy pattern were used and 65 cu.ft. cylinders with single hose demand valves. No problems were met with any of this equipment.

Technical report (summary) by Dr. D.E.G. Irvine (Polytechnic of North London and L.M. Irvine (British Museum - Natural History)

The collections were made from two stations:

- A Kangertitivatsiaq Fjord, 4th August, 1971 - 66° 17' 10" N.,
35° 37' 10" W. Temp: 0°C. Glacial moraine silt in sheltered bay.
- B Ikerssuaq Fjord, 22nd August, 1971 - 66° 40' N., 34° 36' W.
Temp: 0°C - 1°C. Rock and sand.

Collections at three depths (15 ft., 25 ft. and 32 ft. below LW) were made at Station A and at two depths (15 ft. and 25 ft. below LW) at Station B.

Preliminary examinations of the collections have been undertaken and the records compared with those given for East Greenland by Lund (The Marine Algae of East Greenland I Taxonomical Part. Meddel om Grønland 156:1-247, 1959).

Station A

Brown algae predominate at all these upper sublittoral levels, as is usually found in arctic regions. At 15 ft. (5m.) there is a variety of large species, including Fucus distichus subsp. Inflatus, Alaria pylaii, Desmarestia aculeata, and Laminaria (probably L. nigripes). At this depth there is also abundant material of filamentous algae, much of which appears to have been drifting and become entangled amongst the larger algae. The Laminaria also occurred at 25 ft. (8m.) together with fine encrusting plants - probably Lithoderma fatiscens. The Desmarestia appears to be at its best at 32 ft. (10m.). The plants here were very large and growing vigorously, with old, hard, basal parts and young summer growth distally. Although they were covered with Spirorbis tubes and zoophytes, no epiphytic algae were found. Another large brown alga, Agarum cribrosum, occurred at this depth.

Apart from filamentous algae not yet identified, the only green alga found was Chaetomorpha melagonium, occurring at 25 ft. (8 m.).

Of the few red algae present in the collection, an Antithamnion (probably A. boreale) was not conspicuous. It occurred at all depths, but most abundantly at 25 ft. (8 m.) covering stones, Laminaria holdfasts and other algae with luxuriant growth. Red encrusting algae, probably Hildenbrandia sp., also occurred on the stones at all depths. Small plants of Euthora costata were found on an Ascidian at 32 ft. (10 m.).

Station B

The flora here was similar to that at Station A, although Alaria pylaii was not collected, but much-entangled material of Chordaria - like plants occurred along with the Fucus and Desmarestia at 15 ft. (5 m.). A gelatinous plant (probably Eudesme sp.) seemed common here at 25 ft. (8 m.) along with the Desmarestia Agarum cribrosum, etc., and very long plants of Chaetomorpha melagonium occurred at this depth. The only red alga found at this station was Antithamnion boreale. Filamentous algae on Desmarestia and on Fucus have not yet been identified.

Of the larger brown algae present, Laminaria nigripes (to 67 1/4° N. fide Lund) and Agarum cribrosum (to 68° N. fide Lund) were collected from near their northern limits for East Greenland. Alaria pylaii and Desmarestia aculeata are known to occur much further north however. Lithoderma fatiscens is an extremely common encrusting alga, as Lund indicates by his comment "it might be impossible to collect stones that are not inhabited by Lithoderma s.lat - provided that the locality is fit for algal vegetation". The plants of Fucus distichus subsp. inflatus agree both in form and distribution with those observed by Lund.

The collections are, unfortunately, lacking in red algae. This is to some extent accounted for by the fact that several species occur mainly, or only, at much greater depths (e.g. Turnerella septentrionalis 20 - 70 m., Cruoria artica 25 - 120 m., fide Lund.) The absence of common large algae such as Phyllophora interrupta, Phycodrys rubens and Rhodomela lycopodioides is surprising, however.

Further work is continuing, especially on the filamentous and Chordaria-like brown algae. Some of the Antithamnion material has been sent to Mr. A. Whittick, Memorial University, St. Johns, Newfoundland, who is working on the arctic/boreal distribution of the genus. Other difficult material will be distributed to appropriate experts for precise determination.

BOTANICAL REPORTS

1 Report by Dr. G. Halliday on material collected for Lancaster University

During the last ten years, a considerable amount of information has been accumulated on the plant life of the nunataks inland from Angmagssalik, Sermiligaaq and Kangertitivatsiaq fjords. This has been gained from botanical collections made by university, service and foreign expeditions whose primary aims were usually climbing. We now have a fairly thorough knowledge of the nunatak flora of this region; in fact,

it is probably true to say that this is one of the best known nunatak areas in Greenland. The nearest comparable area in South-East Greenland is the area lying around and to the north of Kangerdlugssuaq, some 300 km. further up the coast which was investigated by the Wager brothers in 1935 - 1936.

The original botanical purpose of the present expedition was to collect from a number of nunatak sites between the north-eastern limit of the previously visited Kangertitivatsiaq sites and Steenstrups Søndre Bræ. In the event, two collections were made for the Lancaster University Arctic Herbarium, one from a nunatak site (about 50 km. north-east of the nearest Kangertitivatsiaq site) and the other from the coast nearby. Details of these two sites are given below.

- A Nunatak 8 km. north of Steenstrups Nordre Bræ, 66° 41' N., 34° 42' W. 15/8/1971
- (i) lower slopes of rock buttress facing south-west at 1050 metres
- (ii) south facing slopes at 1200 metres.
- B Tasilaq, 66° 40' N., 34° 36' W. 22/8/1971. Slope between 5 and 32 metres by the fjord, facing west-south-west.

The plants collected are listed below; all are flowering plants and ferns unless otherwise stated and all have been incorporated in the Arctic Herbarium at Lancaster University.

A(i)

B

Campanula rotundifolia	Carex bigelowii
Carex nardina	Cerastium arcticum
Cerastium arcticum	Chamaenerion latifolium
Draba nivalis	Diapensia lapponica
Erigeron humilis	Empetrum hermaphroditum
Luzula confusa	Juncus trifidus
Minuartia rubella	Luzula confusa
Oxyria digyna	Lychnis alpina
Papaver radicum	Poa glauca
Polytrichum piliferum (moss)	Polygonum viviparum
Racomitrium canescens (moss)	Polytrichum piliferum (moss)
Saxifraga nivalis	Oxyria digyna
Saxifraga oppositifolia	Ranunculus glacialis
Silene acaulis	Racomitrium canescens (moss)
Trisetum spicatum	Sagina intermedia

<u>A(i)</u>	<u>B</u>
Woodsia glabella	Salix glauca
<u>A(ii)</u>	Saxifraga oppositifolia
Festuca (cf. vivipara)	Silene acaulis
Lychnis alpina	Vaccinium uliginosum
Poa glauca	
Polytrichum piliferum (moss)	
Racomitrium canescens (moss)	
Silene acaulis	

From this it will be seen that 17 species of flowering plants and ferns were recorded from Site A and the same number from Site B. The list for A can be supplemented by Lycopodium selago and Polytrichum alpinum (moss), both collected immediately south of the base camp on the north slope at 1150 metres. The collection from A is probably fairly complete; twelve previous nunatak collections between 1000 metres and 1200 metres had a mean of 18 species. By contrast, the fjord site, although reported to be far from luxuriant, may have been less thoroughly worked; for comparison we have 66 species recorded from the head of Kangertitivatsiaq and 124 from the Nigertuluk - Tugtilik peninsula 45 km. down the coast.

The list of species from A is very typical of the nunatak sites. Virtually all these plants are common throughout the Arctic and extremely tolerant of exposure; with the exception of Lychnis alpina they are all here well below their altitudinal limits. The upper limit for flowering plants in this area is probably about 2100 metres. The discovery of the fern Woodsia glabella is of some interest. Although it is known from Tugtilik, there are only four previous nunatak records. It was somewhat disappointing to find none of the very characteristic nunatak species, such as Melandrium affine and Erigeron compositus, which are absent from the coast and apparently restricted to the drier, high-arctic climate of the inland nunataks.

The coastal collection, B, includes several of the common species present on the nunatak. Also present are two essentially coastal plants, Ranunculus glacialis and Sagina intermedia, and the dwarf, ericaceous plant Diapensia lapponica which appears not to ascend above 1000 metres.

Although these two collections are not, in themselves, remarkable, they do extend our knowledge of both coastal and nunatak floras further up the coast. Previously, virtually nothing was known of the flora between Tugtilik and Kruuse Fjord.

Identification by Dr. G. Halliday (Lancaster University and Dr. A. Melderis (British Museum - Natural History).

The majority of the specimens were collected from a valley on the north-east side of Kangertitivatsiaq. In addition, a small collection was made in the Tasilaq region where the Lancaster University samples were collected.

A Kangertitivatsiaq region

Collections were made from three sites, details of which are given below:

- (i) sunny 30° west facing slope from sea level up to 30 metres. 66° 23' N., 35° 47' W. 31/7/1971
- (ii) moraine bank facing south-west at the foot of a glacier at 900 metres. 66° 24' N., 35° 36' W. 3/8/1971
- (iii) valley floor running east-west at 500 metres 66° 23' N., 35° 38' W. 6/8/1971.

B Tasilaq region

A collection was made on the nunatak site, (A(i)), which has been described in part 1 of this report.

The plants collected are listed below. All have been incorporated in the herbarium in the Natural History Section of the British Museum.

A(i) (Collection numbers 1-42)

Acrocarpus moss	Oxyria digyna
Bartsia alpina	Phyllodoce coerulea
Carex bigelowii	Poa alpina
Cassiope hypnoides	Polygonum viviparum
Cerastium arcticum	Salix glauca aggr.
Empetrum hermaphroditum	Salix herbacea
Epilobium angustifolium	Saxifraga stellaris*
Epilobium latifolium	Sedum rosea
Eriophorum scheuchzeri	Silene acaulis
Gnaphalium supinum*	Sphagnum sp.
Juncus trifidus	Taraxacum sp.
Juniperus communis subsp. nana	Thymus drucei
Luzula spicata	Trisetum spicatum
Lychnis alpina	Vaccinium uliginosum

A(ii) (Collection numbers 44-66)

Alchemilla glomerulans
*Arabis alpina**
Bartsia alpina
Campanula gieseckiana
Carex bigelowii
*Carex nardina**
Cerastium alpinum - *arcticum*
(an intermediate form)
Cerastium arcticum
Dryas integrifolia
Epilobium latifolium
*Erigeron humilis**
Hieracium alpinum

A(iii) (Collection numbers 101-140)

Bartsia alpina
Carex nardina
Carex bigelowii
(without flowering stems)
*Cassiope tetragona**
Cerastium arcticum
Empetrum hermaphroditum
Epilobium latifolium
Equisetum variegatum
Erigeron uniflorus
Gentiana nivalis

B (Collection numbers 300-319)

Antennaria canescens
Cerastium arcticum
Erigeron humilis
Festuca vivipara
Oxyria digyna
Poa arctica

Lycopodium alpinum
Oxyria digyna
Phleum alpinum
Poa alpina
Polygonum viviparum
Potentilla crantzii
Salix glauca aggr.
Saxifraga oppositifolia
Silene acaulis
Tofieldia pusilla
Trisetum spicatum

Luzula confusa
Lychnis alpina
Oxyria digyna
Pinguicula vulgaris
Poa alpina
Salix glauca aggr.
Saxifraga caespitosa
*Saxifraga nivalis**
Saxifraga oppositifolia
Silene acaulis
Thymus drucei

Poa glauca
Saxifraga caespitosa
Saxifraga nivalis
Saxifraga tenuis
Silene acaulis
Trisetum spicatum

The nomenclature follows:

Dandy, J.E. List of British Vascular Plants (1958)

Tutin, T.G. and al. Flora Europaea (1964 and 1968)

Böcher, T.W., Holmen, K., and Jakobsen, K. The Flora of Greenland
(2nd Edition, English translation).

Seven species in the Kangertitivatsiaq collections are new to the head of the fjord and these are denoted by asterisks (*) in the collection list.

The collection in the Tasilaq region reveals four species which were not included in the samples collected in areas A(i) and A(ii) for Lancaster University. These are Antennaria canescens, Saxifraga caespitosa, Saxifraga tenuis and Poa arctica; all are typical nunatak species.

ORNITHOLOGICAL REPORT

C.G.

Description of areas visited

Coastal waters

Icebergs were present up to 50 miles from land. There was no pack ice and the surface density of the ice was low, except in the region of glaciers, e.g. Steenstrups, where icebergs were being discharged. The sea surface temperature varied between 0°C and 4°C in Kangertitivatsiaq and was 0°C in Tasilaq.

Kangertitivatsiaq

This is a deep fjord some sixteen miles long and varying in width from one to three miles. The Glacier de France discharges icebergs into the fjord at the landward end. The valley immediately south of Ingolfsfjaeld rises at a gentle gradient at right angles to the fjord for four miles to about 650 metres. The shore is rocky and the valley is thickly vegetated with dwarf willows, ling, grasses and a good crop of cranberries. On each side, mountains rise to about 2,300 metres.

Tasilaq

This fjord is fourteen miles long, being four miles wide at its mouth, reducing to two miles in places. The boat was anchored by the snout of a dry glacier with many medial moraines. The bay by the glacier was shallow. The shore was moraine rubble with sea washed lagoons and little vegetation. Wading birds frequented this area and eider and long-tailed ducks and black guillemots frequented the bay. On the rising ground beyond the shore, there was more vegetation, e.g. grass and moss. On the opposite side of the fjord, where streams ran into the sea, were small beaches of black sand on which waders were seen.

The birds of East Greenland

Introduction

The observations recorded here were made on or near the coast and during sea journeys near the coast between latitude 65° 30' N. and 66° 45' N. from 27th July to 24th August, 1971.

List of birds

Red Throated Diver

Gavia stellata

Fulmar

Fulmarus glacialis

Eider

Somateria mollissima

Long-tailed Duck
 Ptarmigan
 Ringed Plover
 Turnstone
 Knot
 Sanderling
 Iceland Gull
 Glaucous Gull
 Kittiwake
 Ivory Gull
 Arctic Tern
 Black Guillemot
 Wheatear
 Snow Bunting
 Greenland Redpoll
 Raven

Clangula hyemalis
Lagopus mutus
Charadrius hiaticula
Arenaria interpres
Calidris canutus
Calidris alba
Larus glaucoideus
Larus hyperboreus
Rissa tridactyla
Pagophila eburnea
Sterna paradisea
Cephus grylle
Oenanthe oenanthe leucorrhoa
Plectrophenax nivalis
Acanthis flammea rostrata
Corvus corax

Observations

Red Throated Diver

1 adult and 1 half-grown juvenile on tidal lagoon. Tasilaq, 16th August.

Fulmar

Up to 8 within two miles of coast.

Eider

20 m. near Angmagssalik, 28th July.

10 m., 11 f. Tasilaq, 15th August

1 f. 2 small young, 23rd August. Nesting sites at Mindesmaerke and Tasilaq.

Long-tailed Duck

Tasilaq: 2 on 15th August, 25 on 17th August and 20 on 18th August.

Ptarmigan

2 small juveniles near Angmagssalik, 27th August. Up to 7 near Ingolfsfjaeld on several days.

Ringed Plover

1 near Kulusuk airstrip.

Turnstone

Tasilaq: 5 on 16th August, 3 on 18th August, 8 on 19th August and 1 on 23rd August.

Knot

Tasilaq: 7 on 16th August, 2 on 18th August, and 1 on 19th August.

<u>Sanderling</u>	3 on 16th August, 5 on 18th August.
<u>Iceland Gull</u>) Up to 4 seen at once. Identified properly only when close to boat.
<u>Glaucous Gull</u>	
<u>Kittiwake</u>	Maximum 12 near Mindesmaerke, 14th August. One or two seen on each sea trip.
<u>Ivory Gull</u>	Tasilaq: 5 on 15th August, 3 on 24th August.
<u>Arctic Tern</u>	6, ten miles off Kap Dan, 27th July. 10, flying south off Mindesmaerke, 15th August.
<u>Black Guillemot</u>	One or two seen most days at sea and in fjords.
<u>Wheatear</u>	Kangertitivatsiaq: maximum 10 on 5th August - several grown young. Tasilaq: 1 on 16th August.
<u>Snow Bunting</u>	Angmagssalik: 3 in town. Kangertitivatsiaq: maximum 12 at 2,500 ft. Seen on most days at Ingolfsfjaeld. Tasilaq: 1 pair on 16th August.
<u>Greenland Redpoll</u>	1 m., 1 f. Tasilaq, 16th August.
<u>Raven</u>	1 at Tasilaq, 18th August.

GEOLOGICAL REPORT

It was not the intention of the expedition to undertake comprehensive geological work, however certain rock samples were picked up in the Northern Area and the following identification has been made:

Mylonite	-	rock similar to that found at Knowlan Cliff, Assynt, Scotland, produced as a result of the Moine Thrust, which is the type locality.
Gneiss	-	high grade metamorphic rock with mineral orientation showing banding - coarse grained, freshly crystalline. Epidote also present with Biotite.
Dolerite	-	dark green homogeneous crystalline type with irregular fractures. Minerals present - Pyroxene, Plagioclase (Felspar) and Quartz. Basic igneous rock, volcanic in origin.
Pebbles from the foreshore	-	mainly Quartz, basically due to less hard material eroding and leaving Quartz. Some pebbles contain veins of Epidote.

MEDICAL REPORT

M.R.

Preparation

Everyone had a tetanus booster, dental check-up and blood group determination. The Danish Government required a form signed by a doctor and a Danish consular official, certifying that the crew were free from, and had no recent contact with, contagious disease.

Equipment

Medical equipment actually carried into the mountains consisted of small 'climbing packs' with each climbing group and 'casualty packs' containing suturing material, spare drugs and extra dressings. These stayed near the shore up north and came to base camp at Ingolfssfjæld. Extra equipment for eyes, teeth, investigation and emergencies was kept in the boat or at shore camp but this was suitable only for use by someone medically qualified. Midge cream and 3 in. plaster for feet were taken separately.

Illness

Happily, the only problems encountered were seasickness, diarrhoea, cut fingers and one case of each of strained knee ligament (from skiing), conjunctivitis and viral infection.

Comments

- (i) Pentazocine (Fortral) was taken to replace morphine and avoid a D.D.A.
- (ii) Two Redisplints were taken and, although not used, were found to be easily portable.
- (iii) The only finger dressings that stayed in place well were tube-gauze dressings.
- (iv) One blood count was done and did little to aid clinical diagnosis.
- (v) Dimenhydrate (Dramamine) and Metoclopramide (Maxolon) helped some cases of seasickness.
- (vi) 3 in. adhesive plaster put on the feet early was useful in preventing blisters and sore patches.

Small climbing pack

Splint	Non-adhesive dressings	Magnesium Hydroxide
Four rolled bandages	Thermometer and scissors	Perphenazine
Cotton wool and	Disprin	Hydrocortisone
Dettol		

"Uvistat" sun cream

Paracetamol

Disposable syringes

Elastoplast

Pentazocine

Cotton swabs and
adhesive plaster

Codeine Phosphate

FOOD REPORT

J.G.

The majority of the food supplies fell into two categories, boat rations and land rations. The differences lay in the packaging and calorific/bulk ratio. The principle criteria in the selection of supplies were nutritional value, ease of preparation, variety and cost. An initial survey of likes and dislikes indicated the popularity of different foods.

Boat rations

These provided slightly under 3,000 calories per man day and proved quite sufficient.

The food was packed in solid fibreboard cases; all foodstuffs within these were in damp-proof containers. The cases were numbered and each group of cases contained complete food rations to last for either four or five days. Ease of preparation and adequate variety were very important considerations. Breakfast and lunch were basically cold meals and quickly prepared, and in the evening two pressure cookers assisted in the task. These have two advantages in that, apart from speeding up cooking, the sealed lid helps to keep the contents inside the saucepan even in the roughest weather.

There was no logistical problem and so we were able to use tinned or fresh food which meant that considerable variety could be introduced in the menu. Dehydrated foods have little value on a small boat since all the water has to be carried anyway. Tinned stewed meat was enlivened by dried peppers and onion flakes plus a variety of spices. When weather conditions permitted, fried foods provided a welcome change. Sweet biscuits, fruit cordial, jars of sterilised cream, fresh scofa bread and birthday cakes on two appropriate occasions, also helped to preserve interest. Several members suffered from seasickness - usually for the first day or two after excessive eating in harbour. Inveterate sufferers could not be cured, but plain and regular meals seemed to be the best general prevention.

Emergency rations

Both life rafts were equipped with standard Board of Trade emergency packs. Twenty-five gallons of water were carried on deck in plastic cans; this quantity would have been adequate under light work conditions for over a fortnight. Boxes containing 14 days emergency rations were prepared; these contained carbohydrate foods (sugar and boiled sweets) plus a small amount of dried soup and porridge with a mug, billy-can, 'Gaz' stove, spoon and waterproof matches.

Emergency shore rations

Cases containing tins of highly nutritional food (Complan, nutriment essence and oatmeal blocks) were left at sea level for emergency use should an inland party return to the shore and be cut off from the boat.

Lightweight rations

These were based on the Medical Research Council Mark V summer sledging ration, details of which can be found in Reference 1. Quantities were increased slightly to bring the calorific value up to 4,500 per day - this was ideal. Apart from variety, ease of preparation and nutritional value, weight and water resistant packing were also of critical importance. Five polythene bags, all containing two man days of supplies were packed in each solid fibreboard box. A comprehensive two man day food pack weighed approximately five pounds.

Some general comments on food taken are listed below.

- (i) Swiss-type meusli was taken as well as porridge and proved very popular; it can be eaten hot.
- (ii) Three types of dehydrated meat were used - Batchelors Chicken Supreme, Farmhouse stew and Cerola curry; these provided adequate variety.
- (iii) Macaroni can be cooked quickly and provides a palatable alternative to instant mashed potato.
- (iv) The only biscuits were plain Army Service biscuits; these are recommended since they are both substantial and popular.
- (v) Sunflower seeds provided a somewhat unconventional addition to the standard dried fruits; they are said to be energy-giving and were always eaten despite suggestions that some members were beginning to look like canaries. They did not enable us to fly up the mountains!

Items such as coffee and jam, which are impractical to repack, were bought in individual packs. Other products were bought in bulk and repacked in either plain polythene bags or, where possible, in laminated polythene bags which were heat sealed under vacuum. All the lightweight food kept in perfect condition apart from chocolate, which suffered from the heat before we reached colder latitudes.

Personal emergency packs

Each member was supplied with a small emergency pack containing glucose tablets, Kendal Mint Cake and boiled sweets.

General

The accounts do not give a true picture of the expedition food costs because a number of firms generously supplied free or cheap food or assisted in packaging. The cost of food shown in the accounts is estimated at 60% - 70% of the total value. Without this assistance, we could not have afforded to provide the variety of food which was a vital factor in maintaining morale.

Reference 1

Exploration Medicine, Chapter 15.
Edited by O.G. Edholm, B.Sc., M.B., B.S. and
A.L. Bacharach, M.A., F.R.I.C.

This section is included in an endeavour to answer the interminable question - 'How did we find our way to Greenland?'. One must never rely entirely on any particular system; navigation involves arriving at one's position in the ocean by a series of methods and, providing that the different methods are not conflicting, one can be fairly certain of an accurate answer. Basically, we used a combination of dead reckoning (course steered and distance run, suitably corrected for winds and current) and radio direction finding on navigational beacons - these are found on a number of headlands or lightships around the British coast and that of the North Atlantic islands, but there is only a single beacon on the east coast of Greenland at Kulusuk, used in the main by aircraft. Echo soundings can be of assistance in shallow water but were not appropriate once we had passed Orkney. We had a sextant which was our 'last resort' system and was not needed; however, it might have been very useful if we had been caught in pack ice off the Greenland coast and had been drifting for any period, as dead reckoning in such circumstances is not practical.

On the east coast of Britain, we seldom went far from land and one can check one's position by direct bearings. Between Scotland and the Faroes, when the wind was north-west, Force 6 (not really the gale described by Colin in 'The Outward Journey'! it was a headwind and seemed like a gale), we homed to the east of the South Island and then on the second beacon. Waters round the Faroes are deep and visibility was adequate to avoid difficulties. After this, the marvellous weather and lack of ice made it easy, but we did get further north than we intended on a couple of occasions.

The problems of ice were much less than anticipated. It was a question of steering round the smaller bergs and keeping a respectful distance from the large bergs and anything likely to turn over. The only ice that we could not avoid was 'brash' from the breaking up of bergs off the Steenstrups glaciers; these could cause large areas to be covered and we had problems when finally leaving Tasilaq as a lot of this ice had been blown or drifted into the fjord the previous night. 'Dead slow' and 'stop' enables one to push one's way, very slowly, through but it took us eight hours to cover four miles, then we broke free and it was full speed ahead.

The Orkney Islands are ill-lit and, arriving there at about 10 p.m., we had to wait until daylight to go in Westray Firth; a few lessons from the Norwegians on sectorised lights would not come amiss or, maybe, we should have had a radar set.

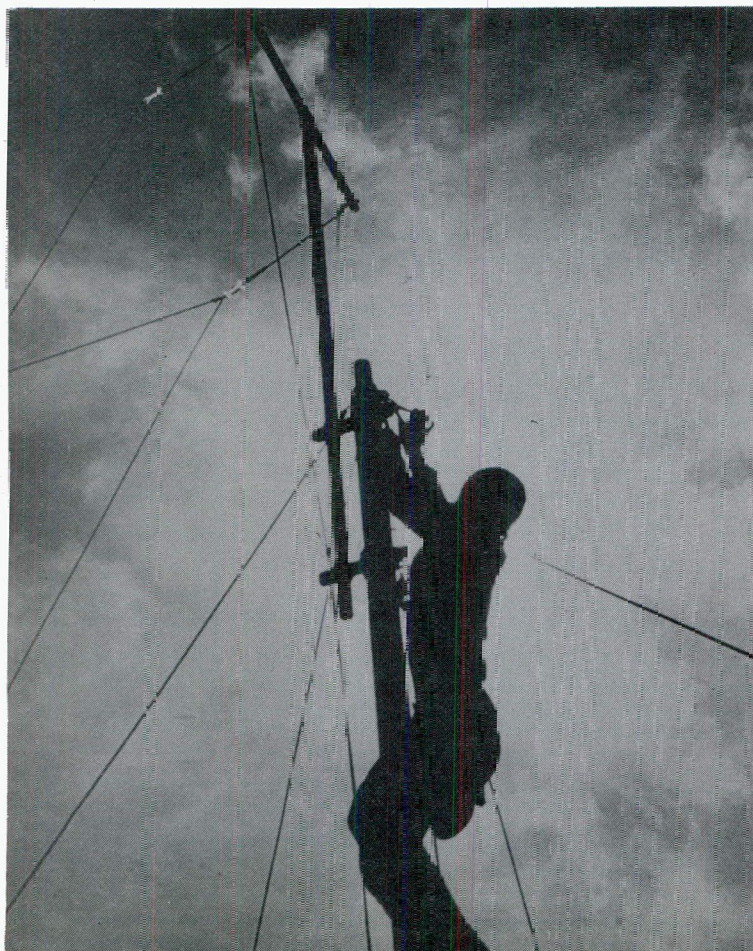


COL CAMP

Photo. Michael Rutland

RUNNING REPAIRS

Photo. Robert Coulter



HOMEWARD BOUND

Photo. James Webster



ACCOUNTS

M.T.

Receipts

Individual contributions @ £120 per head (12)	£1,440. 00
Additional contribution- S. Poulton (for personal fares)	30. 40
Grant - Mount Everest Foundation	300. 00
Cash donations - Harris Brushworks Ltd	10. 50
- Joseph Lucas Ltd	5. 00
	<hr/>
	£1,785. 90
	<hr/>

Expenditure

Administrative - post, telephone, etc.	44. 08
- stationery	6. 97
Transport - charter of Ice King	795. 00
- air fares and miscellaneous	122. 77
Food	268. 41
Equipment - climbing	144. 53
- diving	20. 00
- maps and photographs	17. 09
	<hr/>
	181. 62
Insurance	240. 00
Medical stores	4. 12
Fuel - cooking, etc.	10. 61
Report (provisional)	100. 00
	<hr/>
	£1,773. 58
Balance of receipts over expenditure	12. 32
	<hr/>
	£1, 785. 90
	<hr/>

ACKNOWLEDGEMENTS

There are many people and organisations who gave the expedition assistance by means of advice, gifts, discounts and credit facilities and, without this help, the running of such ventures would be infinitely more difficult. We should like to express our thanks to the following:

General

The British Museum

Den Kongelige Gronlandske Handel

Department of Trade and Industry (Marine Survey Office)

Geodetic Institute, Copenhagen

Hertz Truck Rental

Mount Everest Foundation

The Nuclear Power Group

Royal Geographical Society

University of London Graduate Mountaineering Club

Peter Daley

Dr. G. Halliday

Dr. Noel Dilly

Dr. D.E.G. Irvine

J.H. Emlyn-Jones

Dolfi Rotovnik

Derek E. Fordham

Malcolm Slesser

Richard Grover

Elizabeth D. Tuson

Fridrik Gunnarsson

Prof. E.S. Williams

Nautical

Beaufort (Air-Sea) Equipment Ltd.

Tecalamit (Engineering) Ltd.

Lister Blackstone Mirrless Marine

Telesonic Ltd.

Meteorological Office, Bracknell

Neils L. Underberg - Angmagssalik

P. Newall Petticrow Ltd.

Velasalan HF - Reykjavik

Shell International Petroleum Co. Ltd.

General equipment

British Visqueen Ltd.

Optimus (London) Ltd.

Bryant and May Ltd.

Portere Ltd.

Cellotwist Ltd.

Prestige Group Ltd.

Clog Equipment

John Dewar and Sons Ltd.

Dylon International Ltd.

Jonathan Fallowfield

L.G. Harris and Co. Ltd.

Kiwi Polish Co. (Pty) Ltd.

L.R. Industries Ltd.

Joseph Lucas (Industries) Ltd.

Minnesota Mining and Manufacturing Co.

Clothing

Millar Gloves

Mountain Equipment

Diving

North Atlantic Research Association

Oxford Underwater Research Group

D.R. Shiers Ltd.

Food

Associated Biscuits Ltd.

Cadbury Schweppes Ltd.

Mrs. B. Chadwick

M.A. Craven and Son Ltd.

Dornay Foods

Danish Bacon Co. (Wholesale) Ltd.

Del Monte Foods Ltd.

John Dorell Foods Ltd.

Fine Fare Ltd.

Fowler Ltd.

General Foods Ltd.

Glaxo Laboratories Ltd.

Jenks Bros. Foods Ltd.

Proctor and Gamble Ltd.

Roche Ltd.

Ronson Products Ltd.

Simoniz Ltd.

Thames Case Ltd.

Thermos Ltd.

Vitafoam Wraystone Ltd.

W.D. and H.O. Wills

Y.H.A. (Sales) Ltd.

S.D. Stretton and Sons Ltd.

Sub Aqua Services

A. Tillbrook and Co. Ltd.

Kaveli Ltd.

Lipton Ltd.

Mars Ltd.

Mapleton Foods Ltd.

L. Neilsen Ladfoged and Co. Ltd.

R.H.M. Foods Ltd.

James Robertson and Sons

Scofa Milling Co. Ltd.

G. Shippham Ltd.

Tate and Lyle Refineries Ltd.

Unilever Export Ltd.

Weetabix Ltd.

AFTERTHOUGHTS

M.T.

I write these notes six months after returning home and just before the draft of this report goes to the printers. It is only after such a period that one is able to put aside one's thoughts on the individual problems that arose during the expedition and to look critically at the achievements and failures of the whole undertaking. That we managed to run an expedition at a cost which was little more than half of that which we would have had to pay if we had followed the usual route taken, has to be weighed against the time factor and the need to have the boat manned at all times; if one accepts this principle, one's activities are thereby restricted to the coastal regions. Maybe it would have been better to leave the Ice King in Angmagssalik and proceed up the coast in the two large inflatable boats which could be dumped above the high water line - this would give transport flexibility, an adequate safety factor and enable a more ambitious inland programme to be followed. I should certainly consider this course if I were planning further exploration in the northern area, where there are many opportunities.

We were unlucky in that Ingolfssfjaeld has been climbed a fortnight previously and there appears to be little doubt that the route we were attempting will require a highly competent rock climbing team. It was a pity that we spent so long in coming to this decision before moving to the north, where there were innumerable opportunities for our type of party, if only we had had more time.

I like to think it was not only luck with the weather which enabled us to get to Angmagssalik without delay and to move up and down the coast at will without any serious problems, but one has to remember that Nansen was taken down to the 62nd parallel before he could get in and the Ice King is no 'Ice Breaker' so we could well have had similar problems. As it turned out, all we lost was paint.

Finally, I should like to express my personal thanks to James Webster, the members and all the other people who made the expedition not only possible but enjoyable.

*Printed by The Nuclear Power Group Limited (Technical Publications Department)
Radbrooke Hall, Knutsford, Cheshire.*

April 1972

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March, 1972

