

THE
BRITISH SOUTH
EAST GREENLAND
EXPEDITION 1989

PATRON: LORD HUNT
KG., CBE., DSO.

KING
FREDERIK'S
LAND

NUNAVUT'S
LAND

ARCTIC
CIRCLE



483

48

40

32

24

THE BRITISH SOUTH EAST
GREENLAND EXPEDITION

1989

Patron: Lord Hunt of Llanfair Waterdine KG CBE DSO

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CONTENTS	PAGE
Expedition Area	3
Expedition Objectives	3
Expedition Members	4
Expedition Timetable	6
Grid References Of Camps	7
Expedition Area and Sledging Route	8
A Personal Account of the Expedition	9
Ode to a Mozzy	17
A Walk on the Wild Side	18
Meteorological Report	22
Medical Report	26
Physiological Report	31
Food Report	36
Equipment Report	42
Sledging weights	47
Financial Report	49
Mountaineering Report	53
Acknowledgements	55

Expedition Area

South east Greenland is generally referred to as King Frederick VI Land and it is an extremely remote and hostile area. The inland ice-cap reaches a height of over 2000m and descends in many places unbroken to the sea. Inland from the coast a complex pattern of nunataks break through the ice-cap creating a range of mountains, the highest being the un-named peak 2511m.

The expedition area has no settlements on the coast for a distance of over 100 miles to the north. Previous expeditions to the area have visited only the coastal zone and not ventured inland onto the ice-cap. The area to the south around Cape Farewell has received a fair amount of mountaineering interest, particularly in the Tasermiut and Sondre Sermilik fjords, because of easy access from the settlement of Nanortalik. However, as the the south west coast of Greenland has now been fully explored and climbed, recent expeditions have tended to seek unexplored areas on the south east coast.

Expedition Objectives

The aim of the British South East Greenland Expedition 1989, was to complete an unsupported 300 mile sledging journey through the nunatak zone of the King Frederick VI mountain range, exploring and climbing the main peaks in the area. The highest in this area, at a height of 2511m has only been climbed once by a small Danish party and to our knowledge no past expedition has visited this area.

Once leaving base camp on the shores of Tasermiut fjord, the expedition was totally self-sufficient, pulling specially designed sledges. The proposed route travels for about 200 miles north and then cross the ice-cap to explore and climb a remote nunatak (2820m) on the west coast. From here the expedition intended to sledge a further 60 miles to Narssarssuaq airport, descending the Qorqup Sermia glacier.

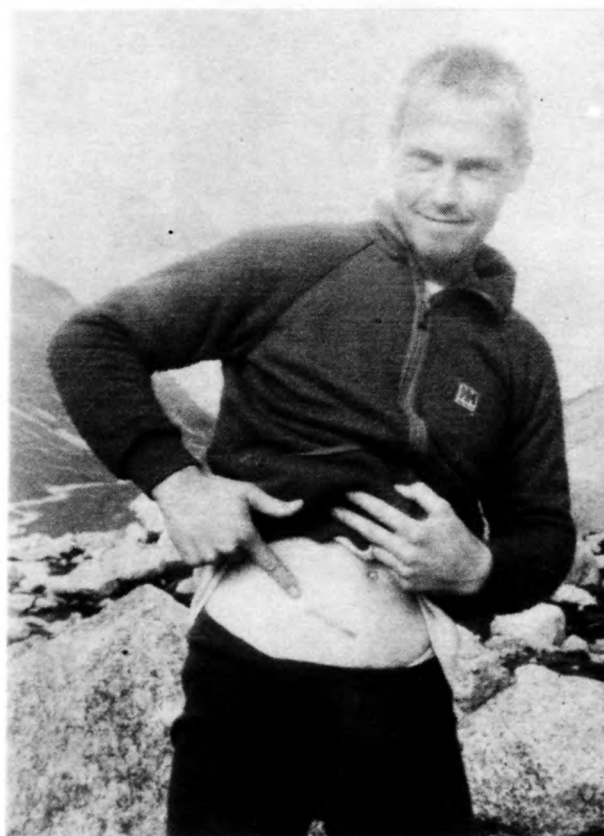
During the four weeks the expedition were exploring the King Frederick VI Land, they will be undertaking a physiology project, specially designed by the Robert Gordon's Institute in Aberdeen.

Expedition Members

<u>Name</u>	<u>Occupation</u>	<u>Role</u>
Les Turnbull	Mathematics Teacher	Leader
Brian Hull	Mechanical Engineer	Equipments Officer
Phil Jumeau	Biology Teacher	Food & Stores Officer
Andy Leslie	Geography Teacher	Treasurer
Dr Andrew Collinson	Medical Practitioner	Expedition Doctor
Martin Dowson	Production Assistant	Meteorologist



Les Turnbull



Brian Hull



Phil Jumeau



Andy Leslie



Dr Andrew Collinson



Martin Dowson

Expedition Timetable

- Sun 16th July - Les and Martin flight Heathrow to Reykjavik.
- Mon 17th July - Les and Martin flight Keflavik to Narssarssuaq.
- Tues 18th to Wed 19th July - Les and Martin recce route from Qorqup Sermia glacier.
- Thurs 20th July - Ferry Narssarsuaq to Qaqortoq (Julianehab).
- Fri 21st July - Ferry Qaqortoq to Nanortalik.
- Sat 22nd July - Brian et al flight from Heathrow to Keflavik.
- Mon 24th July - Brian et al flight from Keflavik to Narssarssuaq.
Ferry to Qaqortoq.
- Tues 25th July - Brian et al ferry Qaqortoq to Nanortalik.
- Wed 26th July - Charter boat Nanortalik to base camp.
- Thurs 27th to Sun 30th July - Load carry up to top dump.
- Mon 31st July - Brian develops appendicitis and is evacuated to Nanortalik, along with Andy and Andrew.
- Tues 1st Aug - Andy and Andrew return to base camp to discuss change of plans.
- Wed 2nd Aug - Andy and Andrew return to Nanortalik to make arrangements for Brian's convalescing and flight to Britain.
- Sun 6th Aug - Les, Phil and Martin move up to col camp and wait for Andy and Andrew to return.
- Mon 7th Aug - Andy and Andrew arrive at base camp.
- Tues 8th Aug - Andy and Andrew arrive at col camp.
- Wed 9th Aug to Fri 25th Aug - Sledge to Patussoq fjord, climb minor nunataks and Peak 2511m and return to shelter stone.
- Sat 26th Aug - Load carrying down to base camp.
- Tues 29th Aug - Charter boat from base camp to Nanortalik.
- Sun 3rd Sept - Helicopter flight Nanortalik to Narssarssuaq.
Flight Narssarssuaq to Keflavik.
- Mon 4th Sept - Flight Keflavik to Heathrow.

Grid References of Camps

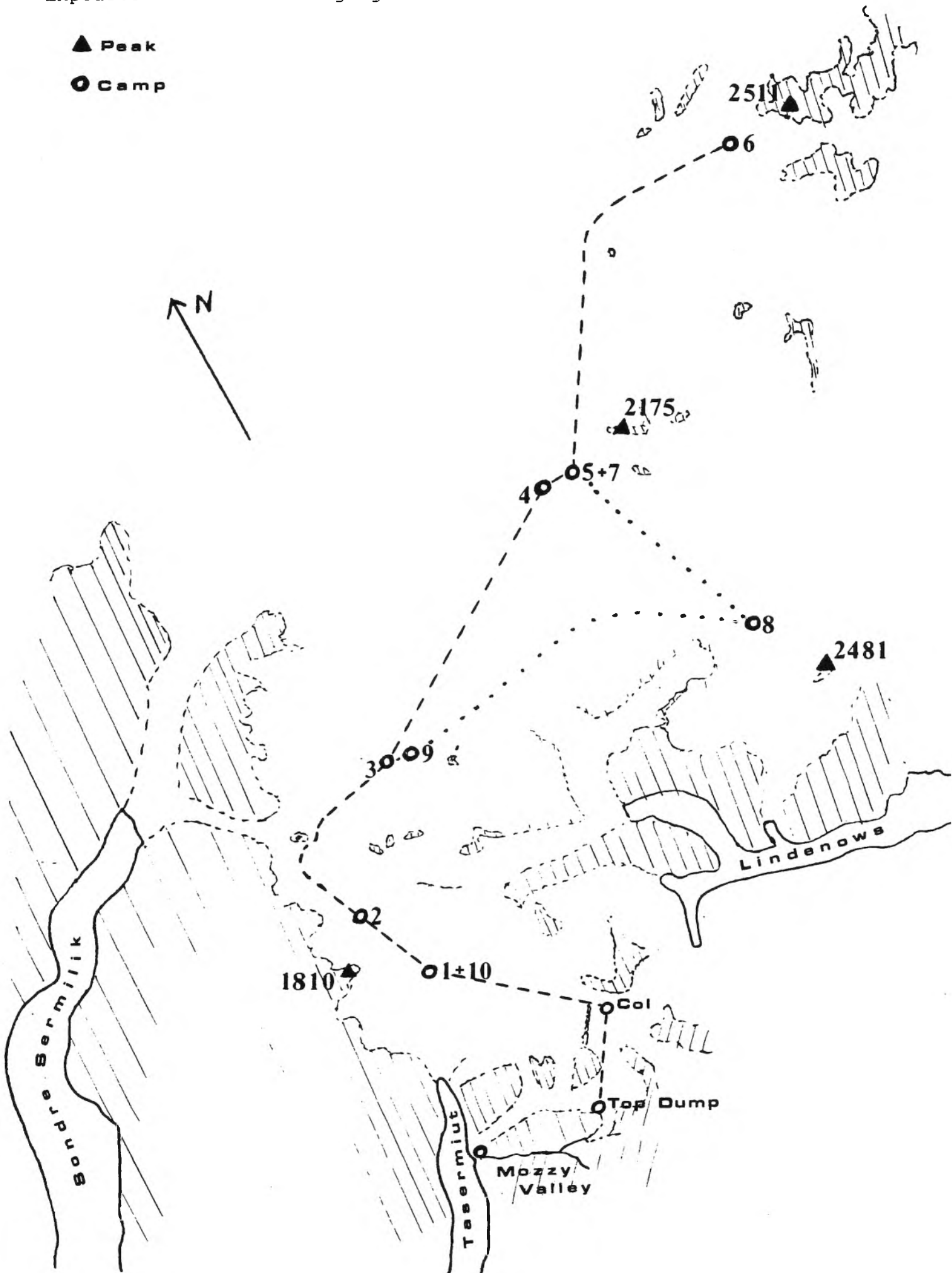
Base camp	60° 31' N, 44° 28' W
Top dump	60° 31' N, 44° 21' W
Col camp	60° 33' N, 44° 17' W
Shelter Stone	60° 31' N, 44° 25' W
The Arches	60° 31' N, 44° 26' W
Camp1	60° 37' N, 44° 27' W
Camp2	60° 39' N, 44° 29' W
Camp3	60° 42' N, 44° 24' W
Camp4	60° 46' N, 44° 07' W
Camp5	60° 47' N, 44° 05' W
Camp6	60° 52' N, 43° 47' W
Camp7	60° 47' N, 44° 05' W
Camp8	60° 42' N, 44° 00' W
Camp9	60° 42' N, 44° 21' W
Camp10	60° 37' N, 44° 27' W



Aboard the "COLO" preparing to leave Nanortalik

Expedition Area and Sledging Route

- ▲ Peak
- Camp



A Personal Account of the Expedition by Les Turnbull

Martin and I flew out of Heathrow airport at 2:45am on Sunday 16th July 1989. There had been some fog at Keflavik airport and so the return flight to Heathrow was delayed by some seven hours. After only managing to capture limited sleep while waiting for the plane we felt somewhat jet lagged even before we had flown. There was still fog at Keflavik airport even when we left Heathrow, so the plane was diverted to Reykjavik airport which is a substantially shorter runway and only meant for internal flights and small jets. The plane hit the runway hard and immediately the brakes were applied; the plane came to rest a few yards from the end of the runway and applause rung out for the pilot.

It was convenient to arrive at Reykjavik as this meant we did not have a further 30 minutes drive from Keflavik. The bus driver took us to the camping site on the outskirts of the city, but of course at this time of the morning nobody was in the office to show us where to sleep. We had not brought a tent with us as we were already over our baggage allowance. We had found quite a lot of empty tents and just assumed that they were available for hiring, as is the case on many campsites in Europe. It was a relief to get down to some proper sleep and we felt the better for it.

The man in the campsite office spoke decent English and when we explained what time we arrived and that we did not have any tent and just used an empty one, he said in a Scandinavian accent "You have stolen someone's house! You must build your own house". We did not really feel up to mixing cement and laying a few bricks for the night shelter, but we got the jist of what he meant, so we vacated the tent and had a spot of breakfast. Later that day a large coach party of German trekkers had arrived and occupied the tents that had been pitched by their trekking company. All the tents were still not full, so after asking their leader if we could borrow the one for the night, we moved back in this time for some decent and uninterrupted sleep.

The next day, Monday 17th, we caught the flight to Narssarssuaq, South Greenland. We caught a few glimpses of mountains on the east coast but were not sure what was cloud and what was the ice-cap. The cloud became patchy in places and as we dropped height to make a descent to the airport, crevasses could be seen. It was difficult to judge whether this was the area that we would hopefully be sledging over enroute to the west coast. The descent to the runway is very dramatic, because the airport is situated at the head of a fjord and close to a glacier. The plane had to bank steeply to approach the runway and as we did, we hit the runway even harder than at Reykjavik. It had been three years since I had been here with the Salford University Cape Farewell Expedition 1986 and I wondered if we were going to have another successful time.

From my last time here, I remembered there was a field station just a mile down the road, and so laden down with two rucksacks each we headed for it. Upon arrival the place looked pretty deserted and then going into the kitchen area found that it had been gutted of all fittings and fixtures. We soon realised that the building that we had passed on the right of the road, was the new field station. The reason for Martin and myself coming to Greenland seven days before the rest of the expedition members, was to recce a route down from the ice-cap to the Qorqup Sermia glacier; this was only some four miles from the airport. It would be useful to leave our belongings somewhere and then to recce this glacier, so we decided to stay in the hostel for the night and possibly seek some first hand knowledge from the warden.

The next day, Tuesday 18th July, we set out to investigate the proposed descent route and enjoyed the stroll along the valley floor. Narssarssuaq, which means "the flat ground", was once an American airforce base during the war, and we could still see the fire hydrants and the sites of temporary accommodation. The whole of Greenland's fjords have been aerial photographed between 1943 and 1948 and you can order a print from Geodaetisk Institut in Copenhagen. One of the prints we bought shows dozens of buildings on this site and it obviously must have housed many airforce personnel. The route to the glacier was a well worn path made by the many tourists wanting to walk on the Greenland ice-cap. We found a suitable part of the glacier from where we could descend safely without the added worry of crevasse danger, as the glacier was solid blue ice.

There is really not much else to see in Narssarssuaq as it only exists to be the airport. After walking to the quayside to find that it was also pretty dead along with the airport (it only livens up when a plane is about to arrive), we caught up with our diary entries and did a spot of reading.

Thursday 20th July; I was glad to be on the move again and eager to get on the ferry to take us to Qaqortoq (Julianehab) the next port of call. All place names are written in two languages, Danish and Greenlandic and similarly all printed documents, newspapers, etc are also in the two languages. The ferry that we would be sailing with would be the "Disko" and is one of the largest ferries in this country. It can carry over 200 passengers and has an excellent restaurant on board. Taking a look at the menu, which is written in several languages, it was a difficult decision whether to go for the grilled mattak (whaleskin) or the reindeer steak.

The ferry journey takes on a more leisurely pace and I believe this is the best way to see Greenland. The country gradually unfolds; the changing colours of the hillsides, the cold air fills your lungs, the icebergs sailing serenely by and clear green waters all act on your senses and you soon appreciate the vastness and beauty of this land. Soon, the ferry encountered pack-ice, but it was not too dense or thick to hamper our progress.

We were met at the quayside in Qaqortoq by Herluf and Anny Rasmussen, who own the local radio and hi-fi shop. We had met them three years ago and we had kept in touch ever since. They are both radio amateurs and contact similar enthusiasts throughout the world; this is how they improved their spoken English. Their house is filled with hunting trophies, as is usually the case in most Greenlanders houses. Skins from seals, polar bears and arctic foxes, carvings made from walrus ivory and soapstone in the shape of evil spirits (Tupilaks) and hunting tools such as harpoons adorn the wall. All the Danish people I had previously met were very friendly and welcomed us in at every opportunity. Living in such a small community, they do appreciate visitors, especially from other countries. Our visit with them was all too short as we had to catch the early ferry the next day, to get to our last port of call, Nanortalik, where the expedition freight would hopefully be. The crates were sent out to Greenland via Denmark one month earlier, to catch the monthly tanker that supplies the larger settlements on the south west coast.

The ferry for the last leg of the journey was the "Aleqa Ittuk"; it was a much smaller vessel that could carry only 20 people, but was much more manoeuvrable in the dense pack-ice. This part of the journey took seven hours, but you do see some of the more isolated fishing villages along the route. The ferry is the lifeline between all the settlements and it carries mail, small cargo and the more than welcome tourist. The Greenlanders are always willing to communicate with you,

to learn where you are from and what you are in their country to do. When we tried to explain that we would be up on the ice-cap pulling our belongings without huskies, they thought it most hilarious. We soon became referred to as the "crazy English".

Over the weekend we were entertained by Steen Madsen, who was the tourist officer for this settlement of Nanortalik. The south coast of Greenland is strewn with old Norse ruins and Eskimo burial sites, all within easy reach of the sea. On one particular day we did a spot of fishing for Cod, or whatever took the bait, at a site teeming with fish. In no time at all the fish box was filled; I did not realise that fishing with the simplest of equipment could reap so many fish. I had been sea fishing at home with rod and reel, but at no time had I caught so many fish. A couple of miles further along the fjord was marked on the map as an old site and we had been told of graves of Eskimos. Because there is no top soil, graves tend to be shallow and the bodies covered with many rocks. It is common to find graves that contain several bodies as Eskimos used to bury people in a family grave. It certainly was an eery feeling uncovering the grave to expose the bones of ancient hunters at this isolated rocky promontory in the mist filled fjord.

On Monday 24th July, Martin and I certainly had the work cut out for us, as we had to collect the crates from the warehouse and to sort out the contents in preparation for the rest of the lads that should be arriving tomorrow evening. The freight was in two large crates and three tea chests totalling some three cubic metres. It felt rather daunting looking at the equipment strewn out before us; all this we would be taking with us; nothing would be left behind and everything would be pulled in the sledges.

The rest of the expedition members arrived late on Tuesday evening as the captain of their ferry (Taterak) had spotted a seal on an ice-floe and so decided to go hunting for it. It had taken about one hour from the initial shot that had wounded the seal, to the time when it was killed and hauled aboard. As is tradition in this country, a woman does the work of gutting and skinning the seal. The liver is then eaten raw and a piece is given to all around. The sight of the animal being skinned, with the blood staining the deck and the guts and intestines placed in a large bucket did put off two of the members. The other two tucked into this delicacy with the rest of the passengers, even the young children.

Having met up with the rest of the lads, the expedition was now complete and we felt a buzz of excitement as we boarded the charter boat "COLO" to take us to the head of Tasermiut fjord, our intended base camp. The weather was not particularly good with some light rain and low cloud that hid the tops of the mountains surrounding the fjord. The fjord is some 64km long in the form of two straight sections. After a short while we could see the end of the fjord where the ice-cap spills over into the fjord, but it would take a few hours to reach the end of the fjord.

Our intended site for base camp had been used several times before by previous expeditions, as it was a strategic place to gain access to many peaks and the ice-cap. We envisaged it would take us some six days to ferry everything from sea level up to the snow line from where we could start sledging and make progress easier by travelling on skis. The site was superb, giving dramatic views of the ice-cap as it calved into the fjord.

The route up to the snowline was by no means easy; it involved a two mile walk through some dense bushes and then a steep scramble up by a waterfall to the site that became known to us as "the shelter stone".

A large perched block stood at the snout of a glacier and it seemed a most appropriate site to deposit the equipment. From here a safe route was found up the gently sloping glacier to a basin where three glaciers merged. This was the highest point of the ferrying journey and became known as "top dump". It was left up to the individual to do their own load carrying and on some days we did two of these, lasting up to five hours each for the return journey. The load carrying was hard work involving long days, as we wanted to get established for the sledging journey as soon as possible. Everything seemed to be going accordingly to plan, and by Sunday 30th July we were all set to break base camp completely and establish ourselves at top dump.

Early on Monday morning Brian woke up to severe stomach pains and he thought this was a result of the hot curry that he had the night before. However, by 7:00am the pains had still not subsided and so he asked Andrew, the expedition doctor, to take a look at him. Andrew was a bit suspicious as to the cause of the pain and so gave him some tablets to ease it, and asked him to return an hour later. The pain did not subside, in fact they got increasingly worse and Andrew suspected it might be appendicitis. Brian was then given an ampoule of diamorphine to ease his condition and the rest of us had then to decide the next course of action.

We had no radio with us to summon help, as the expedition was a sledging journey and weight must be kept down to the barest minimum. However, we had to carry an emergency distress beacon which when triggered, gave off a distress signal that satellites could transmit to the nearest airport. We had no alternative but to use it and my thoughts were now that the expedition was over before it had really started. Luckily for us a boat engine could be heard in the fjord, so we scrambled up to a high point to observe where it was. We could just barely see a small boat across the other side of the fjord, some two miles away, so we tried to attract its attention. We started yelling, waving our brightly coloured cagoules and then lighting a fire, but they all failed to attract attention. Then Andy started blowing on his high pitched whistle and this did the trick. The engine could be heard getting louder and the wake of the boat was definitely heading in our direction.

Two people were in the boat, one of which was the leader of another British expedition that we knew would be in the same fjord. I had met up with Myles Ripley one month previously to discuss our climbing program so that our actions did not interfere with his expedition. After raising a lot of money to go on an expedition in a remote part of the world, the last thing you want to find is another expedition in the near vicinity. The other person in the boat was a doctor and he gave Andrew the second opinion that Brian did indeed have appendicitis and had to be evacuated immediately.

Brian was then wrapped in a casualty bag, a type of sleeping bag with neck supports and carrying loops for up to eight bearers. The other expedition base camp was some six miles down the fjord and they had with them a significant amount of medical equipment, including intravenous drips. Brian was evacuated along with Andrew and Andy; Andrew to give him drugs when necessary and Andy to organise the rescue operation and sort out the insurance details.

Later that day, a fast boat arrived from Nanortalik with a doctor and nurse, and in the evening Brian was operated on. Approximately 18 hours had elapsed between the time when appendicitis was diagnosed and then removed. So that was the end of the expedition for Brian; after months of hard work getting the equipment together and raising the necessary funds, his toil was rewarded with appendicitis that could have happened any time, any where. So why on this expedition!

I shall not go into the full details of what happened over the next few days, but briefly the expedition was now down to five people, a week of precious time was irretrievably lost and our plans had to be revised. What was originally intended to be a one way sledging journey up the south east coast, climb three prominent peaks and sledge over the ice-cap to the airport, now became a return trip to base camp and to sledge as far as we could northwards in the limited time available.

On Sunday 6th August, Phil, Martin and myself established camp at the bottom of the col between Peaks 1940m and 2029m, that would be our route over the subsidiary ice-cap to the main ice-cap. Andrew and Andy would be making their own way here after sorting the insurance arrangements for Brian. We had to negotiate a crevasse field, by zigzagging across the glacier and skiing over snow bridges.

It is always a wise idea to dig a tent well in when you are camping on a glacier, as you can experience very strong katabatic winds and the weather can change very quickly with the passing of fronts. This certainly was the case that evening as a lot of snow drifted around the tent causing us to dig ourselves out. The tent design was of a geodesic dome, which is very stable in strong winds and the curved poles help support one another, as well as giving a little in the wind.

In the morning the result of the night's storm could be seen; approximately three feet of snow had laid around the tent and sledges, and we had to dig everything out for fear of losing some belongings. Simple camping duties such as cooking do take a substantially longer time when you are on glaciers. The ice has to be melted first of all before any cooking could start, and just to make a mug of tea would take up to 45 minutes. Trying to have a quick start in the morning could take anything up to three hours to get packed, have breakfast and set off sledging.

Andrew and Andy arrived at the col camp on Tuesday 8th August having made some use of the Upski parachutes which we had borrowed. The principle of these parachutes is that the canopy can be inflated by a centre venting chord. This is then attached by a harness to the skier who can control and regulate their speed and skiing direction. In strong winds two sledges can be shackled together and a modest mileage can be clocked up.

The route up to the top of the col was steep and so half empty sledges were taken to the top. The final section was very steep so each member had to seek the assistance of one other to hold the back of the sledge to stop it from slewing round. The ski down to the camp with an empty sledge was a tricky affair as the sledge had a tendency to overtake you. This was corrected by tying rope over the runners to create some drag.

On the Thursday 10th August we struck camp and headed up to the col to ski across the subsidiary ice-cap. The weather was not good; it was snowing lightly and visibility was down to 100 metres. Ski-ing in such a near white out on an unknown terrain and fearing of breaking through a crevasse bridge certainly made me nervous. You just could not ski in a straight line and you had to rely on the people behind you to correct your bearing. After about seven miles of this frustrating sledging another camp was made because crevasses could be seen on either side and it was difficult to judge their size and distance away. Anyway, we would shortly be coming to a point where this ice-dome meets the main ice-cap and a turmoil of crevasses would need to be negotiated. We preferred to do this in better visibility so we investigated the route unladen, carrying only light rucksacks.

The route was not as bad as what we anticipated; large crevasses were there but a route could easily be picked between them, albeit a steep one. At long last the weather improved; the low cloud lifted, patches of blue sky got larger and spectacular views of the mountains to the north of Lindenows fjord could be seen. Our spirits were now rising; the initial loss of one member and the days of bad weather soon gave way to our enthusiasm to strive and succeed. The isolation and the pristine snow, with majestic peaks as far as the eye could see does tend to give you a sense of fulfilment. Your eyes are wide open trying to savour every bit of scenery and your lungs burn with the cold but unpolluted air. You use your whole body to pull the sledge upwards, with neck straining and your arms pushing you along as your skis grip the snow.

On the 13th August we woke at 7:00am but by the time we melted ice for brews and porridge we did not set off sledging until about 10:00am. There was a slight breeze coming from the north east but apart from that it was nearly clear skies. The views just unfolded as we progressed mile after mile. Trident (2481m) came into view and then Igdlorssuit Qaqat (2292m) some 28 miles to the south east. It was absolutely fantastic! The sledging was very good, but after mid-day the snow began to deteriorate. We encountered a few sastrugi but they were only a few inches high. All day we headed for peak 2175m, and hour after hour it did not seem to be getting any closer. It was a hard day and we eventually stopped at 6:00pm close to peak 1930m.

The next day we did not travel that far. Peak 2175m stood before us and after a democratic decision we decided to try to climb it. By the time we packed a rucksack ready for the climb and skied to the base of the mountain it was after mid-day and the snow was a bit soft. Andy led off first and had to negotiate a bergschrund on the steep slope. The snow did not hold an ice-axe belay well, so I joined two ropes together, giving him enough length to get to a rocky stance. I followed next but the ice was just shattering into pebble size pieces, so I had to kick deep steps to move upwards. Andrew in the meantime noticed that the snow conditions were getting much worse so he investigated the rocky outcrop to our right. Despite the rock looking a bit loose in places, he picked out a route and thought it was a goer. Andy and I decided to give up on this slope and down climb back to where Martin was sitting.

Phil in the meantime roped up with Andrew and were getting to grips with the rocky buttress. Trying to do a rockclimb with a roped party of three takes a lot longer than a rope of two, so I decided to opt out and give Andy and Martin a better chance of getting to the top before the sun went down. After sitting watching them for some time making good progress, I decided to ski back to where we left the pulks. The lads were of course successful in getting to the summit and they arrived back at the pulks at 5:30pm. We camped where we were.

Because of the poor skiing conditions we noticed after mid-day, we thought of bring our sledging day forward by two hours, giving us an advantage while the snow conditions were good. This was an excellent move; the skis and pulks now performed superbly and throughout the rest of the time on the ice-cap we followed this time regime. However, the only problem this now created was that the tent valances were frozen in place and we had to dig them out. Each tent suffered as a result, receiving many cuts and tears.

We decided to head for Peak 2511m, this being our outer limit and range in the now shortened time on the ice-cap. We got glimpses of this prominent peak when we had to gain height in this undulating terrain. The peak looked solid, standing proud of its surroundings and resembling a castle with a canopy of snow draping down from the centre tower to the ramparts. Its shape was symmetrical in nature and we all knew that we had to climb it. It was just too good to miss.

However we lost a lot of height as we skied down a glacier to this peak; so much so that instead of snow falling that evening, it turned to rain. But the temperature did drop in the early hours of the morning, to turn the rain into ice and by breakfast the tents were covered in an icy shell. Although by now we could predict the weather pattern, it seemed to be changing so quickly that we were somewhat cautious. We wanted so much to climb this peak that we knew we had to be quick, because a frontal system was on its way with associated bad weather.

We woke at 3:30am on Thursday 17th August to find the mountain clear of cloud but with wisps of spindrift coming off the summit; a sure sign of strong winds up there. We arrived at the base of the mountain just before 6:00am and in no time at all set off ice climbing up the lower ramparts of the mountain. So much was our eagerness to get up the mountain that we did not bother roping up, but then wisdom prevailed and we climbed in a roped party of two and three. The first obvious section was soon climbed by gaining a distinct shoulder, but from here a traverse had to be made across a snow bowl. The sides of the bowl were not steep but extreme caution had to be exercised as crevasses were evident below, and beyond that a 1000 foot drop to a glacier that flows into Patussoq fjord. A steep section of ice climbing of some 150 feet led to the summit ridge. From here we ascended roped up; it was not of a difficult standard, merely a long and steady plod to the summit. We were successful in gaining the summit; the views were spectacular and the vastness of the Greenland ice-cap was soon appreciated. The ice-cap lies unbroken for some 1500 miles to the north to Peary land on the edge of the Arctic ocean.

Our outer limit was now reached due to time restraints and we would have to return to Tasermiut fjord. At the time we all felt that we could have continued across the ice-cap to the airport, but we had made the necessary arrangements and a boat would be coming to collect us from our previous base camp. We were making good time sledging back, so we decided to explore an area around Peak 2481m, called Trident. When I was in this part of Greenland in 1986, some miles to the south, I could see this peak and was always intrigued by it and wanted to have a closer look. It was called Trident probably for two reasons; it was distinctly pyramidal and it had three separate summits. A lovely mountain to climb but we just did not have the time.

Our previous tracks and camps could still be seen, a comforting thought if we had to ski in another white out back to the col camp. The glacier between the shelter stone and the top dump was now quite different. All the winter snow had melted revealing deep ice runnels that made sledging difficult. The sledges did not now run smooth, but crashed against the ice causing a significant amount of wear in those two hours than the whole of the previous 14 days.

We camped at the shelter stone for one night, mainly to rest but also it was Andrew's birthday and we wanted to celebrate. Unknown to him, I had carried all the way some party hats and candles and the rest of the lads kept their miniature bottles of liquers from the flight to Narssarssuaq. What a feast we had that evening, because Brian's food had been left here for our return. The only disappointment is that the booze ran out far too quickly.

Although sensing that the expedition was soon to be over we still had the task of cleaning up after us, to remove all of our equipment from the glacier and to take it down back to base camp. The hardest job was to get the sledges down the scramble close to the waterfall. The sledges were over six feet long and it was difficult enough to get them up here let alone getting them back down. Rather than doing this individually as we did on the way up, we decided to lash two or three of them together and with a team effort and the help of a rope, we got them safely down the waterfall without any further damage.

It was now Saturday 26th August and in two days time a boat would be collecting us from base camp. We had been ferrying equipment from the shelter stone to the screens just above base camp, and that evening after I had deposited a rucksack full of belongings I was sitting and resting when I saw a lone walker. I could not believe it at first, but then this is a popular fjord and walking parties could be met. The person was having some difficulty in crossing the river and then I noticed the person had an awfully familiar style of walking, let alone the same coloured cagoule. I sat watching for about 30 minutes and then the person noticed me and changed direction to come my way.

I just could not believe it; it was Brian! I assumed that after recuperating he would probably go home, but it was not to be. After a week in Nanortalik he joined the expedition that had come to our rescue and they had plenty of surplus food to feed him. After a short time with them, they were about to depart and so Brian went on a solitary five day hike, intending to meet us again at base camp. Later that evening the expedition was complete again and we caught up with what happened to Brian, and equally he was eager to know of our success.

The British South East Greenland Expedition 1989 was partially successful in achieving some of its aims, in view of the fact that the expedition was down to five people and over ten days were lost due to the rescue operation and bad weather. The expedition could have easily been terminated before it had really begun. It certainly would have been finished if Brian had developed appendicitis two days later when we would have been on the ice-cap. The distress beacon would definitely have been switched on and eventually a helicopter would come to our assistance.

"Ode to a Mozzy" by Martin Dowson

Dedicated to the makers of "Jungle Formula" and to the hundreds of mosquitoes that died in that week of misery in Mozzy Valley.

"Oh to be a mozzy with naught to do all day,
But laze around amongst the scrub and while the time away.
Of shelter there is plenty in Mozzy Valley's shade,
Away from wind and weather's might, the mozzy's home is made.

But what's this noise approaching? A human being is near,
A laden sack on straining joints and a sweating brow appear.
Take pity on this wanderer of aspiring heights he seeks,
He means not harm as he passes by to reach those jagged peaks.

But sweat and noise and movement signify just one thing,
To a mozzy it's a bag of blood waiting for the sting.
So up they swarm as in one mind to achieve their deadly deeds,
Ignoring swats and repellent spray to cater for their needs.

So what shall be the choicest cut for the mozzy's probing jaws?
The eyes, ears, nose and mouth are equally welcoming doors.
Or is it that stretch of back your arm can never reach.
That allows a feast for thousands, of a dozen cc's each?"



Martin by cairn above Nanortalik

A Walk on the Wild Side by Brian Hull

Background

After my successful appendix operation, I was fortunate enough to be able to continue my stay in Greenland as guest of the Earthquest expedition, at their base camp in Uiluit kua valley off Tasermit fjord.

On Wednesday 23rd August, Earthquest were due to leave their base camp, so I planned a walk starting from Uiluit Kua that would occupy me the next four or five days, until I could meet up with the lads from our expedition and sail out with them on the 29th August.

This four day battle with nature described below took me up Uiluit kua, down Tupaussat, along Qinguadalen, along the northern shore of Taserssuaq and up the eastern shore of Tasermit fjord to the BSEGE base camp at Sermitsiaq.

Day 1 Wednesday 23rd

After saying farewell to my many new friends at the Earthquest camp, I made my way up the now familiar, and sad to say, well trodden looking path in the Uiluit kua valley. A spell of dry weather had for the first time made this incredibly boggy area of a classic U-shaped glacial valley navigable with dry feet. Keeping to an area where the marsh of the valley floor ends and the scrub of the hillside begins, seems to be a useful and quickly learned rule of thumb for walks in Greenland's valleys. In this instance, the north side of the river being best.

Some three hours of walking saw me leaving Uiluit kua by the only way open to the walker, over the col between peaks 1720m and 1800m. This reveals a new world of no scrub, no bogs and easy walking. The outlet from the small lake first down from the col proved suitable for a lunch break.

From here followed a one and a half hour long glaciologists dream. Examples of erratic boulders by the thousand, hanging glaciers, scratched bedrock, and plucking and friction cracks, made this section to the next large lake all too short.

Walking along the side of this lake, the beach started with nice shingle, but after about one hour developed into a scree and boulder field that served as a natural dam to form the lake, but an unnatural barrier to the human walker. Huge boulders proved both tiresome and dangerous to cross; a slip downwards would send you on a one way potholing trip! A particularly heavy sack and wet lichenous rock would make this a serious area.

Just downstream of the dam, I chose a gravel area on a meander of the river as my bivvy site. Being typical of most areas in these valleys, the ground was strewn with delicious Arctic Blueberry and Wimberries; the former being less common but far nicer. Earlier in the week, Arctic Blueberry pancakes had proved a real treat, and now served as a delightful topping to my rations.

The mosquitoes had dwindled in numbers as August wore on, but were replaced by equally irritating small black flies. However, on these clear hot days, half an hour after the sun drops below the ridge, the fall in temperature forces them to retire. Though ice lay on my bivvy bag by 7:30 pm, the temperature fell little below freezing throughout the night.

Day 2 Thursday 24th

Up and straight off by 8:00am, the direct heat of the sun and the flies soon followed. Whilst stationary, I find the flies unbearable and so had to seek the shelter to eat my late breakfast.

I stopped on the south side of the Drepanocladus dam, as marked on the map. This natural dam appeared to be a smaller version of that crossed yesterday, though Phil assures me the word Drepanocladus is some type of moss. Shelter stones are in abundance on this walk and so dry bivvy sites could be found in the wettest of weather. This particularly fine example was about as large as a ten storey block of flats, with room underneath for a party.

The penance of my travelling lightweight meant that I had no stove and had to eat my muesli from a plastic bag with a lid as a spoon, still at least I was out of reach from the mossies.

On down to sea level at the shore of Kangikitsoq fjord, then turn right and head up to the col between peaks 1340m and 1730m. This height gain of about 500m was most pleasant along a fast flowing glacial meltwater stream cascading over rocks, complemented by glimpses of an Arctic Hare grazing on the upper hillsides. Attainment of the col deserved a lunch break.

From the col rounding a lengthy corner gradually reveals the wonders of the upper reaches of Qinguadalen valley, each valley seeming another world from the one before. Receding glaciers and fine examples of scree formations feed the start of the river, easily crossed at this upper stage (not the case lower down!). When the walking is easy, as here, one cannot help wondering what price you will have to pay in the form of harsh terrain further down the valley.

In this respect, Qinguadalen does not disappoint; the boulders gradually get larger and more arduous to pick a route through, but the going is relatively pleasant until at about the 200m countour line, when Greenland's highest forest begins. At this point I again bivvied on the river shingle and left the forest until tomorrow.

Day 3 Friday 25th

Off by 7:30am, having had breakfast before the flies got up and prepared for the battle with the scrub.

Maybe it is my imagination that makes every new area of scrub, scree or boulders seem worse than that which you have endured before, but feeling by this stage somewhat of an authority on the delights of Greenland's valleys, I certainly agree with this being the highest. Willow trees two to three times my height can be seen; the more usual Birch scrub being waist to head height and quite impassable when at its most dense.

Three and a half hours of carefully picking routes and battling with scrub when I had to, got me to the north shore of Taserssuaq lake by 11:00am.

From here my greatest fears of the walk gradually subsided as from the map, being able to walk around peak 1600m at shore level looked doubtful due to the steep sides of the mountain. A further two hours of knee wrecking boulder hopping, scree clambering and bouldering around, through or over (whichever proved the easier) rock falls from the flanks of the mountains above (rather like continuous Cromlech boulders) where rewarded in lunch and sunbathing on a perfect beach, from where the going looked very straightforward.

Initially confused as to the origin of large animal tracks, I eventually realised the sheep from the nearby Taserssuaq farm had worn paths in the ground. Following such tracks seemed sheer bliss and I soon got to respect the time honoured paths as the easiest way forward, anything that seemed like a possible shortcut being stopped at some impassable boulder or waterfall etc.

Progress to the shores of Tasermiut fjord was so quick and easy, I continued on tracks all the way to reach my bivvy site at Qoromiut in three and a half hours from dinner.

Day 4 Saturday 26th

Straightforward walking along the eastern shore of Tasermiut fjord was broken only by three river crossings, no more than knee deep. Six and a half hours of walking saw me sat at Uiluit kua, the now abandoned site of Earthquest base camp. My intention to walk on and reach Sermitsiaq put me ahead of schedule which allowed me to tuck into day five's food goodies which I had stashed here before I set off four days ago. From Uiluit kua, the three and a half hours walk to Sermitsiaq consisted of shingle beaches up to the next valley. This river is best crossed at low tide on the braided beach, which gradually gave way to more awkward greasy slabs (crossed high above) and more boulders.

The river just before Sermitsiaq was the most difficult to cross, but was never more than knee deep. Unknown to myself, this last crossing was observed by Les who, despite me wearing our uniform cagoules, could hardly believe it to be me. That evening was a reunion with the rest of the lads, all of which where surprised as they presumed me to be back in England. The next two days were spent carrying down everything I originally carried up to the shelter stone, which I had never used.

In recollection, I would advise anyone undertaking a walk through Greenland's valleys in this area to :-

- Allow sufficient time, thereby eliminating the feeling of having to make desperate progress through relentless scrub and boulders, where "stupid" but serious accidents could occur.
- Take close fitting normal, ie not Yeti, type gaiters to protect the shins and clothing from scrub. Yeti's would be de-randed in a single day on the rocks.
- Take mossie nets and repellent.
- You can get by with only bivvy bags if inclined to do so because of all the shelter stones.
- Avoid periods when the rivers are at full height. This would make many otherwise placid crossings most treacherous and even progress along rivers would be difficult because of marshy areas.

- Rain would mean wet slippery lichen, again making the boulders a real problem.
- Use of standard ferry's from Nanortalik to Augpilagtoq and Tasiussaq, as well as the stores in these villages, makes it possible to implement a cheap, lengthy, lightweight walk in this remote area.
- Easier or standard routes are apparently possible along the south side of Taserssuaq lake and on the south east side of Qinguadalen river.



Andrew, Les, Martin & Phil through the crevasse zone between subsidiary and main ice-cap

Meteorological Report by Martin Dowson

These notes are not meant as a comprehensive meteorological report of the expedition, but purely as an indication of the conditions met during the four weeks away from populated areas. Hopefully they will be useful as a guide to any future expedition in this region.

The tables show measured temperature and approximate wind speed at three times during the day - usually at local times between 7 - 9am (breaking camp), 12 - 2pm (lunch) and between 7 - 9pm (before retiring). Due to the varying location of observation, the approximate height of the camps have been noted. Times when readings were not taken have been left blank.

The temperatures were recorded (until August 15th) on a spirit thermometer (range -40°C to 30°C) mounted on a wooden holder. The graduations were coarse and are thus quoted to the nearest degree Celcius. This thermometer was broken on the 15th August and thereafter a whirling hygrometer, using wet and dry bulb thermometers was used. This could be read accurately to the nearest half degree. Only the dry bulb is quoted. Unfortunately the minimum reading on the scale was -5°C , so temperatures recorded below this are approximate.

As a rough guide, average temperatures taken from the daily readings are calculated to the nearest 0.5°C as follows:-

Base camp, Tasermiut fjord	9.5°C (vegetated area)
Top dump camp	4.5°C (snow line)
Col camp	1.0°C (glaciated mountains)
Ice-cap camps	-0.5°C (snowfield/glaciated terrain)
Shelter stone to base camp	9.0°C (vegetated valley)

These basically show the drop in temperature as height is gained and as snow and ice cover increases. On the ice-cap, the minimum recorded temperature was approximately -7°C (early morning) and a maximum of $+6^{\circ}\text{C}$ (midday). It is expected that the night time temperatures were falling at least one or two degrees Celcius below those of the early morning temperatures.

Occasional humidity temperatures were taken on the ice-cap, showing that the relative humidity lay between 55 - 75% on the clear "dry" days and between 85 - 100% during misty conditions or precipitation.

Wind speed was measured using a very simple anemometer. The quoted speeds are very approximate due to the often gusty nature of the wind. Directions are not quoted due to the influence of the mountain and immediate local terrain. Strongest and most consistent winds were experienced at the head of glaciers leading to fjords or coastline where winds were channelled up or down the narrowing valleys. For example, winds sweeping up to the col camp from Lindenows Fjord or past camp 6 down the glacier to Patussoq fjord. Wind in the more open areas seemed in general to be from the west and northwest. The maximum wind speed experienced at any of the camps was 30 - 35 knots.

"Forecasting". The approach of fronts was relatively easily recognised and the weather for later in the day or for the following day could often be predicted with reasonable confidence. This was obviously not always the case, however, and a simple barometer would have been sufficient to have clarified the situation.

The regular passage of frontal systems seemed to be a feature of the summer; the residents of Nanortalik relating it to be the poorest summer weather-wise for a number of years - a result no doubt of the excellent summer in the UK. The region's usually settled summer weather was replaced by systems bringing two or three days of cloud with one or two days respite in between, possibly due to the more northward tracking of depressions this year.

Conditions then were more varied than expected from our last experience in 1986, but on the ice-cap it was cool and dry enough to avoid slushy snow. Radiative heating on the sunny days was the major contributor to soft conditions, slowing sledging down a little and allowing the tent valances to freeze in overnight.



Sorting out food rations at base camp

Date	Location	Temperature (°C)			Wind Speed (Knots)			Comments
		AM	Noon	PM	AM	Noon	PM	
27 Jul	base camp	-	13	9		0-3	0-3	Overcast. Showers in am.
28		8	9	7	0	5	0-3	Intermittent drizzle. Clearing by pm.
29		10	-	9	0	5-10	0	Minimal cloud. "Hot and sunny". Clouding over in pm.
30		11	-	-	-	10-15	-	Intermittent moderate rain.
31		-	11	8		5	10	No record.
1 Aug	base camp	8	13	5	0	0	0	Stratus round peaks and in higher valleys. Clearing in pm.
2	top dump	-	4	4	0	0	0	Distinct layer of haze @2000' below cloud layer. Cleared to 0 octas cloud. Faint aurora 11:30LT.
								0 octas cloud.
3		4	10	5	0	0	0	Moderate continuous rain. mid am onwards. 8 octas stratocumulus.
4		4	4	4	20	20	20	Bright. 4 octas cirrus not thickening.
5		2	3	3	10	10	10-15	Light intermittent snow mid am onwards. 8 octas alto cumulus. Stratus
6	top dump	-	5	-	-	3	-	round peaks. Snow continuous after 1800LT.
7	col (1500m)	1	2	-1	0-3	3-5	10-15	Light continuous snow and drifting snow. Vis 0.25 < 0.5 mile. Cleared with passage of front (?) 2000LT.
								0 octas cloud.
8	col (1500m)	1	3	-4	5-15	10	0	Bright. Some broken altocumulus thickening and dropping. Snow and
9	col (1500m)	0	3	-	0	20+	(20+est)	drift by afternoon onwards (Vis < 0.25mile).
	col (1500m)							8/8 cloud. Continuous light snow from this altocumulus noon onwards
10		-	3	-	0	0	0	(Vis < 0.5 mile).
	camp1 (1600m)							Light continuous snow (Vis < 1 mile). Intermittent light snow with
11	camp2 (1600m)	1	6	0	0-3	0-3	-	sunny intervals in afternoon.
12	camp3 (1600m)	1	3	-	0-3	3-5	-	7 octas altocumulus. Sunny intervals. Light intermittent snow after
	camp4 (1850m)							1400LT (Vis < 1.5mile)
13	camp4 (1850m)	1	2	-6	5-10	5-10	0	7 octas altocumulus. Cleared to 3 octas altocumulus and cirrostratus.
14	camp5 (1900m)	0	-	-5	5-10	5-10	0	0 octas cloud
15	camp6 (1700m)	3	5.5	1.5	0	0	5	0 octas cloud. Rapidly approaching front from morning onwards. Rain at
16	camp6 (1700m)	3.5	1.5	-2	10	10-15	25-30	1830LT (Light turning to moderate rain). Rain stopped 0600LT. 3 octas broken altocumulus in morning. 2 octas
17	camp6 (1700m)	0.5	-	1.5	0-5	0-5	0-5	cirrocumulus and altocumulus in afternoon. Drift snow and some blowing
18	camp7 (1850m)	2	1	-0.5	10-15	20-25	0-5	snow in early evening (Passage of front?). 3-4 octas altocumulus drifting over throughout day. Not developing.
19	camp8 (1800m)	-3	-1	--2	0	0-3	0-3	Gusty winds building progressively with day. Suddenly calmed at
20	camp8 (1800m)	-	1	--5	0-3	0-5	5-15	1700LT. Lenticular altocumulus and arographic cloud. 3 octas total
21	camp9 (1600m)	-4	-3	--6	10-15	10-15	5-10	cloud cover. Cloud sitting over ice-cap away from coast.
22	camp10 (1600m)	-7	0	--4	5	0-3	0-3	Fog and light snow. Visibility < 0.25 mile, clearing to 2-3 miles
23	col (1500m)	1	4	0	0-5	0	0-3	occasionally.
24	col (1500m)	-1	-	-2	10-15	-	0-5	Continuous snow all day. Visibility < 200m until 1500LT. Clear by 7pm.
25	shelter stone (500m)	0	4	8	0-5	0-3	5-10	3 octas altocumulus. Drift snow in evening.
26	the arches, mozzy valley (150m)	9	-	-	-	5-10	10-15	2 octas altocumulus. Cloud down on ice-cap away from coast. Drift
27	the arches, mozzy valley (150m)	14	-	10	5-10	5-10	5-10	snow.
28	base camp (0m)	10	-	-	0-3	-	-	Heavy frost overnight. 1 octa cloud. 2000LT Cirrus and altocumulus



Above col camp between Peaks 1940m & 2029m looking south



Andrew & Les at camp 2 on subsidiary ice-cap

1) Background

The potential for injury, illness or fatality on an expedition such as ours is self evident. Clearly, minimising this danger involves making a reasonable prediction of conditions, terrain and degree of isolation to be encountered and planning accordingly. Other sections of this report detail the expedition's objectives and planning in other respects, while the following is a brief summary of considerations that influenced the planning of medical resources.

a) Terrain:- Crevasse danger particularly on routes on and off the ice-cap. Risk of avalanche rock fall or climbing falls during attempted peak ascents.

b) Climate:- Extreme cold not anticipated (though obvious need for precautions against hypothermia and frost bite). Bulk of expedition on snow and ice risk of sunburn and snow blindness.

c) Activities:- Prolonged physical exertion over rough ground with heavy loads - likelihood of minor trauma including sprains, muscle tears, cuts, blisters, etc.

d) Communication and support:- The single greatest consideration - up to five weeks without radio or other contact with the outside world, with reliance upon a radio distress beacon should an emergency arise. Serious casualties would need to be stabilised and cared for until rescue services arrived; less serious conditions would need to be treated using the expedition's own resources.

2) Preparation

Objectives in preparation were:-

a) to ensure adequate paramedical expertise among team members.

b) to prepare a medical kit suitable to the needs of the expedition.

a) Expertise:- Of the six team members, one was medically qualified with some experience of casualty work. All other members had received some previous first-aid training. One had been a member of a mountain rescue team; two members had attended a first-aid course run by the British Antarctic Survey; two had learnt first-aid as part of mountain leadership courses.

The team as a whole would clearly need a degree of confidence in managing the continuing care of patients beyond the boundaries of what is normally considered "first-aid", to thus ensure as much collective expertise as possible.

i) Several members attended an extended first-aid training weekend in Aberdeen, organised by the Robert Gordon's Institute of Technology specifically for our expedition.

ii) Two copies of "Medical Handbook for Mountaineers" by Peter Steele were carried on the ice-cap, along with information sheets that were prepared for the expedition. These covered the basic treatment of common emergencies and the specific uses of the drugs and equipment in our medical kit.

b) Drugs and Equipment:-

i) Sources:- the bulk of the necessary drugs were obtained through the Pharmacy Department of the West Cornwall Hospital, Penzance, though some patented drugs were obtained directly via the sponsorship of individual companies (listed at the end of this section). Other medical supplies were put together with the help of two high street chemists in Penzance and Hayle, Cornwall, both of whom gave us a discount. A set of inflatable splints was lent to us by the Cornwall and Isles of Scilly Ambulance Service and Wasdale Mountain Rescue Team. Full acknowledgements appear at the end of this section.

ii) Legal considerations:- Diamorphine is a Class A controlled drug, and as such it is covered by strict regulations regarding its use and carriage across customs barriers. As a qualified medical practitioner, I was able to buy a limited quantity of the drug from a hospital pharmacy, with the signature of a senior member of the medical staff to authorise its dispensation. Permission to carry a named quantity of Diamorphine through customs in the UK on outward and return journeys was granted by the Home Office Drugs Branch in London. A less formal letter of approval was obtained from the Medicines Division of the National Board of Health in Denmark, allowing us to carry Diamorphine in and out of Greenland.

iii) The medical kit:- As with all other equipment, the difficulty was not in deciding what to take, but what to leave behind. Non-essential weight was to be avoided, so the medical kit had to be comprehensive but small - not an easy combination. Furthermore, for safety and convenience in the event of the expedition splitting into two groups at an early stage, it was decided to divide supplies into one medical kit between two sledges, or at each strategic point on the ferrying route between the fjord and the ice-cap. As a consequence, the overall weight of medical supplies was considerably increased as items had to be duplicated to provide three complete sets. Each full box weighed approximately 2kg, and the contents were as follows:-

Medical Supplies per Box (3 boxes)

<u>Item</u>	<u>Quantity</u>
wool balls x 5	2
gauze pieces	1pkt
melolin dressing 10 x 10cm	3
melolin dressing 5 x 5cm	2
dressing pad 20 x 10 cm	2
dressing pad 20 x 20cm	2
elastoplast strip, fabric, 1m	1
" " , waterproof 1m	1
assorted fabric plasters	1
eye pad	1
adhesive elastic bandages	1
adhesive waterproof bandage	1
light bandage 10cm x 4m	2
cotton bandage 190cm x 4.5m	2
cotton bandage 7.5 x 4.5m	1
cotton bandage 5cm x 4.5m	1
steristrips/ skin closures (x3)	9
suture 2/0	1
suture 3/0	2
suture 5/0	1
scalpel blade	1
scissors	1
safety pins, assorted	16

cotton wool buds	18
sterile gloves	1pr
tubigrip (short)	1pr
knee arthropad	1
savlon sachet	1
airway	1
green venflon	2
syringe 5ml	3
green needles	3
forceps	1
vaseline tubes	2
fabric plaster tape	1
durapore tape	1
calamine cream	150ml
zinc ointment 25g	2
paracetamol 0.5g	35tabs
soluble aspirin 300mg	30tabs
ibuprofen 200mg	16tabs
dihydrocodeine 30mg	36tabs
diamorphine 5mg	5amps
temgesic (buprenorphine) 0.2mg	6tabs
naloxone 0.4mg	2amps
amoxycillin 250mg	25tabs
flucloxacillin 250mg	25tabs
metronidazole 200mg	25tabs
chloromycetin 200mg	25tabs
predsol-n ear drops	1tube
[clotrimazole powder 1%	1tube each-carried individually]
piriton 10mg in 1ml	2amps
adrenaline 1:1000 1ml	2amps
metoclopramide 10mg im/iv	3amps
metoclopramide 10mg oral	20tabs
lignocaine 2%	1 x 20ml amp
diazemuls 10mg in 2ml	3amps
amethocaine 1% eye drops	6pods
codeine phosphate 30mg	10tabs
gaviscon	20tabs
flamazine cream	1tube

In addition to the above list, one kit contained the following:-

cephradine iv	1g x 4
metronidazole suppositories	1g x 6
iv giving set	1

Two units of Haemaccel plasma expander were packed with this to be used in shock.

3) On the Expedition

a) Medical Problems:- With one notable exception, the expedition members escaped anything more serious than indigestion, sunburn, blisters, cracked lips, grazes, perineal irritation (the polite term) and one troublesome achilles tendon. However, the exception was an important and very unfortunate one. Five days following arrival at temporary base camp, the day of our planned departure for the ice-cap one member of the team developed severe abdominal pain, with a history and physical signs strongly suggestive of acute appendicitis. A total of 15mg diamorphine iv (5mg x 3, with metoclopramide) was used for pain control during evacuation to Nanortalik, where the offending appendix was removed approximately 18 hours after the onset of symptoms and 10 - 12 hours after the diagnosis was made.

5) Acknowledgements

We would like to thank the following for their help in providing training, advice and supplies for the expedition:-

Professor Nelson Norman, Dr Phil Hormbrey & Dr A Milne
Robert Gordon's Institute of Technology Survival Centre
King Street
Aberdeen

Elaine and the Pharmacy Staff
West Cornwall Hospital
Penzance
Cornwall

Ambulance Service
Cornwall and Isles of Scilly Health Authority
Royal Cornwall Hospital (Treliske)
Truro
Cornwall

Mr Derek Robinson, Boehringer Ingelheim Ltd

Smith and Nephew Pharmaceuticals Ltd

Bayer UK Ltd. Pharmaceutical Business Group

RL Hamer, Commercial Dispensing Chemist, Penzance

Mr Bill Paterson, Wasdale Mountain Rescue Team, Cumbria

6) Useful Addresses

Home Office Drugs Branch
Queen Anne's Gate
London SW1H 9AT

Medicines Division
National Board of Health
378 Frederikssundsvej
DK-2700 Bronshoj
Denmark

General Medical Council
44 Hallam Street
London
W1

Introduction

Recent (unpublished) work by British Antarctic Survey personnel has investigated renal and endocrine adaptations to prolonged activity in cold conditions and the relevance of these to observed changes in fluid balance in healthy subjects. Previous studies have related cold exposure to increased secretion of adrenal corticosteroids, catecholamines and electrolysis as well as to increased urine flow rates (2). The British South East Greenland Expedition, as originally planned, was predicted to involve a period of approximately five weeks man-hauling sledges in a cold environment at a roughly constant level of daily activity, and with little variation in dietary and fluid intake. It was proposed that this would provide a relatively simple context in which to measure variables related to body fluid balance. A study was thus devised in cooperation with the Robert Gordon's Institute in Aberdeen.

Aim

To determine whether in total, the activities and environment of the expedition were associated with:

- i) alteration in total body fluid volume,
- ii) alteration in intravascular fluid volume,
- iii) significant weight change.

Fourthly, where a change in body weight was recorded immediately following return from the ice-cap, serial measurements would subsequently be made to observe the speed with which body weight returned to its pre-expedition value, thus indicating the possible relevance or otherwise of body water content in this process.

Method

I: Identification of Net Alteration in Weight.

All subjects to be weighed daily for seven days prior to and following the expedition, including measurements within 24 hours of embarking from the final settlement to Tasermiut fjord, and immediately upon descent from the ice-cap.

II: Measurement of Intra and Extra Vascular Fluid Volumes.

These to be calculated from measurements in each subject of:

- a) Total Body Water (TBW) assessed using a deuterium oxide dilution method.
- b) Intravascular Fluid Volume (IFV) calculated by Evans Blue Colorimetric method.

TBW and IFV to be carried out within 24 hours of departure from settlement and immediately upon return. Details of the method for each of these assays is given at the end of this report (see Appendix)

III: Daily Assessment of Fluid Balance.

To be calculated from measured fluid and urine output (collected in a graduated jug and discarded). Insensible losses to be estimated.

IV: Assessment of Activity, Environment and Subjective Factors.

In order to provide a context in which to view emergent data, recordings to be made daily of:

a) Environmental conditions:

- i) wind speed,
- ii) humidity,
- iii) temperature.

b) Type of activity, entered onto chart by scoring for each hour of the day as follows:-

activity score:

sleep	1
relaxing in tent	2
working in tent	3
relaxing outside	4
working outside	5
climbing	6
sledging	7

c) Subjective recordings of:-

- i) thirst,)
- ii) hunger,)- rated on a scale 1 - 10
- iii) warmth.)

d) Subjects

Six man expedition team, aged 24 - 32 years.

e) Experimental conditions

Man-hauling sledges and mountaineering on the Southern Greenland ice-cap, July - August 1989.

f) Results

(sub-divisions refer to those listed under "method")

- I: insufficient accurate data.
- II: insufficient data for TBW; measurement of IFV not possible.
- III: insufficient data.
- IV: a) data listed in general report. See discussion below.

- b) desired test conditions achieved for total of 33 days by three team members only (one member excluded due to illness; two members experienced one week interruption of activity) activity level over this period.

Day	Score	Day	Score	Day	Score
1	68	12	62	23	83
2	78	13	47	24	82
3	75	14	57	25	62
4	80	15	55	26	58
5	58	16	71	27	74
6	57	17	69	28	77
7	82	18	74	29	61
8	84	19	82	30	54
9	74	10	71	31	70
10	48	21	70	32	81
11	70	22	57	33	60

average score = 68.2, median = 65.5 (range 47 - 84)

g) Discussion

Potential flaws and inaccuracies in the study were identified at an early stage. The small sample size, unpredictability of conditions to be encountered, the large number of physiological and environmental variables and the lack of adequate experimental controls, all limit the usefulness of data. Samples and recordings were necessarily simple, and thus precluded assays which might have provided more relevant information. Furthermore, the study had to be designed around an expedition, rather than vice-versa; standardisation and comparison of the results with those of other studies is consequently more difficult.

These possible pit-falls, although identifiable prior to the collection of data, did not seem prohibitive. It was anticipated that despite obvious limitations, any significant results would be a useful addition to other work in this area.

In the event, several more fundamental factors led to the eventual failure of the study to produce useable data. These are itemised as follows, again sub-divided as in the "method" above.

I: Identification of Net Alteration in Weight.

i) Daily weights pre-expedition: The four days immediately prior to arrival at temporary base camp (designated start of study conditions) involved travelling from Britain via Iceland to Greenland. Weights were of necessity measured on each occasion on a different set of scales. These presumably varied considerably in accuracy and calibration, thereby limiting interpretation of small differences between individual results.

ii) Daily weights post expedition: The four days prior to the first post-expedition weigh in, consisted of load carrying below snow level. Temperature (air), physical activity, food and fluid consumption during this time have differed markedly from that of the sledge hauling section of the expedition, and the final 36 hours were mainly spent relaxing. Again, a different set of scales had to be used and there is no doubt that these differed markedly in accuracy and calibration from those used previously.

II: Measurement of Intra and Extra Vascular Fluid Volumes.

i) Total Body Water Estimation: Pre-expedition assays were successfully carried out and samples were stored. On return from the ice-cap to Nanortalik, all deuterium oxide samples and venesection equipment had been sent inadvertently with our crates to Narssarssuaq, and so the second (crucial) assay could not be carried out.

ii) Intravascular Fluid Volume: Attempts to obtain samples of Evans Blue Dye for this assay were met late in the day by news that it had been recently withdrawn from the market, following reports of carcinogenicity. A substitute for the assay was not available, and so measurement of this variable had to be abandoned.

III: Daily Assessment of Fluid Balance.

i) Fluid intake: For 17 days on the ice-cap, daily fluid intake was fairly consistent at approximately four litres per person. Fluid intake before and after this was more variable as a result of the more ready availability of drinking water from streams etc, below the ice-cap.

ii) Measurement of urine output proved impractical; given that insensible losses during hard physical exertion account for a considerable proportion of total fluid output, and that these losses could not be calculated, knowledge of fluid intake and urine output alone would not provide an adequate means of identifying net positive or negative balance. Measurement of urine output was eventually abandoned.

IV: Assessment of Activity, Environment and Subjective Factors.

i) Daily recordings were made of temperature, wind speed and humidity and these are recorded elsewhere in the expedition report. Although snowfall and cloud cover were greater than had been predicted, temperatures were much as expected, hovering from 0 - 5 C during most days and dipping below freezing at night.

ii) Subjective recordings of thirst, hunger and warmth were abandoned early in the expedition, since they varied so enormously from one point in the day to the next, and then were usually remedied before being recorded.

iii) Recording of activity level was more straightforward, although in the event, the headings used did not always effectively describe activities engaged in (eg load carrying from base camp would involve an expenditure of effort probably comparable with man-hauling and greater than that of other forms of mountaineering encountered).

iv) As so often happens the expedition, although partially successful, did not go as planned. Loss of one expedition member through illness meant that not only was he excluded from the study, but that two other members had to leave the expedition for one week, thus detracting from the value of data obtained thereafter.

v) The criteria that the study should take place in cold conditions over a prolonged period were not fully met. Air temperatures were comparatively warm; time on the ice-cap was less than had been anticipated, and daily activities varied significantly in level of energy expenditure.

Conclusion

This account reads like a catalogue of disasters, and clearly this is a study that failed. It is fair and realistic however to conclude on a more positive note. The planning and attempted realisation of this project was itself a learning process and one that may benefit the planning of similar works on expeditions to come.

Acknowledgements

Warm thanks to the following people and organisations that supported this aspect of the expedition:

Professor Nelson Norman, Dr Phil Hormbrey, Dr A Milne
Robert Gordon's Institute of Technology
Survival Centre
King Street
Aberdeen

The Staff
Nanortalik Clinic & Hospital
South Greenland

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Andrew, Martin, Andy & Phil resting.
Peak 2481m (Trident) in background.

Food Report by Phil Jumeau

The success of any expedition is largely dependent on a nourishing and satisfying diet. First, it provides the nutrients and the calories which drive the body through strenuous exercise. Second, the day's activities are largely structured around meal times and, just as the calories fuel the muscles, the prospect of a hot meal brings comfort to exhausted minds and bodies working under often inhospitable conditions. Because the expedition was initially conceived as a one way crossing of the southern ice-cap with no base camp or food depots for re-supplies, cutting down on weight and space were the prime objectives. In order to achieve this, potential sponsors were approached with specific food items in mind. These food items were selected on the basis of the following criteria:

Nutrition. Our diet was based on a calorific intake of approximately 4700 Kcals per man per day. To this end food items were chosen for their high calorific content to weight ratio. Because of the short duration of the expedition, vitamin and mineral deficiencies were not an anticipated problem. However, some expedition members chose to supplement their diet with multivitamin and iron tablets.

High weight:volume ratio. This factor was considered along with the calorific content to weight ratio. The form of packaging was often considered when choosing between alternatives. For example, Manley Ratcliffe sponsored the expedition with honey contained in plastic tubes as opposed to glass jars.

Food preparation. Where the food had to be cooked, this process had to be economical on fuel. For example, Mornflake Quick Oats which were provided by Morning Foods Ltd, best fulfilled this criteria. This porridge only needs to be boiled for one minute.

Variety. Each food item in the diet was carefully considered to ensure that, within the constraints discussed above, it would contribute to a varied diet. We are eternally grateful to Health and Diet Food Co Ltd, who kindly provided us with 26 varieties of cereal bars!

Packaging. It was decided early on in the planning of the expedition that all non-burnable food packaging would be brought back with us from the ice-cap to be disposed of in Narssarssuaq. Only the metal porridge tins could not be burned but, when empty, these doubled up as useful containers for biological collections.

Pre-expedition storage, packaging and distribution. All the food was stored in out-buildings at Brian's parents farm until the packing date. Only the pasta and rice, and fruit-drink crystals were divided in plastic bags in 100g and 75g portions respectively before packing into the crates. The 'Greenland' fruit-cake was sliced into 36 rectangular slabs and sealed in clingfilm. Superfluous packaging was removed from all the other food to save on weight and volume before packing into the crates. The unpacked food was distributed to members of the expedition on the beach near our temporary base camp in Tasermiut Fjord. For the first few days at base camp, all the cooking was done in pairs using contingency rations. After Brian's departure the cooking was carried out as a pair and a trio. The latter grouping prolonged cooking considerably. At base camp each member was responsible for packing his own sledge as he saw fit and the remainder five members adopted a different method of dividing and packing their food into rations. On the whole the food was divided into one-day or two-day ration bags. Brian devised a rather complicated system based on a 13 day cycle which he was never able to put to the test!

BSEGE man-day food rations and calorific content

<u>MEAL</u>	<u>QUANTITY (g)</u>	<u>ENERGY CONTENT (Kcals)</u>
BREAKFAST:		
porridge	100	400
drinking chocolate	20	70
dried milk	10	35
4 biscuits	50	180
margarine	30	220
honey	30	100
	-----	-----
TOTAL	240	1005
	-----	-----
AM BREAK:		
2 cereal bars	100	500
fruit drink	25	90
	-----	-----
TOTAL	125	590
	-----	-----
LUNCH:		
4 biscuits	50	180
margarine	30	220
2 cheesespreads	30	90
chocolate	75	400
fruit drink	25	90
	-----	-----
TOTAL	185	980
	-----	-----
PM BREAK:		
2 cereal bars	100	500
fruit drink	25	90
	-----	-----
TOTAL	100	590
	-----	-----
EVENING:		
rice or pasta	100	500
mince and onion	70	300
1/2 sachet soup	20	20
margarine	30	220
drinking chocolate	20	70
dried milk	10	35
Greenland cake	100	330
1/2 sachet custard	50	60
	-----	-----
TOTAL	400	1535
	-----	-----
DAILY TOTAL	1050g	4700Kcal

Food Quantities sent out to Greenland

<u>per man for 6 weeks</u>	<u>Total expedition quantity</u>
3 tubs margarine	48 tubs x 500g = 24.000kg
8 tubes honey	48 tubes x 220g = 10.560kg
126 sachets Ovaltine	400 sachets x 20g = 8.000kg
7 tins porridge	42 tins x 500g = 21.000kg
5-6 tubs dried milk	34 tubs x 283g = 9.622kg
42 pkts biscuit	252 pkts x 50g = 12.600kg
21 pkts rice	126 pkts x 100g = 12.600kg
21 pkts pasta	126 pkts x 100g = 12.600kg
21 sachets custard	120 sachets x 76g = 9.120kg
6 blocks fruit cake	36 blocks x 700g = 25.200kg
24 bars Scotbloc	144 bars x 300g = 43.200kg
84 sachets dried meat	504 sachets x 60g = 30.240kg
14 rounds cheese-spread	70 rounds x 100g = 7.000kg
14 sachets soup	84 sachets x 30g = 2.520kg
160 cereal bars	962 bars x 40g = 38.480kg
2 jars Vecon	12 jars x 113g = 1.356kg
50 bags drink crystals	300 bags x 75g = 22.500kg
selection of Swartz spices	
	Total food weight = 290.598kg

Notes and remarks

None of the expedition members showed any appreciable weight loss upon return from the ice-cap. On this basis it can be concluded that our calorific expenditure was balanced by our calorific intake. However, our anticipated metabolic requirements were not completely put to the test since our original travelling plan on the ice-cap had to be changed after Brian's illness. In addition, any weight lost during the sledging phase of the expedition may have been more than regained during the last few days upon return to base camp when surplus rations left behind at Top dump and the shelter stone were raided.

There is remarkably little information available on calorific requirements for sledging journeys. It would of course be difficult to standardise any such information, since the numbers of calories required per unit time of sledging are a function of a number of variables such as, the level of fitness and weight of the sledger, the weight of the sledge, the terrain, the snow conditions, the wind resistance and the intensity of sledging. The average basal metabolic requirement of a 160lb male is 1640 Kcals per day (Table 1). With six hours of sledging per day at an average of 7.5 Kcals expended per minute during moderate exercise (Table 2) our daily sledging requirement was going to be 2700 Kcals. Our total daily calorific requirement (basal + sledging) would be in the region of 4400 Kcals, or at least 1000 Kcals in excess of that of a "very active" person as prescribed by the DHSS (1979) (Table 3).

It must be stressed that this budget does not include those calories needed for the period of light activity between pitching camp and sleep. For comparison with the above estimates the average calorific intake of the expedition members during the sledging phase of "In the footsteps of Scott" expedition was 5000 Kcals per man per day for an average of 7.5 hours march.

<u>Weight</u> (lb)	<u>Calorific Expenditure</u> (Kcal)
140	1550
160	1640
180	1730

For every inch over 5' 10" tall add 20 Kcal.
 " " " under " " subtract 20 Kcal.

Table 1: Basal metabolism (Sharkey, 1979).

<u>Work intensity</u>	<u>Pulse rate</u>	<u>Kcal/min</u>	<u>Example</u>
light	<120	<5	golf
moderate	120-150	5-10	jogging
heavy	>150	>10	running fast

Table 2: Energy expenditure (Sharkey, 1979).

	<u>Kcals</u>	<u>Ca</u>	<u>Fe</u>	<u>vit A</u>	<u>vit B1</u>	<u>vit B2</u>	<u>vit C</u>
very active	3350	500	10	750	1.3	18	30
		mg	mg	ug	mg	mg	mg

Table 3: Recommended Daily Intakes (RDI) (MAFF, 1984).

Within the constraint set by the need for light rations all members of the expedition were satisfied with the variety and quantity of the food. No item was omitted but the large surplus of dried milk and margarine left at the end of the sledging phase indicates that we could have saved on weight in this department.

It must be stressed that the morning and afternoon breaks proved to be welcomed incentives on those stretches of the journey on the ice-cap devoid of land marks which could otherwise be used to gauge our progress. The cheese-spread was an essential addition to our otherwise mainly sweet diet and another portion per day would not have gone amiss. The Greenland fruit cake and custard, eaten in the warm comfort of the tent after a hard day's travel was the highlight of our diet.

Fluid intake

Dehydration is a serious threat to travellers in cold deserts because of the combined effect of excessive water loss during exercise and high winds. In addition, melting ice for drinking water is time consuming and is best done at the end of the day under the tent. The average daily requirement is one litre per day (MAFF, 1984). However, a marathon runner may sweat out up to two litres per hour (Sharkey, 1979). In order to meet this requirement each member of the expedition made sure that their minimum fluid intake was as follows:

<u>SOURCE</u>	<u>QUANTITY</u>
drinking chocolate	2 x 0.33 lt mug.
fruit juice	1 x 1 lt (water bottle topped up with snow as it was drunk).
custard	0.33 lt mug.
mince and onion mix	rehydrated with 0.33 lt per serving.
TOTAL	2.33 lt

Table 4: Fluid intake per man per day.

Sponsorship

We are grateful to the following individuals and their companies who donated the following food:

Mrs SR Jay, Appleford Ltd, Greenford	Chewy cluster bars.
Mr GC Boyce, Sheperd Boy Ltd, Syston	Sunflower bars.
Mrs R Townsend, Simmers Ltd, Edinburgh	Oatcake biscuits.
Ms J Rackham, Health and Diet Food Co Ltd, Godalming	Holly Mill cereal bars, soup and dried mince and onion sachets.
Mrs S Beddard, Rowntree Sun-pat, Hyde	Instant custard and peanut butter.
Mrs K Cuddihy, St. Ivel Ltd, Swindon	Dried milk vouchers.
Mr P Haylor, Pasta Foods Ltd, St Albans	Pasta.
Mr SJ Todd, Rowallan Creamery, Kilmarnock	Sunflower margarine.
Mr B Webber, Wander Ltd, King's Langley	"Choc-o-lait" and "Ovaltine light" instant drinks.
Mrs J Facer, Modern Health Products Ltd, Chessington	Vecon vegetable stock.
Mrs J Mabey, Schwartz, Oxon	Spices and herbs.

Mr K Scott,
R & W Scott Ltd,
Carlisle

Scotbloc cooking chocolate.

Mr and Mrs J Fox,
Fox Bakery,
Oldham

"Greenland" fruit cake.

Mr Bailey,
Manley Ratcliffe,
Oxford

Honey.



Andrew, Andy & Phil on Peak 2175m.

Equipment Report by Brian Hull

The original plan for a one-way nature of the journey, without a fixed base camp or even a return path meant that once the boat left us on the banks of the fjord, all our belongings had to be carried with us wherever we went.

Naturally, this gave us an incentive to keep our load down to a minimum. From the outset this affected our choice of kit and to whom we would write for sponsorship etc.

Difficulties arise when one combines long distance pulk touring with winter climbing. The latter requires the usual grotesque weight of gear and add to this weight a pair of redundant plastic mountaineering boots and you have, whilst you are manhauling, a substantial dead weight in your pulk.

Most of the equipment taken was standard "off the shelf" models, with the exception of the pulks, the manufacture of which was undertaken by the members themselves. A full inventory of the equipment taken follows below. The "model" of article taken is given as a useful aid to anyone planning a similar expedition.

The choice of equipment was affected by several factors. Each member of the expedition already had personal experience of conditions very similar to those expected and as such had a good idea of what equipment he ought to take. Hence we could be confident that our expedition meetings carried out in their democratic (and subsequently very prolonged) way, should at least yield a thorough and comprehensive equipment inventory, despite the fact that it would be curtailed in the early hours of the morning. For some reason, equipment always seemed to be last on the agenda.

The extent of personal experience, meant that many items of gear, both personal and expedition, could be obtained from personal stock, accounting in many cases for the often diverse range of types of gear taken. Every so often the six of us would have a consensus of opinion, leading to a bulk purchase, which, together with the items kindly sponsored by donation or favourable prices, accounts for the uniformity of choice seen with some items.

Personal Gear

Items owned and provided by members at personal expense and responsibility.

<u>Article</u>	<u>Quantity</u>	<u>Type</u>
cagoule	1	Snowdon Mouldings "Summit"
salopettes	1	" " "Super salopettes"
thick balaclava	1	various
thin balaclava	1	Damart
thermals:		
tops, long sleeved	2	Damart & Sanctuary
longjohns	2	" "
underwear	?	(didn't ask)
fibrepile jacket	2	Jack Wolfskin & Helly Hansen
" salopettes	1	Helly Hansen
waterproof mitts	1	various
fibrepile mitts	1	"

thermal gloves:		
with fingers	2	Damart & Sanctuary
fingerless	2	" "
socks, loopstitch	6	Bridgedale
shorts	1	various
mossie net	1	
goggles	1	various
glacier cream:		
factor 10	2	Uvistat
lipsalve	2	"
mozzy repellent	1	Jungle Formula
boots:		
ski-ing	1	Asolo "Snowfield", leather 3 pin
mountaineering	1	Koflach/Asolo, plastic
gaiters	2	Artiach/Berghaus Yeti & Alpine
rucksack	1	various
waterproof sacks	2	Jack Wolfskin, large
mattress	1	Artiach, full length, 5mm
sleeping bag	1	various
bivvy bag	1	Snowdon Mouldings
camera	1 or 2	various
film	8 - 15	various
duvet	1	Mountain Equipment
headtorch	1	Petzl
spare batteries	2	
" bulbs	2	
climbing:		
ice axe	1	various
ice hammer	1	"
helmet	1	"
harness	1	"
karabiners	6	"
long sling	4	"
short "	4	"
prussik loop, long	1	"
" " short	1	"
crampons	1	Camp
cross country skis	1	Asnes Sondre Telemark
bindings	1	Telemark Cable, 3 pin
skins	1	Colltex
poles	1pr	Swix/Leki
wax	1	Swix
miscellaneous:		
maps	1set	
aerial photos	1set	
compass	1	
first aid kit	1	
watch	1	
whistle	1	
swiss army knife	1	
wash kit	1	
writing equipment	1	
lighters	3	
spare boot laces	2pr	

eating utensils:			
pint mug	1	Dalesman International	
deep bowl	1	"	"
spoon	1	"	"
water bottle	1	"	"

Expedition Kit

Kit paid for communally and belonging to no particular person at the end of the expedition. The number of items taken refer to totals for the six expedition members, unless stated otherwise.

<u>Article</u>	<u>Quantity</u>	<u>Type</u>
sledges:		
pulks, gaybo	6	DIY
rigid trace	3	Simmmal, aluminium pole
rope trace	6	
harness	6	
ski spares:		
ski tips	3	Swix
skins	1pr	Colltex
skins adhesive	4tubes	"
p-tex candles	6	
ski poles	2prs	Swix
ski baskets	2	"
waxes:		
glide	6sticks	Swix
grip	3tubes	"
tents:		
super-nova	1	Wild Country
montana	2	Jack Wolfskin
snow shovels	3	Camp
candles	12	
tent sponges	3	
puncture kits	3	Artiach
primus stoves	3	Optimus
stove spares:	3sets	
tank lid		Dalesman International
packing		"
leather cup		"
cleaning nipple		"
nipple		"
billies	3sets	Dalesman International
pan grips	3	
pan scourers	6	
fuel containers:		
plastic (5ltr)	15	Autostores Ltd
metal (1ltr)	3	Dalesman International
small funnel	6	
primer fuel	34x20	Meta-tabs
matches	12boxes	
toilet paper	36	
upski parachute	2	Upski

ropes	3	Cousin
protection:	3racks	
rocks	6	various
karabiners	14	"
deadman	1	"
extenders	2	"
pitons	6	"
ice screw	2	"
distress beacon	1	Locat Developments Ltd
first aid	3kits	
cord	50m	
packing crates:		
24"x24"x7'6"	1	DIY
22"x22"x7'	1	"
tea chests	3	
plastic bags:		
6"x9"	1000	Weldbank Plastic Co Ltd
12"x18"	1000	" " " "
24"x36"	20	" " " "
sheeting	10'x30'	" " " "

Sponsorship

We are grateful to the following individuals and their companies who donated the following equipment:

Mr AH Birkmyre Allcord Ltd Newcastle-Upon-Tyne	Reduced prices.
Mr MA Hidalgo Artiach Spain	Artiach gaiters and Confort mats.
Mrs B Atkinson Autostores Ltd Manchester	Plastic petrol cans.
Miss J Pickering Burton McCall Ltd Leicester	Loop-stitch socks.
Mr D Robinson Boehringer Ingelheim Ltd Bracknell	Uvistat sun screen and lipsalve.
Northern Feather Leisure Ltd	Reduced prices.
Mr T Stephenson Cloudbase Keswick	Reduced prices on Jack Wolfskin equipment.
Mrs H Scott Damart Thermawear Ltd Bingley	Thermals, gloves and hoods.
Mr MD Harrison Dalesman International Ltd Leyland	Reduced prices on camping accessories

Mr PR Orpin Everbright Fasteners Ltd Twickenham	Stainless steel fasteners used in pulk manufacture.
Mr C Watts First Ascent London	Reduced prices on Asolo boots.
Mr Goldsmith Gaybo Ukfield	Loan of "In the footsteps of Scott" sledge mould.
Mr G Barn WL Gore & Associates (UK) Ltd Livingston	Goretex fabric.
Mr D Edgell GRP Material Supplies Ltd Rochdale	Fibre glass used in pulk manufacture.
Mr G Smith GSI Sport Ltd Watford	Reduced prices on Koflach boots.
Mr I Hudson Highland Guides Aviemore	Reduced prices on Asnes skis.
Mr R Barlow Leyland & Birmingham Rubber Company Ltd Leyland	Sorbothane inner soles.
Mr L Forkin Polypenco Salford	Ultra High Molecular Weight Polythene (UHMWPE) used for pulk runners.
Mr MJ Turner AB Optimus Ltd Rushden	Reduced prices on primus stoves.
Mr F Bennet Sanctuary Mountain Sports Ltd Warrington	Reduced prices on thermal wear.
Mr Simmons Simmal Ltd Preston	Aluminium tubing (used for pulk rigid traces).
Mrs J Anthoine Snowdon Clothing Ltd Llanberis	Manufacture of salopettes & cagoules.
Mr J White Upski (UK) Ambleside	Loan of Upski parachutes.
Mr LA Bage Vaude (UK) Ltd Hexham	Reduced prices on rucksacks.
Mr James Weldbank Plastic Co Ltd Chorley	Reduced prices on plastic bags.

Sledging weights by Les Turnbull

<u>Weights per person</u>	<u>lb oz</u>
sledge and trace	32 00
rope trace	1 08
Asolo ski-boots	4 12
Koflach boots	5 08
ice-axe	2 00
ice-hammer	1 12
ice screws (3)	11
snow shovel (half)	8
Petzl head torch	10
spare battery (2)	8
fibrepile salopettes	1 06
fibrepile jacket	1 06
thermal tops (2)	1 00
thermal bottoms (2)	1 04
helmet	13
Artiach confort mats	2 00
large rucksack	4 04
Snowdon Mouldings cagoule	1 12
" " salopettes	2 01
" " bivvy bag	1 08
camera & wide angle lens	2 07
zoom lens	2 01
glacier goggles	6
Artiach gaiters	1 02
trionic gaiter	13
sleeping bag	4 06
duvet	2 03
balacclava & thermal hat	6
mitts & damart gloves	10
J Wolfskin Montana tent (half)	4 13
Optimus hiker stove (half)	1 13
stove spare parts	3
ski poles	13
ski skins	7
Asnes skis & bindings	6 08
glide wax	2
ski skins adhesive	2
ski tip	2
loop stitch socks (6 prs)	1 14
underpants (4 prs)	8
food bags for 28 days	70 00
rope (half)	3 09
paraffin containers (2, plastic)	2 06
paraffin for 28 days (half)	12 04
Sigg bottle (large, with pourer)	7
climbing harness, etc	2 00
karabiners (6)	11
climbing protection	2 00
Upski parachute (half)	6 08
J Wolfskin water-tight sacs (2)	2 04
Uvistat sun cream	8
Meta-tabs (primer. 4)	1 00
swiss army knife & spoon	5
toilet roll (6)	1 00
compass & whistle	3
watch	3
first-aid kit (half)	1 08
maps/oblique photographs	1 02
toothbrush & paste	4

billy set (half)	6
camera film	1 00
crampons	2 08
tape loops (4)	1 00
plastic mug	2

TOTAL WEIGHT	212 00

The above list of articles and their corresponding weights gives an approximate total weight that each member was pulling. The total weight obviously varied from member to member because of different types of personal gear. After Brian's evacuation, most members raided his food bags for goodies such as chocolate and honey.

A total of nine paraffin containers were taken on the sledging journey between the remainder five members. This we knew to be in excess of our requirements, but took extra in case a paraffin container was lost or leakage occurred. Four paraffin containers were returned to base camp after the journey.

One tent was left at base camp during the journey to save on weight. This meant that Andy and Andrew shared one tent, and Phil, Martin and myself shared the other.



Camp 6 at Peak 2511m

Financial Report By Andy Leslie

An account was opened twelve months prior to the expedition departure with Barclays Bank, on the promise of sponsorship perhaps at a later date (this never materialised!).

The initial estimates of the expenditure and income are given below and were calculated for budget planning 18 months prior to the expedition departure. The actual costs and income are given to show a comparison.

<u>Expenditure</u>	<u>£ estimate</u>	<u>£ actual</u>
Travel	3400	3972
Insurance	600	623
Food	800	130
Equipment	1300	1416
Freight	400	890
Boat Charter	500	617
Administration Costs	100	250
	-----	-----
	£7100	£7898
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<u>Income</u>	<u>£ estimate</u>	<u>£ actual</u>
Personal Contribution	4200	5400
Grants/donations	1800	2250
Sponsorship (goods)	500	*
Fundraising	600	200
Gear resale	???	363
	-----	-----
	£7100	£8213
	-----	-----

* The expedition received sponsorship in goods from various companies and this resulted in an obvious reduction in costs which cannot be quantified as a meaningful figure. The companies that sponsored the expedition are mentioned elsewhere in this report.

A more detailed account is included at the end of this section.

Income

Grants and Donations.

The expedition was relatively succesful in attracting money from grant awarding bodies. The total figure for assistance in this manner accounted for 28% of the expedition costs and exceeded our initial estimates. The following organisations and individuals assisted us; our thanks go to them for making this an affordable experience for all expedition members:-

British Mountaineering Council.
Mount Everest Foundation.
Gino Watkins Memorial Fund.
Hofheimers Inc.
Pilkington Grants Fund (Triplex Safety Glass).
Dowager Countess Eleanor Peel Trust Award.
Mr and Mrs P Wood.

Fundraising

The avenue of fundraising by raffles and sponsored events was not exploited by the expedition members. Some money was raised by the sale of philatelic covers which were sent to interested stamp collectors throughout Europe. This would be a relatively easy way for other expeditions to raise money if they advertise the expedition in philatelic journals.

Sponsorship

The estimated expedition costs were reduced in certain areas by receiving sponsorship or donations of products. We were well supported by food manufacturers, reducing our food bills from £3.80 per person/per day to below £0.60 per person/per day.

Equipment sponsorship was limited in terms of reducing communal equipment costs. Trade price offers of equipment however reduced our outlay on expensive items such as tents and stoves. Many firms were generous in donating material for the building of the pulks, which reduced their construction costs considerably.

Personal Contributions

Personal contributions rose from £700 to £900 per person. This figure was considered "reasonable" by all expedition members. In addition they had to finance personal equipment, which on average increased the personal bill by a further £500.

Expenditure

Flights

The flight cost to Narssarssuaq exceeded the original estimate and worked out at £588 each. It is worth bearing in mind that the price of return tickets to Greenland increases considerably if your visit is longer than four weeks.

Insurance

An insurance policy is demanded by the Ministry of Greenland for all expeditions. The value of the search and rescue insurance stipulated by the Greenland Authorities is dependent on the "risk" of the expedition. We were classified as "high risk", due presumably to the remoteness of the area in which the expedition was to operate. A policy covering £75,000 had to be taken out for search and rescue cover. This figure was amply met by the standard British Mountaineering Council expedition policy.

A claim was made on the insurance for the evacuation and care of Brian following his appendix operation. Telephone calls to Britain confirmed that the policy was still valid for the other members and the expedition could continue. On return the claim was settled to our satisfaction by the underwriters with the minimum of hassle. Therefore I would recommend that this policy would be difficult to beat.

Food

Food costs were reduced considerably by sponsorship. Outlay was only required for a small number of items such as drink crystals, cheese spread and custard powder.

Equipment

The sledges accounted for the major costs on equipment. The cost of each sledge was reduced by the donation of a number of key materials such as UHMWPE, fibre-glass and epoxy resin. The cost to the expedition of each sledge was in the order of £75.

Freight

The freight cost was double our original estimates. This was due in part to being caught out by a dramatic price increase in return shipment from Denmark to Britain; the cost being twice that of the outward rate.

Boat Charter

We chartered two boats in Greenland as a result of revising expedition plans following Brian's departure. The second charter was considerably cheaper than the first, so it pays to shop around in Nanortalik - although you will be told that the prices are fixed!

Detailed Expedition Account

<u>Expenditure</u>	£
Flights 6 x £588	3528
Ferry Narssarssuaq - Nanortalik 6 x 374Dkr	192
Helicopter Nanortalik to Narssarssuaq 6 x 490Dkr	252
Boat charter "COLO" (outward)	350
Boat charter "KORAL" (return)	267
Equipment	1366
Insurance 6 x £90	540
Insurance communal gear	83
Freight Britain - Denmark	130
" Denmark - Greenland	362
" Greenland - Denmark	153
" Denmark - Britain	245
Administration costs	250
Maps, aerial photos, etc	50

	£7898

<u>Income</u>	£
Personal contribution 6 x £900	5400
Philatelic covers	200
Dowager Countess Eleanor Peel Trust Award	700
Mount Everest Foundation	300
British Mountaineering Council	200
Gino Watkins Memorial Fund	450
Hofheimers Inc	300
Pilkington (Triplex safety Glass)	250
Mr and Mrs P Wood	50
Gear Resale	363

	£8213

Balance of account	£315

The balance in the account is being used to finance the printing of the report and supply sponsors with publicity material.



Andrew, Les, Martin & Phil start sledging on main ice-cap



Martin & Phil resting while sledging

Mountaineering Report by Andy Leslie

The expedition attempted to climb four peaks along the sledging route. We succeeded in gaining the summit of three of these, of which we believe one to be a first ascent and two to be second ascents.

1. Peak 2511m (60 53'N 43 45'W). Grade AD.

Second ascent (first British ascent).

Climbed on the 17th August by A Collinson, M Dowson, P Jumeau, JA Leslie & L Turnbull.

The peak was attempted after a long examination by the south ridge. The main difficulty was gaining access through a complex crevassed area on the lower slopes to reach what appeared an easy summit ridge. An early start was made on the peak at 3:30am to take advantage of the better snow conditions. The initial route through the crevassed area was by a relatively straight-forward ice-ramp. A snow basin was crossed easily to below the summit ridge, and a more difficult ice pitch (grade 2/3) gained the easy summit ridge, which was followed without further problems to a final airy summit. The descent proved to be considerably more difficult due to poor snow conditions low down on the mountain. The final ice-ramp, which was ascended in 30 minutes in the morning, took two hours during late afternoon.

2. Peak 2175m (60 47'N 44 03'W). Grade AD.

First ascent on 14th August by A Collinson, M Dowson, P Jumeau & JA Leslie.

An ascent was made from the col between Peak 2175m and a subsidiary peak. An initial attempt on a direct ice slope was abandoned by AL and LT due to poor ice conditions. AC found a simple, if a little rock route on a buttress to the right. This was enjoyable Diff. scrambling and lead directly to the summit. Descent was made down the south face of the mountain and proved straight-forward except for a crevasse leap low down.

3. Peak 1810m (60 38'N 44 30'W). Grade F/PD.

Second ascent on 22nd August by A Collinson, M Dowson, P Jumeau & JA Leslie.

The peak was climbed from the subsidiary ice-cap to the north. The route followed the west ridge. Little difficulty was encountered and skis were used to climb a considerable way up the ridge. The view from the peak was excellent; to the north the main ice-cap stretched away and to the south there were views down into Tasermiut and Sondre Sermilik fjords.

4. Peak 2029m (60 34'N 44 17'W). Grade AD+.

Attempted on 24th August by A Collinson & JA Leslie.

The peak was attempted from the south west by a small rock ridge overlooking the col over to the subsidiary ice-cap. The aim was to gain the main summit ridge via the south west ridge. This proved to be enjoyable Diff-V Diff climbing in the lower parts, followed by a steep snow slope. The final section 100m below the main ridge was extremely loose and dangerous. AC pushed a further 25m up this ridge, but common sense, or the point blank refusal by AL to climb on such rock, forced a retreat.



Down climbing the summit ridge to the snow basin of Peak 2511m.

Acknowledgements

The expedition members wish to thank both individuals and organisations for their invaluable assistance during the planning of the expedition, as without their help and encouragement this expedition would not have been possible.

Lord Hunt of Llanfair Waterdine, KG CBE DSO for being patron of the expedition and giving his continued enthusiasm in our aims.

Commander Chris Furse OBE RN who gave his seal of approval to the expedition logistics and being a referee for the many applications made to grant awarding bodies.

Mr and Mrs Hull for accepting the many deliveries of food and equipment and storing the freight in preparation for transportation to Denmark. We thank them also for keeping us well fed and watered during the many hours of making the fibreglass sledges and packing the crates.

Mr Bailey of Prontaprint, Chorley, Lancs for donating the printing of the expedition prospectuses and headed notepaper.

Steen Madsen and Kim Cronberg of Nanortalik, who entertained us, before, during and after the expedition. Also for their help in organising the rescue of Brian during his appendicitis and his time of recuperation in Nanortalik.

Herluf and Anny Rasmussen of Qaqortoq (Julianehab) for entertaining Les and Martin during their brief stop-over.

Myles Ripley of Sedbergh School and leader of the Earthquest expedition, for coming to our assistance during Brian's appendicitis.

Joss Lynam of the Irish Greenland Expedition 1968 & 1971, that lent us aerial photographs of the area around Lindenows fjord and giving constructive advice.

Dr Iain Campbell of the North Group Trans Greenland Expedition 1982 for his continued interest in the physiology project and for being a referee for some of the applications for grants.

Rob Ferguson of the North Group Trans Greenland Expedition 1982 for general advice on sledging and food rations.

Dr Gert Fønne of Copenhagen that gave us detailed information of the glacier conditions towards Narssarsuaq and Peak 2511m.

Clive Allard of Falcon Iceland who dealt with the booking of flights.

Lastly, but not least, our friends, families and colleagues who encouraged us during the year of preparation.