

BRITISH GREENLAND EXPEDITION 1993

REPORT



*An unsupported crossing of the Greenland ice-cap
by a young British team of four,
man-hauling sleds across almost 400 miles of ice in 38 days.*

Stephen Jones
Carl Holt
Jamie Miller
Peter Price-Thomas



Close Brothers Investment Limited

ACKNOWLEDGEMENTS

Stephen Jones

Our sincere thanks go to all the individuals, companies and organisations that helped us.

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INTRODUCTION

Stephen Jones

The Expedition

The aim of the expedition was to cross Greenland from coast to coast by a 400 mile route from Angmagsalik to Sondre Stromfjord. We planned to travel on foot with only the benefit of skis and the supplies we could take with us on our sleds. Such an unsupported venture means going without the assistance of dogs, motorised transport, air support, or pre-placed depots that have characterised most other Arctic expeditions.

Outline

We flew in a chartered Cessna aircraft on 10 July 1993 from Iceland to Kulusuk, a dirt air-strip with a small Eskimo village on the East coast of Greenland. We hired a small fishing boat and some Inuit guides and spent two days trying to find a safe passage through ice choked fjords to the mainland. This proved to be impossible and we diverted to Angmagssalik, home of a Greenlandair Bell 212 helicopter. Unfortunately this proved to be the only available method of reaching the icecap and so we chartered the helicopter for a one way ticket to the eastern edge of the icecap.

After a few days on the east coast we set off on our ice cap crossing. There were almost four-hundred miles of ice separating the two coasts and gradually the physical effort of each day inched past. Shivering at temperatures as low as -30 °C, with the snow becoming as resistant to the pulks as sandpaper the distance to go slowly dropped. Nearing the western coast, we tackled labyrinthine crevassed regions and numerous melt-water lakes and rivers.

After 38 days we reached land and walked down to the airfield at Kangerlussuaq, to the welcome sights of green grass, wild flowers, reindeer and musk oxen, showers and flights home.

Choice of Route

Early in the planning stage of the expedition, it had been hoped that we would be able to take an unexplored route across the ice-cap further to the north. The only financially viable method of reaching the start-point for this route was by a ski-equipped plane. When this became unavailable, it was decided to cross between Angmagsalik and Sondre Stromfjord.

GREENLAND

Carl Holt

Greenland is the World's largest island having an area of 2175600 sq km. Lying mostly within the Arctic Circle, it is surrounded by the Arctic Ocean to the North; the Greenland sea to the east; the Denmark Strait in the south-east (which separates it from Iceland); the Atlantic Ocean in the south; and Davis Strait and Baffin Bay in the west (which separates it from Baffin Island, Canada). Greenland itself is 2675 km long, from Cape Farewell to Cape Morris-Jesup and had a maximum width of about 1290 Km.

Geologically, the island is part of the Canadian Shield and, therefore of North America. More than 50% of its ice-free area consists of rocks of the Precambrian era, mostly granites and gneisses. The entire coastline is deeply indented by fjords and there are many offshore islands, of which Disko Island is the largest. Except for about 341,880 sq km of coastline and coastal islands, an ice sheet covers the island. At its thickest the icesheet is around 4500m deep.

Cold winds from Greenland's interior make the weather very uncertain and foggy. The North Atlantic Drift gives the south-west coast of Greenland a warmer climate and heavy rainfall. There are no forests in Greenland; dwarf trees are found in the southern coastal areas. Natural vegetation also includes mosses, lichens and grasses. Polar bear, musk ox, polar wolf, lemming, Arctic hare and reindeer are the chief land animals. There are numerous sea birds some of which are hunted for their fresh eggs and down.

Economically, fishing is the main industry. Sealing is also important along the south-west and north-west coasts. There is extensive sheep breeding in the Southern area. The only large-scale mining operation had been for cryolite. Molybdenum, Uranium and coal are also found.

Despite what may be the initial perception, Greenland has been inhabited for over 4500 years. The earliest peoples were of the Saqqaq culture and lived around Sisimiut and other areas. A quite different people, the Tunits, replaced the Sisimiut before they were replaced by the modern day Greenlander, the Eskimos or Inuits. The Inuits crossed the Bering Straits around 1000 years ago, roughly about the same time as the Norseman, Eric the Red who reached the island in 982 AD. Greenland, it is claimed, was named by Eric the Red to persuade settlers to come to the country. At first settlements were primarily in the North but with the climate cooling the settlers retreated further South where most of the settlements of today can be found.

Today, the West and East coasts of Greenland are very different to each other. In the West, the people generally wish to be referred to as Inuits, the term Eskimo is almost a form of abuse (as is referring to them as Danish). The economy is much more Westernised than the East coast settlements and there is much on offer to tourists. On the East coast the Inuits care less if they are referred to as Eskimos or Inuits. They live very much as their ancestors; with the addition of a few modern items. Life seems more relaxed and slower than on the West coast. There is less wildlife near the settlements; anything that shows itself risks being instantly shot for food. On both coasts there is a fair amount of alcohol abuse with many of the social problems this entails.

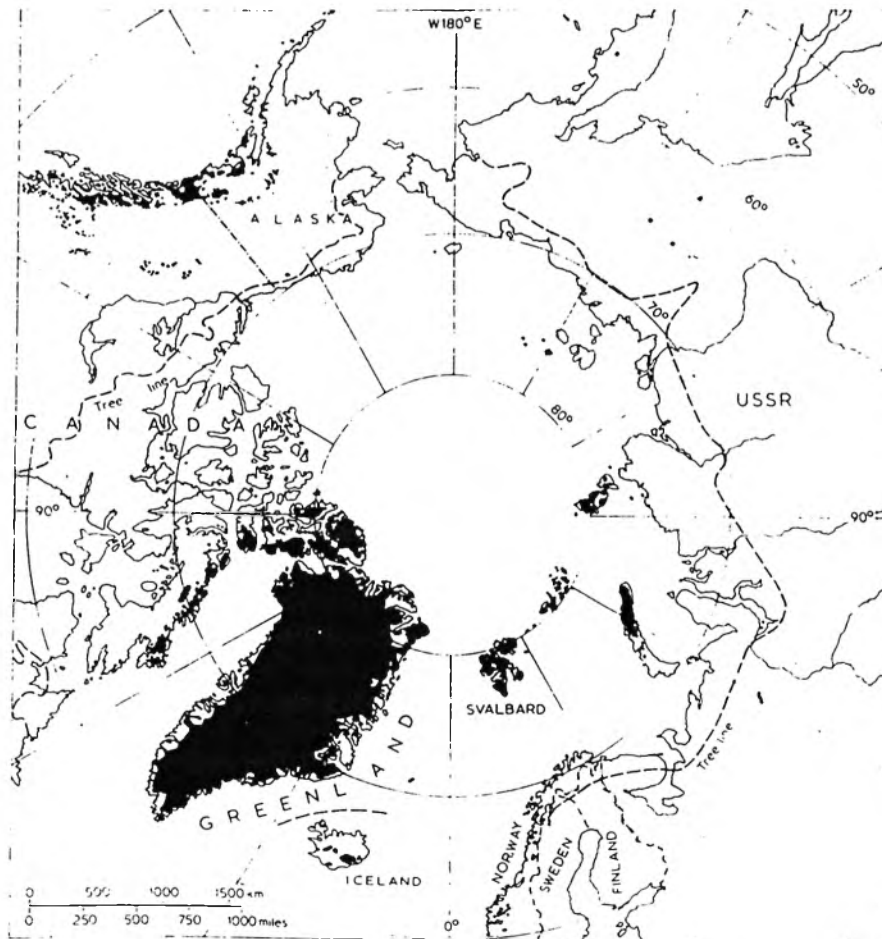
Greenland became a bishopric, c.1110, and ruins of churches of that period remain. By the 12th century, the population numbered some 10000 (in 1992 the population was 50000). Greenland became self-governing, but failed to achieve political stability. In 1261 the colony came under Norwegian rule, but in the 14th and 15th century it was neglected, and the Norse colonists either died out or were assimilated with the Inuits. The British explorers Martin Frobisher and John Davies "rediscovered" Greenland in the 16th century but found no trace of Norsemen. Modern colonisation began in 1721 by the Norwegian missionary Hans Egede. Danish trading posts were established shortly afterward, and colonisation was furthered by the deportation of undesirable subjects to Greenland. In 1815, at the Congress of Vienna, Denmark retained sovereignty of the colony. The Inuits have a polysynthetic language in which entire ideas are expressed in a single word. Hence, impossible looking megasyllabic words can intimidate foreigners with their sheer length when written on a page. Danish is spoken more on the West coast but, officially, settlements are referred to by their Inuit names.

In the 19th and 20th century Greenland was explored and mapped by numerous Arctic explorers. In World War II, after the German occupation of Denmark, the United States invoked the "Monroe Doctrine for Greenland", taking control and responsibility for the defence of the island. During the course of the war a

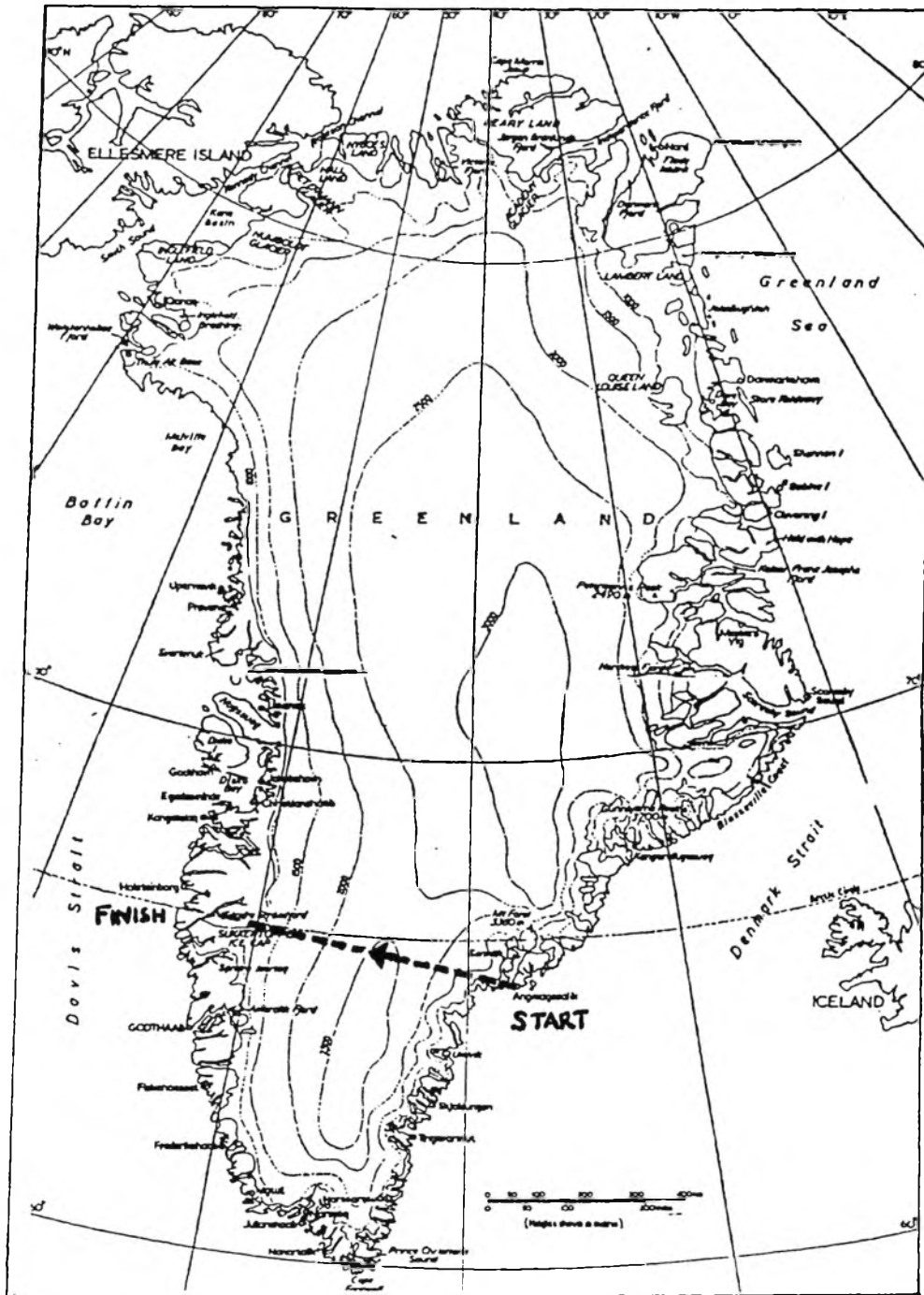
number of air-bases were built on both the east and west coasts and at the end of the war the American presence continued. A Danish-American agreement for the common defence of Greenland was signed in 1951 and the US bases were retained. During the cold war the Americans erected a number of early warning radars (DEW Stations). These stations were designed to give early warning of the launch of USSR ballistic missiles at the USA. One of the DEW Stations was established in the middle of the ice-cap.

The fall of the Warsaw Pact and a lower the threat of ICBM attack spelt the death knell of the DEW Stations. In 1992, with the cold war over, the American strategic interest in Greenland waned, and operations were drastically reduced. An agreement between the Americans and the Danish governments agreed to the hand over of the bases of Kulusuk and Sondre Stromfjord, in full working order, to Denmark (and then on to the Greenlandic Home Rule Government). In exchange for the air-bases, the Danish agreed that the US had the right to use of them in the future if necessary. The Americans still have a presence, most noticeably at Thule in the north-west of Greenland. Thule air-base is now a modern monitoring and early warning station.

In 1979 Greenland was granted independence from Denmark in internal matters; the joint American-Danish treaty still provided for the defence of Greenland. The "Home Rule Government" was formed and the first elections took place. The Greenlandic flag was designed and is flown along side the Danish flag.



ROUTE ACROSS THE GREENLAND ICECAP



THE TEAM

Stephen Jones

Stephen Jones Expedition Leader

Age 27, single. Administration Manager for Close Brothers Investment Ltd. lives in London. Experienced mountaineer with eight years experience of climbing in the British Isles, Europe and the greater ranges. He has been on two expeditions to the Himalaya and two expeditions to Alaska. In 1988 he was a member of the Charakusa Spires expedition to the Karakoram Himalaya and returned to the area in 1991 to attempt Masherbrum, the world's 25th highest mountain at 25,560ft/7,821m. In 1990 he organised the first of two successful two man expeditions to Alaska and climbed Mount McKinley, at 20,320ft the highest mountain in North America. Leader of two man British Multi-Peak expedition to Alaska 1992 and was successful in climbing Mount McKinley again as well as exploring the area for new routes. Member of the North London Mountaineering Club and the Alpine Club.

Jamie Miller

Age 21, single, lives in Edinburgh. Electronics and Computing Undergraduate at Durham University. He is an experienced climber and a keen ski racer who was a member of the British Children's Ski and Scottish Ski Teams. He was a member of the British Schools' Exploring Society Svalbard Summer expedition to Spitsbergen in 1990. He was awarded a Short Service Limited Commission from the Royal Military Academy, Sandhurst in 1990 and joined the British Army Ski Team in February 1991. He completed his year in the Army as Troop Commander, Royal Engineers, Canada 1991 before starting studies at Durham University. He currently is an officer in the reserve forces.

Carl Holt

Age 21, single, lives in Lancashire. He has recently graduated from Manchester University and is carrying out Initial Officer training with the Royal Air Force.. He was also a member of the British Schools' Exploring Society Svalbard Summer expedition to Spitsbergen in 1990 and returned to Spitsbergen as leader of a four man RAF expedition in 1992.

Peter Price-Thomas

Age 21, single, lives in Buckinghamshire. Geography Undergraduate Edinburgh University. Started rock climbing when 14. Member of the British Schools' Exploring Society Svalbard Summer 1990 Expedition to Spitsbergen. Member of British Vatnajokull Expedition 1992, which completed a 180 km circumnavigation of Iceland's largest icecap. Associate member of the Royal Geographical Society.

"COLD SWEAT"

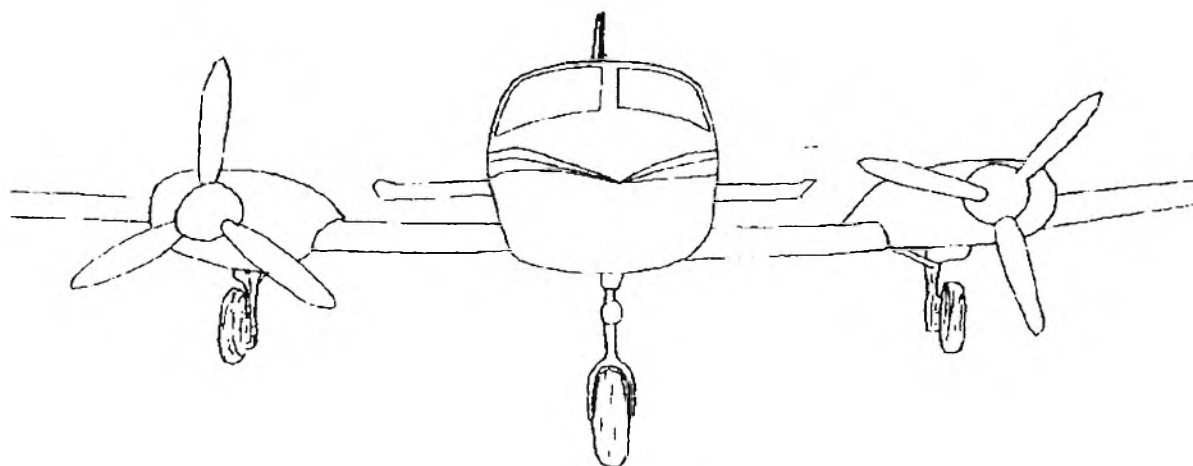
*Text and drawings by
Jamie Miller*

I sat down on ground for the first time in almost two months, and felt the springy tundra plants that grew like a thick, burgundy carpet around me. To the west, the colour flowed down the glaciated valleys towards the fjords, struggling to cover the bare rock that forced through on every ridge and every rise. To the east, and from where I had come, the life crept gingerly for only a few yards into the towering slag heaps of moraine which in turn failed to impress upon the cold, clinical white of four hundred miles of ice that lay beyond.

It was during last October that I first embarked upon this crazy scheme, safe by a cottage fireside in Glen Luce. Crossing the Greenland ice-cap had seemed such an absurd idea that it would never come off and so there was no danger in wholeheartedly committing myself to it. With powerful waving of pens we traced imaginary routes across maps of the world's largest island with little worry for the practicalities of cost or of getting there. "We" were myself, Jamie Miller, a student at Durham University; Peter Price-Thomas and Carl Holt whom I had met on an expedition to Spitzbergen and who were students at Edinburgh and Manchester Universities and Steve Jones, a keen mountaineer, working for Close Brothers Investment. "We" were going to ski across Greenland.

I tried saying it with conviction, but even the most gullible found it hard to believe. Sitting in an over packed, sweaty student pub at the end of January, I had just been asked what I was doing this summer. I gave my reply and the look of disbelief was complete and, by now, expected. In truth, when I stopped to think about it, I wouldn't have thought that a group where three were aged twenty-one and the fourth twenty-six had a hope in hell of coming out of such an adventure alive, never mind organising it. But, I was up to my neck in it now and time would tell whether or not we would sink or swim. In going on an expedition, the adventure starts from the very day that you first open an atlas, pore over the intricate lines of coastline, mountains, rivers and glaciers until they are known intimately and begin the dream. Frighteningly, that dream slowly becomes reality, creeping up as equipment is bought, freighting investigated, money raised and information gathered.

Our dream very nearly never made it into reality. Only a month before our departure date, we were still desperately short of funds - an occupational hazard as a student - and were saved only by the generosity of Steve's company; Close Brothers. This started a final sprint finish of preparation, driving thousands of miles to collect equipment scattered across the country, buying the local cash and carry out of its supplies of Yorkies, Cup-a-Soups and Vesta meals and packing them into bags. Pete's garage was filled to the gunwales and looked like Aladdin's cave (had Aladdin had a passion for crossing ice-caps and munching Galaxy bars). All too soon the freight had gone, we had everything we needed, including permission from the Danish Polar Centre (which administers Greenlandic ice-cap expeditions) and, with passports and plane tickets in hand we bade farewell in the stuffy July heat of Heathrow. First stop Reykjavik, Iceland.



Our freight had been sent by sea to Reykjavik and from there we would charter a small plane to take us to a landing strip on the east coast of Greenland. After some hunting around the dismal, grey hangars under a dismal, grey sky at dismal, grey Reykjavik airport we found a charter company that, although more used to flying Japanese tourists on day trips, was willing to fly the four of us and our mountain of gear to Kulusuk airstrip that weekend. So, we arranged for our freight to be brought to the airport and spent the next couple of days in the mist and rain getting last minute things like a thermometer and, perhaps more importantly, a map!

That weekend we turned up at the arranged dismal, grey hangar and were met by the pilot who told us that he had just managed to squeeze all the equipment in after having removed some of the seats. "Just"? We still had two large rucksacks apiece and twenty-four fuel containers to put in, as well as ourselves. A quick inspection of the tiny, twin engined Cessna showed that we were in trouble. Not as much trouble though as when the pilot discovered that we intended packing his precious plane with one hundred and twenty litres of high octane, unleaded petrol. At this, I thought that he, not the petrol, was about to explode. With plenty of smiling, and assuring him that really, there was no problem, we coaxed him into accepting the fuel onboard. It was imperative that we took the fuel, for there was only aviation fuel for sale in Kulusuk that would clog our stoves, making them unusable - fatal on the ice-cap where there is no water and almost all our food would be dehydrated. With the fuel in the wing lockers and everything else forced into every nook and cranny so that we could barely see out of the windows, we were ready for the off. What are a few air-safety regulations between friends?

Leaning forward in our seats, to move the centre of gravity closer to the nose, we picked up speed agonisingly slowly and trundled down the strip of tarmac built by the RAF during the second world war. The engines screamed in protest at their massive load and there were white knuckles all round the cabin. Using far more of the runway than is good for the health, we eventually lumbered into the Reykjavik sky which, as we were leaving that day, was cobalt blue. We banked west, climbed to ten thousand feet and then settled down to two hours of drone, leaving the snow-capped volcanoes of Iceland behind.

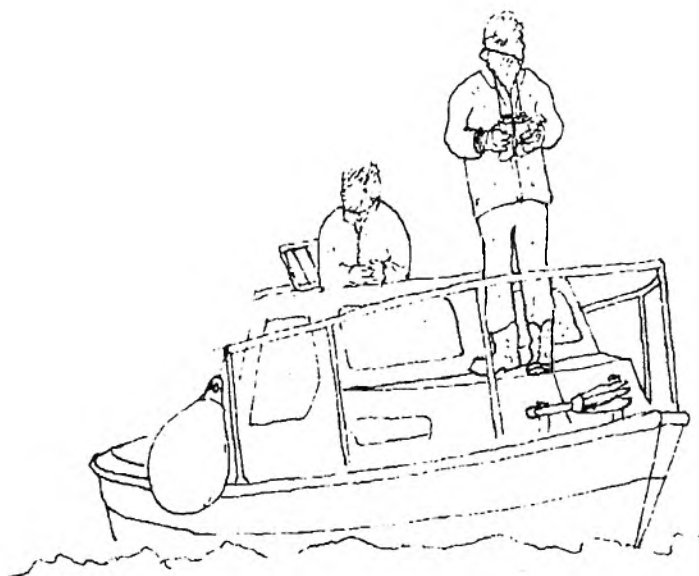
I woke with a sharpened elbow digging at my ribs. Pete was mouthing something over the noise of the engines and it took several moments before I realised what he was saying: "The coast!". My bleary eyes struggled to focus through the bright haze of what looked like cloud but now I saw a thin black line of mountains on the very horizon, guarded by a thick band of brilliant pack-ice that stretched miles and miles into the sea. Soon we lost the sea beneath us, replaced by the thick white of broken, floating ice and it became possible to make out on the horizon firstly peaks, then valleys and then great dirty ribbons of glaciers that inched down the valleys to crash into the sea and join the pack ice.

We headed straight for one large mountain and, now over streaking land and fjords, I was a little concerned to see the pilot and co-pilot (both clad in the mandatory Ray-Ban Aviator sun glasses) peering out of the side of the plane, as if looking for the runway. At last, and worryingly close to the mountain, one of them exclaimed and pulled the plane into a right-angled turn and down through a narrow valley to where a dusty airstrip lay perched on the edge of an island. With relief, we touched down in a cloud of dust and, whilst still carcering down the strip, pulled what seemed like a handbrake turn and came to a silent rest fifteen yards from Kulusuk's one airport hut. A tractor with baggage trailers arrived and we dutifully loaded everything into them assuming it was to be taken some distance away. It then drove in a huge circle to end up at the hut, saving us the fifteen yards. Customs don't pose too much of a problem in this part of the world; there weren't any.

So, here we were, sitting in the dust of what was most definitely a carbuncle on the face of east Greenland but, at least, it was Greenland and we had made it this far. Like all arctic "civilisation" it bore the scars of the bulldozer and the tin can and, understandably, we were keen to get away. To get to the ice-cap's eastern edge and the start of our crossing, we had to travel over the narrow band of twenty or thirty miles of land and fjord that lies sandwiched between inland ice and sea. To do this, we had two options: firstly, to hire a helicopter which would take us and all our equipment, but for an extortionate price, straight up to the edge of the ice in a matter of minutes; or secondly, to pay a local Eskimo to take us by boat to Johan Petersen Fjord from where we could ascend a gully to the inland ice. A little concerned that there might still be too much pack-ice in the fjord,

we called the only telephone in the village of Tinctiqilaq and were told that one of the hunters from there had got through to that particular fjord only the previous day. After some deliberation, we decided to take the gamble of going by boat. This also had the extra attraction of spending some time with the InnuIt.

The only problem that remained now was to find a boat big enough to take four of us with our five-hundred kilograms of food, fuel and equipment. This meant a walk down to the village of Kap Dan, about half an hour away along a muddy path marked by discarded beer cans. Long gone are the turf houses, the summer houses and the igloos. Now, the modern InnuIt live in brightly painted wooden huts, have fibre-glass boats with outboard engines and wear jeans like the rest of the world. The east coast Eskimos are, however, the most traditional of those in Greenland, selling pelts to supplement their benefit from the Danish Government and still living off seal, fish and, occasionally, polar bear. It was a village of contrasts between two worlds: the Western and the InnuIt. Two girls pushed a pram along a track against a backdrop of mountains, glaciers and icebergs. A chained husky lay next to a discarded, rusty skidoo. We eventually tracked down "the man with the big boat" and after great haggling we reached a price that we could afford and that he was delighted with. We set the time and date and hurried back to the air strip to prepare our equipment.



This may sound ridiculous, but we had never had all the kit together in one place before and were not entirely sure that it would all fit into the sledges! We pushed the trolleys, overflowing with our belongings, to a patch of snow that led to the sea, unloaded the equipment, put up the tents and settled down to a well earned night's rest under the arctic sun. Next morning we laid everything out and divided it all equally into four so that should we lose a pulk when loading them in or out of the boat then we would lose only a quarter of everything as opposed to all of something and, with luck, the expedition would not be doomed. It was with great relief that the last zip was done up and it was clear that we could, in actual fact, fit in everything that we had brought with us.

Our patch of snow didn't quite connect with the sea and so, when the boat came, we had to carry the pulks over a short stretch of ground and we came in for a shock. There were almost one hundred and thirty kilos in each sled and, even with four of us carrying, it was exhausting and demoralising work. Four of us were struggling to lift one and so how on earth were we going to manage the sleds individually? That, however, was not the present problem as we had to rush to load up the boat before the tide went out. We perched precariously on the edge of the thick ice that lined the shore and lowered the pulks, one by one, into the boat. I describe it as a "big" boat, but this is only by Eskimo standards. In reality, it was only eighteen feet long and fibre-glass with a pigmy-sized cabin complete with Primus stove and hatch. Most of the room was taken up by the engine casing and bags of seal meat but with cursing and scraping of paint we fitted the four pulks in and, with nowhere left to stand, sat on them.

Leaving the bulldozed tracks and fuel storage tanks of the airstrip behind, we entered an entirely different world. The sky was clear, but a gentle, freezing mist lay eerily across the still water as we weaved our way through the floating ice that threatened to choke the fjord. The most beautiful sculptures slipped gently by as we motored along, carved by sun, wave and time, some only a few feet wide, soon to disappear, and others, huge great slabs, half the size of a football pitch. The ice varied dramatically in colour too; from brilliant white snow through a myriad of blues to clear, sharp glass. It was a truly magical scene and there was no greater contrast to the civilisation that we had fled from.

To our surprise we came across a boat tied by the shore in a particularly narrow passage between islands where we had to ram the ice and push it out of the way. I could see the owners of the boat on the shore, butchering some freshly caught seals, the rocks stained red by the separate piles of entrails, bones, flesh and offal. They waved, barely stopping from their work, as their deft knives glinted in the sun and we passed on, completely alone once more. Our progress would often be interrupted when the ice would form an almost impenetrable white barrier from shore to shore. The three Eskimo guides, Pele, Guidion and Eruk, armed with binoculars and Inuit instinct would always find a way where, with the hull of the boat glancing off ice, rock or the bottom, we would sneak through and out into the clear water on the other side. In this manner, we pushed on in our little Mayflower and after ten hours reached the next village: Tinetiqlaq.

Very similar to Kap Dan, this collection of around twenty wooden houses lies on the edge of Sermelik Fjord, one of the largest in the area and our last barrier to reaching Johan Petersen Fjord and our route to the inland ice. We had been on the go for quite some time and as Pele and his companions had relatives here, they disappeared, clutching presents of sacks of sealmeat, to talk and drink long into the light night. The community boasts a telephone and a store where, among other things, one can buy apples and outboard motors. By the time the apples have reached Tinetiqlaq they make an outboard seem quite reasonably priced and just about as tasty. There are small, isolated patches of tough grass that grow in-between the slabs of rock and litter and huskies lie everywhere. Nearby, huge wooden scaffolding supports thousands of fish, drying in the sun to form the winter food stock. The howl from the huskies is continuous.

The next morning, with more fuel on board, we nudged our way out through the ice in the entrance to the bay and into Sermelik Fjord, hoping to make it to the inland ice. Moving into the centre of the fjord, we were dwarfed by the huge ice-bergs that were often as big as three or four storey houses above the surface and eight times that beneath. Occasionally, a huge block, weakened by the sun or the sea, would crash into the water with a great roar while the ice berg would roll slowly until it found its new balance and settled. It was much more difficult to see ahead and choose a route with these great white towers looming all around and several times we came up against dead ends, surrounded by impenetrable ice for as far as the eye could see. The only thing to do was to follow the thin ribbon of blue back out to clearer water, move down the fjord, and try again. For four or five hours we pushed on at this, getting within a couple of hundred yards of the coast once but then blocked by ice that was too thick to let our little boat through but too thin to support our weight and sledges. The mist that had been lingering to the south now lifted to show us the entrance to Johan Petersen Fjord and I could see that it was packed with immense ice bergs and between there and the boat floated an impassable thick belt of pack ice. I refused to believe that we had come all this way only to fail when so close to reaching the ice-cap. I felt that there must have been a way through but, as the mist rose even further, it was quite plain that there was not. Pele, Guidion and Eruk were all rather nervous and had been voicing their concerns about the change of wind and tide. This led to the danger of the boat becoming trapped and crushed by the ice as it accumulated against the shore. Realising that time was short and that the chances of getting to the shore that day were only lessening, we scurried back the way we had come; back, disappointed, to Tinetiqlaq.

We were left in a dilemma. Did we hang on in the village, paying the daily rate, until the ice cleared or cut our losses, head to the main village of Ammassalik and hire a helicopter. Our funds were, of course, limited and we could only afford a few days of waiting for a clear route. From what we had seen, we felt that it was unlikely that the fjord would be crossable in that time. So, our dilemma was solved and, although it contradicted all of my Caledonian monetary policy, we prepared to pay the outrageous price for a helicopter and our guarantee of reaching the ice.

Ammassalik was not just a larger version of Tinetiqlaq or Kap Dan but a thriving, throbbing metropolis with a road (at least a kilometre of it), a church, museum, policeman, pub (sadly not found) and, of course, a store selling bruised apples for a fortune. After such an incredible few days with our three Inuit friends, weaving through the ice, this was too much like civilisation and the two days until we could get a flight just couldn't pass fast enough. Finally, though, we once again had our four red pulks packed and lined up ready for our journey to the ice.



Before we could load them into the helicopter the sleds had to be weighed and, although merely a shed, the "departure lounge" had its own scales next to a hole in the wall through which the baggage had to be passed. With a great deal of huffing, panting and more scraping of paint we managed to get the first and lightest pulk through the hole and on to the scales. 120 Kg! On seeing this I immediately started to assure the girl that all the pulks were exactly the same weight and that as it was such an effort passing our equipment through the eye of a needle that she should just multiply this by four. After some consideration she agreed and disappeared whereupon I breathed a great sigh of relief. The sleds weighed a great deal more than in the calculation for the helicopter cost and, had she weighed the other pulks, we would have been stung for money that we just couldn't afford.

Having called the engineer to remove the seats, we managed to cram all four pulks between ceiling and floor of the large Bell 212 chopper, leaving just enough room in the sideways facing seats to wedge ourselves in. For cost per minute of travel, I hoped that this was the most expensive trip that I was ever going to have to make. As the rotors began to turn, I could feel the pound notes slipping away but soon we were airborne and the scenery was striking enough to let me forget my financial worries for the mean-time. The landscape was lunar and barren; the ridge lines bare, crumbling rock; the corries still lined with heavy, granular snow. Only the valley bottoms showed any sign of life with green dabs of grass and bog. After just minutes, we were in sight of Sermelik Fjord that had taken us hours to reach by boat. I was delighted. The fjord was just as badly if not more choked than during our previous attempt and, although my pessimistic mind traced a thousand routes through the blue and white maze, we would not have got through for days or weeks. I would like to meet the mythical Eskimo who had got through "only the day before".

It only took twenty-five minutes to reach the ice cap and the helicopter set down safely beyond the crevasses in the literally blinding light of the snow. The rotors stopped turning and the engines were switched off, leaving a striking silence after the deafening whine of the turbines. I slid back the side door and stepped, squinting, out into the brilliance, sinking up to my calves in the soft, wet snow. The surface was rippled like sand at low tide and stretched to the horizon in all directions with only the peaks at the coast interrupting the smooth line between blue and white. Managing to move the pulks for the first time without scraping paint (the pilot was watching) we manhandled the four pulks out of the cabin and away from the helicopter. The pilot was most insistent on taking our photograph before he left. I was worried that this was so that he knew what he was looking for when called out on a rescue mission in a few weeks' time. Photo taken, he lifted off, hovered briefly and then disappeared towards Ammassalik, leaving us very much alone.

Now the test had begun. I looked at the four pulks and realised that everything we needed to survive in this environment, right down to the last biscuit or match, had to be in them. It was too late now to buy anything and time would let us know whether or not our planning had been detailed enough. What I still did not know was whether or not we could actually pull the sleds and, as my curiosity could be contained no longer, I grabbed my skis, got into my harness and attached my pulk. I leaned into it. Nothing happened. I leaned a little further and still the beast would not budge. With a great push with my arms and thrust with my hips, the sled began to slide slowly forward. Once moving, the drag lessened a little and I could keep it going at a steady walking pace, ploughing through the top couple of inches of wet snow. It wasn't easy but at least it was possible for one man to pull a single pulk. We had been a little concerned that initially we might have to ferry the loads with two men per sled but if it was possible during the day then, hopefully, if the surface froze at night then it would be quite manageable. Having had an early start that morning, we pitched the tents for the first time on the Greenland ice-cap and celebrated having made it to the start with an evening meal.

Our initial intentions had been to do a different, longer route but this was no longer possible and now, committed to doing a shorter route, we had a number of days' food spare and so were in no great hurry to set off westwards. We decided on making a trip to the edge of the ice not only to keep our consciences clear but also to see Johan Petersen Fjord and where we had hoped to ascend to the ice-cap. The next morning a gentle breeze was blowing towards the coast and it seemed like a perfect opportunity to try out one of the parachutes that we had brought with us and see if it would drag the four of us along on skis. With a complex arrangement of rope, harnesses, skis and sticks, the 'chute was inflated and slowly began to pull us over the surface. As the wind speed increased, what had started as a relatively ordered affair deteriorated into Keystone Cops hilarity and ended in large body-shaped patterns being formed in the snow.

After a while the parachute was abandoned for the time-being and we proceeded more sedately and safely by ski alone. Pete, Carl and I had skied quite a number of times with Telemark skis (leather walking boots are secured flexibly to the ski at the toe only). We found that, with only rucksacks, we could skate quite happily and cover a great distance. Steve, however, had only previously used alpine mountaineering skis with plastic boots and so found great difficulty in getting any speed up. Early in the morning, the surface had remained frozen, hard and fast from the previous night but by midday it had thawed and become a heavy, wet mush that made skiing miserably hard work. Our poor progress led us to return to the camp and to try again, this time travelling at night.

Back at camp we were in for a nasty surprise. The sun had been incredibly strong that day, allowing us to ski wearing only thermals. In our absence, the temperature within the pulks had risen dramatically under the powerful rays, causing the butter in the rations to melt. Fortunately, not all of our supply of fat had been destroyed and we set about a salvage operation, reshaping some of the blocks and burying them in snow to harden. We relied on a large amount of butter to provide the necessary calories in the daily ration - about six thousand - and couldn't afford to lose much at all. We learned from our mistake and buried the sacks of butter every time that we camped from then on.

We woke with the sun low on the horizon, tainting the snow a warm orange, belying the fact that it was around minus five degrees Celsius. By the time breakfast had been cooked, rucksacks were packed and skis were on, the sun had set and the temperature dropped another five degrees. With heavier rucksacks, as we intended to bivi at the coast, and compasses set, we pushed off, skis chattering over the hard ice, almost effortlessly in comparison to the previous sweaty, slushy floundering. A couple of hours took us to the edge of one of the many glaciers from where we could look down to the fjord, a silvery mirror, speckled with ice bergs and rimmed by black, jagged peaks against a crimson horizon of the rising sun. It had never really become dark in the few hours that the sun had sneaked just out of sight.

Presented with seven miles of a down hill run, many people might be quite enthusiastic but, I can assure you, it was less pleasant in our situation. The ice was rough and our packs heavy and so it was not long before the inevitable happened. Balancing with a heavy rucksack on skis when only attached by the toes I found that would often cause me to come to an involuntary halt, having used my nose as a brake. This is most damaging, not only to the facial tissue but also to the ego and I soon yearned for the soft, pisted slopes of Val d'Isere. My only consolation was that my three companions were in an even worse state. Several hours and many cuts and bruises later we found ourselves amongst the first crevasses where we decided to rope up and risk the possible catastrophe of skiing tied to one another.

Although the crevasses were initially well spaced and therefore easy to negotiate, the ground soon deteriorated until the way ahead was virtually impassable and we headed for the rocky ridge line that ran by the edge of the glacier. Carl and Steve satisfied themselves that this was the edge of the ice-cap and that it was far enough for one day but Pete and I skied on and climbed a peak before returning to join the others. From the top of the peak it was possible to see all of Johan Petersen Fjord and the enormous glaciers that flowed into it. These were dirty grey bands of ice that were so sliced with crevasses that no piece looked more than a couple of yards wide. Travelling up one of those glaciers would be nigh on impossible and as I looked across the fjord I could see the single gully, used by previous expeditions and as a sledging route by the Inuit. It looked quite possible

to get up there but I became appreciative of the work done by the helicopter in lifting our five hundred kilograms of kit up from sea level.

On our way back to join the others. Pete and I stopped in one of the crevasse fields that we had crossed and I abseiled down into the dark, blue interior of the glacier. The crack gradually narrowed as I descended and was two or three yards wide when I stopped on what looked to be the bottom. Now I could see that I was standing on an ice block and the crack twisted on down into the black. Huge icicles a yard long and wrist thick hung down and, tapping with my ice axe, I watched one drop, bouncing from wall to wall beneath my feet. I could still hear it falling long after it had disappeared from view. There the ice was aquamarine and polished in contrast to the white, granular snow above that one day would be down here too.

To get back to the surface, I climbed up a chimney in the ice, my two axes biting into the pure blue and sending sparks of ice tinkling into the void. My route bent left and over a large bulge which, after I had negotiated it, left me contending with a stream of iced water dripping from icicles above that found my open collar and trickled down my chest. The climb continued up the narrow end of the crevasse and another ten metres took me damp, but exhilarated, into the bright, white world again.

In the heat of the day we slept in bivi bags on the rocks and woke at sunset to head back to our tents. As we climbed the ridge line we magically kept apace with the rising shadow of the setting sun and, sitting to rest at the highest point, we watched the last sliver of gold slip over the horizon. With a final glance to Johan Petersen Fjord we turned west and back on to the ice cap.

By now we were raring to get going westwards and eat up some of the three hundred and sixty miles that lay between our camp and Sondre Stromfjord on the west coast. Having reversed our days, we cooked a fine porridge as the sun set and prepared for our first day's proper pulking. In the half-light we saddled up with the over packed sleds and trudged off one behind the other up the very slight incline west. It was hard work, particularly as the snow was so bumpy, and we soon stopped to remove clothing to avoid sweating into clothes which would then have frozen and been of no use when they were needed. The sled would slip forward, easily for a few feet and then hit a little ridge in the snow, almost stopping and one would have to lurch forward to get it moving again. It was less than perfect and certainly little pleasure but we were delighted to be on our way and with head bowed, I trudged along in the ski tracks of the person in front.

After an hour Pete at the front stopped for a rest and a bite to eat and Carl and I drew our pulks alongside him. I unclipped my harness, stepped out of my ski bindings and looked back along the track expecting to see Steve just behind me but he was nowhere to be seen. I scanned the horizon and then found him; a little black dot moving against the horizon. He was a long way behind but still plodding on and after half an hour he pulled in to join us. He had not really done much pulking before and it was rather unfortunate that he was being thrown in at the deep end of the pulking world and, I suspect, it was rather a shock both physically and mentally for him.

There was no advantage in having our group travelling at such different speeds and so we lightened one sledge by moving fuel cans into some of the others and this helped a little. However, we ended that day after travelling only seven and a half miles (12 Km) and camped, determined to make better distance the next day.

The temperature range was quite striking, being well below zero as we skied during the night and uncomfortably warm under a sleeping bag in the tents. The air temperature during the day was probably only around plus ten yet the intense power of the sun cooked the tents to well above that. Even in our short time on the ice-cap we were



already showing signs of skin peeling from sunburn and had impressive sun tans (only, I'm afraid, from the Adam's apple upwards). Having come from the warmth of the south of England in July, Iceland and then Greenland had seemed incredibly chilly. Our bodies were getting used to it though and we would often bask on Karrimats after an "evening" meal at ten or eleven a.m. The nights felt much colder than the thermometer gave them credit for as the air was humid from the surface melting during the day and always a stiff, cutting wind blew from the north. This chilled one to the bone when one was stationary, serving to keep our rest breaks short.

We had risen a fair deal in a series of steps, several kilometres long, and the peaks of the coast were now mere pimples on the horizon and it was fascinating to see a mirage one sunset when the light was bent through the differing densities of air to show a full mountain, shimmering and floating on the ice-cap. A couple more days took us out of sight of land altogether and on to a smoother, flatter surface. This created a most strange and unnatural environment. For three hundred and sixty degrees there was nothing to be seen in the unblemished, virgin white. Blue above and white below, joined in an even, smooth circle of horizon, we were trapped; forever at the centre of this great white disc. Occasionally a trans-atlantic aircraft would enter our blue hemisphere at thirty thousand feet and, for a few minutes, be the closest thing to us.

As the days and the distance passed a routine developed, starting a couple of hours before sunset to wake and dress before the temperature dropped too far. I find the early morning fight against gravity tough enough at the best of times so the prospect of leaving the warm confines of my down sleeping bag failed to enthuse me. When I had summed up enough courage to pull the zip down, I would retrieve my pre-heated thermal top and fleece from in between the bivi bag and down bag and pull them on in a blinding flash. Next, I would search for my lighter and remind myself for the umpteenth time to leave it next to the stove before I went to bed. There would still be enough pressure in the bottle from the evening meal and I would watch while too much fuel ran into the priming cup, nearly removing my eyebrows and a tent panel when I lit it. The stove would soon settle down to its characteristic roar whereupon I would place the, now frozen, bowl of porridge with butter, that had been soaking overnight, on the stove to burn.

While the porridge was burning, I would spit into a tube as part of a series of thrice daily samples that we were taking to form a profile of the stress level of each team member throughout the expedition. By the time I had put my tubes away, there would be a suitably acrid smell of burnt porridge in the tent to recall me to my culinary duties and I would wake my tent partner. When the last spoonful of almost three quarters of a litre of porridge slid down a pan of water would be boiling for either a cup-a-soup or hot chocolate and to fill the flasks with the same. We had an incredibly varied selection of drinks covering hot chocolate or tomato soup or golden vegetable. After two months one tries putting the golden vegetable in with the hot chocolate. If I thought it was going to be a particularly cold day then we would spread the biscuits and take the wrappers off the Rolos; impossible tasks with mitts on. We changed round every two days between the tents so that after a two day stint it would be another four days before someone would have to put up with the smell of my feet or porridge again.

A series of complex grunts between the two tents would signify the progress through these tasks and when each thought that the other was ready, four people would suddenly emerge from their tents and scurry around striking tents, filling fuel bottles, packing pulks and retrieving butter. If there had been any wind during the night then a huge drift would have built up around the tent and a fair amount of digging would take place to extract the tent. The most awkward job was that of folding the tent poles as they had invariably frozen together with condensation during the night and took a great deal of effort to part. On a good day the whole procedure would take just over two hours from unzipping to donning harness.

Carl usually led for the first hour and a half which was usually the worst as the mind was still active and yet the body not; making the time pass slowly. Out of the tent it seemed perfectly light as our eyes became accustomed but camera exposure readings showed it to be quite dim and by mid August it was almost dark. Even then, though, we could see one another a long way away should one of us have had a loo-stop or halted to add or remove clothing. Occasionally one of us would shout up to the person in front to correct their path.

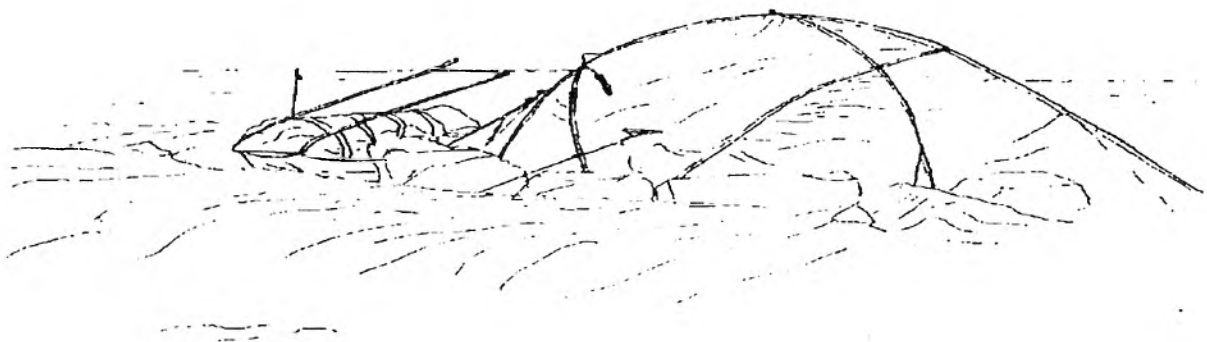
With absolutely nothing as visual reference laterally, there is real difficulty in trying to ski in a straight line and this was equally the case in blue skies as it was in complete white-out. The best conditions, we found, were when there were some clouds on the horizon and these could be used to head for. The remainder of the time, the person in front had to check the compass pinned to his jacket every hundred yards or so.

At the end of each hour and a half we would line our pulks up side by side, the traces resting on ski poles. I, like the others, kept a down jacket at the top of my pulk, next to my thermos and food, and would pull this on as soon as we stopped. Although I would probably be sweating when I got out of my harness, I would be freezing within five minutes without the jacket. Depending on the menu, I would have biscuits or chocolate and some soup, the biscuits with thick slices of butter in the same way that people would eat cheese. It made the stomach turn, particularly as the butter was a little off, but the calories were needed.

Pete would do the next stint and in the break before Steve took over we would take our second sputum sample of the day. I would lead the final stint, finishing around eight hours after having left the previous camp. Carl and I would turn on the two Global Positioning Systems to collect data from satellites while we pitched the tents. One of the tent pair would usually get the stove going to melt some snow while the other pitched the tent. Both, then, would start the tedious task of cutting out blocks of snow with the snow saws or shovels to hold the valences down on the tent and prevent spindrift from filling the gap between inner and fly. Some of the blocks would be stacked inside one of the bell-ends to act as the water supply. By this time the water would be boiling and the GPS's would have collected their data and we could retire to the relative warmth of the tent to cook dinner and find out the good or bad news as to how far we had travelled that day.

My moods were very much tied in to the distance covered each day. I was unhappy initially, and no doubt grumpy, when I saw that the distance we covered was much less than I had hoped and less than I thought that we were capable of doing. If we had made good ground one day, I would collapse, exhausted, into the tent, warm and satisfied to have achieved. If not, I would collapse, still exhausted, into the tent, unhappy that my efforts that day had not been translated into distance towards our goal. Our daily achievement depended to a certain extent on the weather conditions, wind direction and type and texture of the snow but also on the mental state of the slowest man. Physically, it was pretty much the same effort on either type of day.

The situation is a fairly basic one in the middle of the ice-cap. If one does not strive to cover the distance then one strives for nothing.



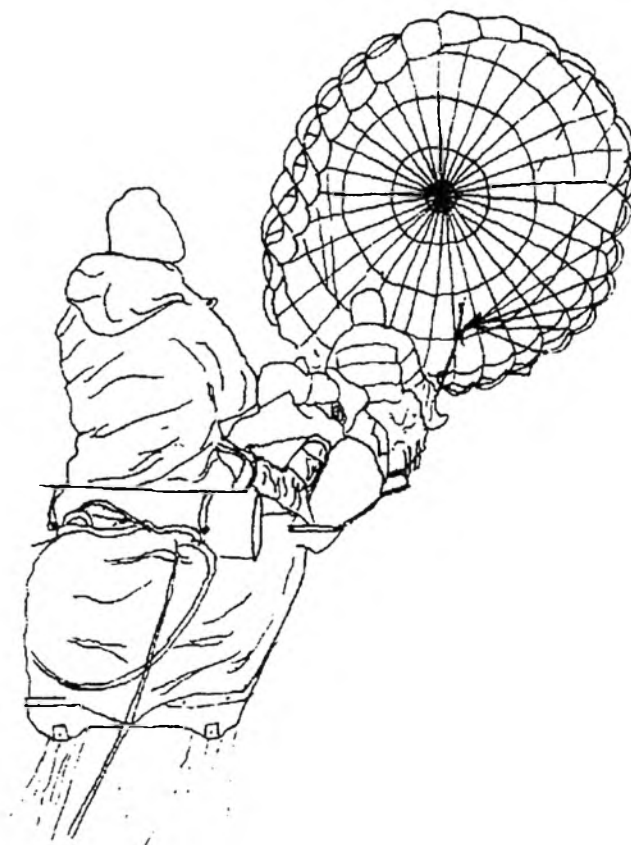
Next came the evening meal and, if feeling daring, one might add a little curry, garlic or mixed herbs to the dehydrated food to dry and coax a little bit of life into it. I must say that adding water to a packet and bringing to the boil is a black art as, for some of us, it seems to end in a partially rehydrated meal with peas like ball-bearings and, for others, a Delia Smith masterpiece. It is noted, however, that, from an in depth latrinal study, the peas, whether ball-bearing like or not, defy the human body's digestive system time and time again. To the pot would have been added a two hundred and fifty gramme block of butter.

After dinner drinks of hot chocolate would lead to a little bit of reading, light chit-chat about the scenery of the day or diary writing while the stove continued to roar away, melting snow to fill bottles, flasks and pans with water for the following day. Spitting into the third tube would be the final task of the day and, extinguishing the stove, I would slip back into my wonderful down-filled slumber.

Steve was still finding the going particularly difficult and had started suffering from diarrhoea. We were concerned that, as he has celiac disease, some gluten was present in the rations he was eating. Pete had gone to great lengths to ensure that every component of the rations made for Steve were entirely gluten-free and so it was strange that he should be affected. There was little that we could do other than systematically remove one item at a time but this failed to solve the problem and the same rations were eaten quite happily, with no ill effects once off the ice-cap. Fortunately, his situation was not deteriorating and, apart from the unpleasantness of going to the toilet on the ice-cap, he was not affected too badly physically. A substantial amount of Steve's equipment was redistributed which helped, but only brought the average daily distance to around ten miles (16Km).

For almost three weeks, we had had our sights set on "the saddle": The most level stretch of ice-cap and approximately seventy miles long, it was not going to be perceptible when we reached it but it was the first, and only feature on our map and therefore had great psychological value. At 8000 ft. it was also the highest point on our route and in the centre of the ice-cap so that, in theory, it was all down hill from there. When eventually the GPS dictated that that was where we were, I was delighted and, for the first time, it struck me that we might actually be successful in our venture. To top it, we were about to receive a free ride:

Carl called to me from the other tent, asking whether or not I thought the wind was strong enough. It had been blowing from the east for a couple of days now but, as yet, had only been a breeze and nothing like strong enough to inflate our parachute to drag the sleds along. It had picked up, though, and the tent fly rippled in the wind. Dressed in only my thermals and down boots, I crawled out of the tent and got the larger parachute from my pulk, unpacking it and attaching the two strops to the handles on Carl's pulk. Even if it was only strong enough to pull the pulks at walking pace, it would be a welcome rest from dragging them ourselves. As I lifted the centre of the 'chute, the green silk billowed out, filled and lifted up; the guy lines tightening and the bottom edge kissing the ground. The ski stick that I had dug into the snow and attached to the pulk suddenly gave way and the sled shot forward. I grabbed it as it passed and jumped on, instantly excited by the realisation of the parachute's power. After a hundred yards I released one side of the canopy and watched it collapse to the ground. I turned round to give the thumbs up to Carl but he had already gone to wake up Pete and Steve who had just gone to bed.



We packed the camp up frantically, in case the wind should dare to die or change direction, and soon had two pulks on each parachute and were ready to go. The wind had, in actual fact, increased while we packed and now the 'chutes pulled not only the pulks but us sitting on top of them too. Being rather unsteerable, I was concerned to see low cloud coming towards us in which we might lose sight of one another. By the time it did reach us the wind had picked up sufficiently that we could tie all four pulks in a Heath-Robinson affair, all sitting astride them, like arctic cowboys. This was most entertaining and, tying a rope to the back, we had a go at water skiing, making great swooping turns behind our air-driven convoy. The wind strength increased still further and, checking our bearing with the GPS, we discovered that we made eighteen kilometres (over ten miles) in a single hour. This really was the way to travel and I don't think that I have experienced a more surreal situation than lying back on a bumping sledge, chatting to Pete about my ideal meal in a restaurant, as we skimmed over the ice-cap at a great rate of knots with an enormous green parachute in front. Contemplating the thoughts of someone seeing us pass left us in stitches.

Having had no sleep, we managed only four hours with the parachute before we were forced to stop. We had managed to travel sixty kilometres in that short time and moved forty-five kilometres closer to our destination. Steve had already fallen asleep, letting his leg dangle dangerously close to the streaking surface and we decided to quit while we were uninjured and ahead. The wind was really quite vicious now and pitching the tents became an exciting task. We tried again the next morning but with much less success, covering only fifteen kilometres before the wind swung round. The parachutes, together weighing twenty kilograms, were never used again.

Towards the western edge of the saddle, we came in for some particularly cold weather. We had had a spell of low cloud for around ten days in which the light had been so flat that one could not even see the ripples in the snow between one's feet. As one could barely tell which way was up, it had been an incredibly frustrating time and was now relieved by clear skies. With the clear skies came a temperature plunge. It had been, fairly steadily, ranging between minus ten and minus twenty Celsius for a number of weeks and then, suddenly we were finding that it was dropping to minus thirty. This really was a wee bit chilly and we found patches of frost-nip appearing on noses and ear-lobes which later developed black scabs that fell off. Water bottles froze solid. The fuel in the stoves was so cold that the stoves burned poorly. Chocolate had to be pre-heated in inside pockets. Metal froze to exposed skin and batteries and liquid crystal displays refused to work. Soon my pockets were full with things being kept warm or defrosted.

It was sometimes so cold that the snow became like sand, dragging at the pulks most terribly and refusing to let them slide over the surface. This at least meant that, while skiing, I was perfectly warm, excepting extremities, and great ice crystals grew all over my body where hot breath or sweat vapour had frozen. Fortunately, the sand did not last for too long and, as we began to descend ever so slowly from the saddle and move closer to the coast, the temperature rose slightly.

We had been on the ice cap for about four or five weeks at this point and the air inside the tent had become decidedly fruity. I decided that it was time for a spring clean and commissioned the great coiffeur, Valentine (aka Pete), to cut my hair as best as is possible with scissors on a Swiss Army penknife. The result was rather disappointing and I was glad that I had few social engagements over the forthcoming month but resolved to continue my renovation with some ablution. Perched on a Karrimat in the snow, I splashed soapy water over my body, rubbing frantically to maintain some warmth, and even washed my hair. The water that ran off stained the snow grey with my dirt and, changing into my second pair of underpants, I retreated to the tent to melt my by now frozen hair. The whole affair was incredibly refreshing.

A couple of weeks later I saw a striking blue thin cloud on the horizon. We were visibly going down hill now, although it seemed to have little effect on the pulks' drag, and knew from the GPS that we were about forty miles from the edge of the ice. As I led on, I noticed that the cloud appeared to be moving along the horizon to my right and, changing shape, it slowly came round to be almost behind us before disappearing. Then I realised that what I had seen was a melt-water lake. A lake in the ice, forty miles from the "shore"? We were not expecting these for many miles yet but, as I thought about it, I could see another one appearing several miles ahead. This was not good news as it signified a long, damp time ahead.

Our camp that night was on hard, water ice, a few hundred yards beyond some miniature cracks, a couple of inches wide, that we had discovered. If this meant that there were to be crevasses for forty miles then this was to be hell on earth. Naively, we had been dividing the distance left by our daily average - still ten miles - and reasoned that we might be on land in five days. Thank goodness we did not know what lay between us and success.

The distance we could cover started to decrease the next day as we wound our way around lakes that only seemed to become visible when almost on top of them. Walking at right angles to the direction one hopes to go in is incredibly frustrating yet there was nothing we could do to avoid the subtle dips in the ice cap. I would have killed for an aerial photograph. Rounding one lake, we came across a melt-water stream approximately three metres wide and a complete barrier to our progress. These rivers are like flumes at a swimming pool.

carved into the ice by the racing water to leave a polished gutter from which there is no escape. Falling into such a stream would mean being washed down stream, scrabbling at the polished sides, until a crevasse, lake or the sea was reached, kilometres on. Fortunately we found two small islands which one could jump between, with crampons and a rope, to ferry the equipment across. It was a tedious process and, in all, took almost three hours. That night was spent, camped on the wrong side of another river, having reached it late in the evening. The surface had become steadily more bumpy over the past couple of days and now the moguls were one or two feet in height making pulking particularly exhausting.

I lay back on my sleeping bag, listening to the gentle bumping of chunks of ice as they floated down the river and contemplated how best to cross the river next morning. I heard one of the pair in the other tent shout something and thought that he must be talking in his sleep.

"Hello!"

He was shouting quite loudly and must have been having a nightmare.

"HELLO, ENGLISH PEOPLE!"

I almost jumped out of my skin. There was somebody else outside. After five or six weeks on the ice-cap one gets quite a shock if someone calls in. Staggering out of the tent, I saw three men on the other side of the river and recognised one to be Petre, a Finnish mountain guide whom I had met in Kulusuk and whom I knew to be attempting a crossing some time after us. We shouted a conversation across the water and he told me that they had seen our tents from several miles away and had altered course to see us. Not wishing to get their feet wet and the temperature being too low to hang around chatting, they cooked their dinner on the opposite bank and then pushed on; for their day was out of synchronisation with ours.

The following morning saw a very strange sight as, clad in stockings, we waded through the river carrying our pulks. I shall not even attempt to describe how cold one's feet feel after such an experience but the human body is an excellent machine and had our legs back in working order after twenty minutes. Once across, we could see the tracks left by our Scandinavian friends and these we followed for about an hour to their camp where we swapped stories, tips and chocolate with only twenty miles left to go to the edge of the ice. Full of bravado, Petre and his companions, both called Bjorn, told us that they would be drinking beer in Sondre in three days time. Less confident, I said that we had a lot of food left and so would take it slowly and steadily.

Our two groups set off into the obstacle that had stopped Petre the previous night: an enormous crevasse field that stretched as far as the eye could see. These cracks were up to five yards wide and thirty deep. This meant that we would walk forward a few yards to the edge of a crevasse, follow it along until a strong enough snow bridge appeared which was usually between fifty and a hundred and fifty yards away left or right. Once over the bridge, we could advance another few yards to the next crevasse and repeat the process. In this way we would move forward as slowly as seven hundred yards in an exhaustive hour and a half's work. Resting, we saw the other group progressing in the same manner but they had no ropes. I watched Little Bjorn falling in a number of times, only saved by the traces of his pulk and then extracted by Big Bjorn. Soon they were lost from view in the undulating, ruptured ice.

Choosing a route was a constant battle between the two evils of melt-water streams in the low ground and the crevasse fields on the high ground. In addition, ice hummocks three or four feet high peppered the surface so that, even when free from crevasses or water, one could not walk in a straight line and had to weave in and out of the bumps, heaving the pulk up over a saddle between two hummocks only for it to crash down the other side, the traces battering one's kidneys and bruising one's hips. The previous month had inured us to a daily physical battering and, had there been similar terrain at the start, I don't think it could have been crossed. Each day our minds became numb after the first hour or so of toil. Again, I thank heaven that we did not know it was going to get worse.

Small, shallow melt-water streams became ubiquitous and unavoidable. No longer wearing skis, we would run at these streams, the pulks dropping down into the water to stop dead for an instant until the running body would take up the strain, lurching the sled up the opposite bank: the force digging the harness deep into the abdomen. Wet feet and sweat were the order of the day so a wide, shallow stream at the close of one day was

no problem. With my camera and other electrics safely in a dry-bag and wearing only underpants and socks, I beat the water to a froth in a thirty yard dash through iced water, two feet deep. To my surprise, my pulk, though over a hundred kilos, floated quite well and reached the other side with everything inside still dry. The others followed in similar attire and manner.

To our delight we saw land for the first time the following day. Merely a black, jagged strip, it was little to see but psychologically it was a great boost as the finishing post was in sight, if still a long way off in time and effort. The boost was met by a set-back as we made only a mile that day, stuck in the middle of a crevasse field like no other. We weaved a path along the top of the thin, rough slices of ice, continually with fearsome drops into the dark interior on either side. The ice was so broken that often we would have to back track and attempt a different way through the maze. Eventually it became impossible to take the sleds any further and we stopped to consider the situation. It took some searching to find a big enough patch of ice to take the two tents and as we discussed the possibilities we could hear, and occasionally feel, the ice cracking as it moved beneath. With around seventy kilos per man, there was no chance that we could carry all the equipment with us. If we could, we would do a series of load carries to the shore but, if the terrain that we were camped in now was the norm, it would take us all our effort to reach the shore, leaving the kit behind.

Now, only around ten miles separated us from the land, yet the last ten miles had taken us two days and we now knew that the terrain was not going to get any easier. We resolved to form a kit dump of the pulks, spare food and fuel and anything that we couldn't carry on top of what we needed to survive and six days' food. Six days we hoped would give us plenty of time, should the terrain be desperate, to walk to Sondre with a single pack. If the going was manageable then it would also be sufficient for taking the load for a day and then returning to pick up more, still with enough food to make a dash for Sondre should we be unable to relocate the food-dump. It all seemed good in theory.

Without the pulks, progress was possible the next morning. I looked back at the pulks with their traces lashed vertically to act as markers and became painfully aware of how slowly we moved away from them as we zig-zagged through the ice maze. The first hour, however, took us well out of sight of them and into better terrain. Staggering under packs weighing as much as forty five kilograms was a less than pleasant experience but at least it was taking us closer to success and we pushed on, only collapsing after over eight hours of walking. We were only two and a half kilometres from the land.

With still plenty of food left at the dump, we could not bear nor afford to leave the equipment on the ice. I, and the others, assumed that it would be an easy day's walk back to the dump but it was not to be. One bump of ice looks very much like another and so it proved impossible to follow the route that we had come by. It was not long before we found ourselves amidst a nightmare of crevasses and then streams. The biggest obstacle was a melt-water river, ten yards wide and two or three deep. An enormous, thundering torrent streaked past the polished walls, on its way to the sea. Not even from the sluice gates of the largest reservoirs, have I seen water run with such power and ferocity. It was completely uncrossable.

The GPS told me that the dump was just over a kilometre away but we then had to trudge for three hours upstream until we came across a thin and precarious snow-bridge over the river. Using a rope, we crawled across on our bellies, spreading the weight as much as possible and, thankfully, getting across safely. My electronic navigator then led us into the crevasse field, right up to within fifty metres of the dump from where we could see the four sets of traces silhouetted. With great relief we gorged ourselves on chocolate, salami, peanuts and biscuits before crawling into bivi bags and sleeping in the pulks like babies in cots.



With packs, this time up to fifty five kilograms in weight, we left a small amount of food and fuel on the ice and retraced our steps of two days previously to the tents and the rest of the equipment. We were now getting used to pitching the tents in places where real estate was at a premium and took great caution when nipping out to go to the toilet not to disappear into an abyss. In this particular area, the crevasses were quite horrific and we decided to do an initial reconnaissance of the route to land with light loads. From the camp we escaped the crevasse field after an hour or so to enter an incredible, lunar landscape where Dr Who would have been most at home. Miniature valleys, ridges, lakes and rivers had been formed in the ice and from the top of one of the ridges I discovered that it was like this for as far as the eye could see. My heart sank, for moving through this terrain meant climbing over these thirty feet high ridges every twenty yards, continually avoiding lakes. Even with the light packs, our progress was slow and a real struggle.

The ice was like a gigantic, but less uniform, egg box and I sat down on my pack on the top of one of the ridges to rest. A cold, damp mist hung all around, merging land with sky. The Sony Pyxis GPS beeped at me to signify that it had received the satellites' data and, picking it up, I could hardly believe what it said. Two hundred metres. Two hundred metres to the edge of the ice. After so many weeks of watching the figure drop so slowly, it seemed impossible that what had been hundreds of miles should have finally dropped to a mere two hundred metres. Enthusiastic, I lumbered on and, after a hundred yards or so, could see a great dark shape looming before me. Land! The past two and a half kilometres, a distance that a runner could cover in under ten minutes, had taken us almost five hours.

With increasing elation, we wandered down on to the flat, grey ice that led to the loose mountains of black moraine. Every so often, rocks would tumble down the sides of these slag heaps, crashing into the filthy brown river that was the boundary between the moraine and land. Caring not about my long-sodden boots, I splashed through the river and up a bank to collapse on the soft, colourful tundra plants. I could smell the plants; the first smell other than our own, for so long. With great satisfaction, I lay on my pack, savouring the moment. I am not normally disposed towards emotion, but I must say that I was mightily pleased then as it represented not only the success of our physical efforts but also the realisation of a plan conceived three years before and the result of almost a year of planning.

However, there was little time to ponder, for it was getting late and we had still to return to our camp in the ice for another load the following day. This second load left us with only two men's worth on the ice and so, reaching land for the second time, we split: Carl and Stephen to head to Sondre Stromfjord to try to book us on to the next week's flight while Pete and I returned for the final load from the ice. I, unfortunately, had damaged my knee by a combination of a heavy pack twisting me one way and a crampon-clad foot twisting in the other. My knee absorbed the argument between the two and now left me hobbling painfully through the crevasses.

Spurred by the fact that this was our last journey over the ice, Pete and I made a good hobbling speed and were soon off at the kit dump at point 660. From here a spit of land ran between two glaciers for about ten kilometres. It was idyllic, walking by the edge of lakes lined with bog-cotton, reindeer silhouetted on the ridge lines and the sound of birds all around. In actual fact it was incredibly barren but to us it seemed like the garden of Eden; warm and dry under the clear blue sky.

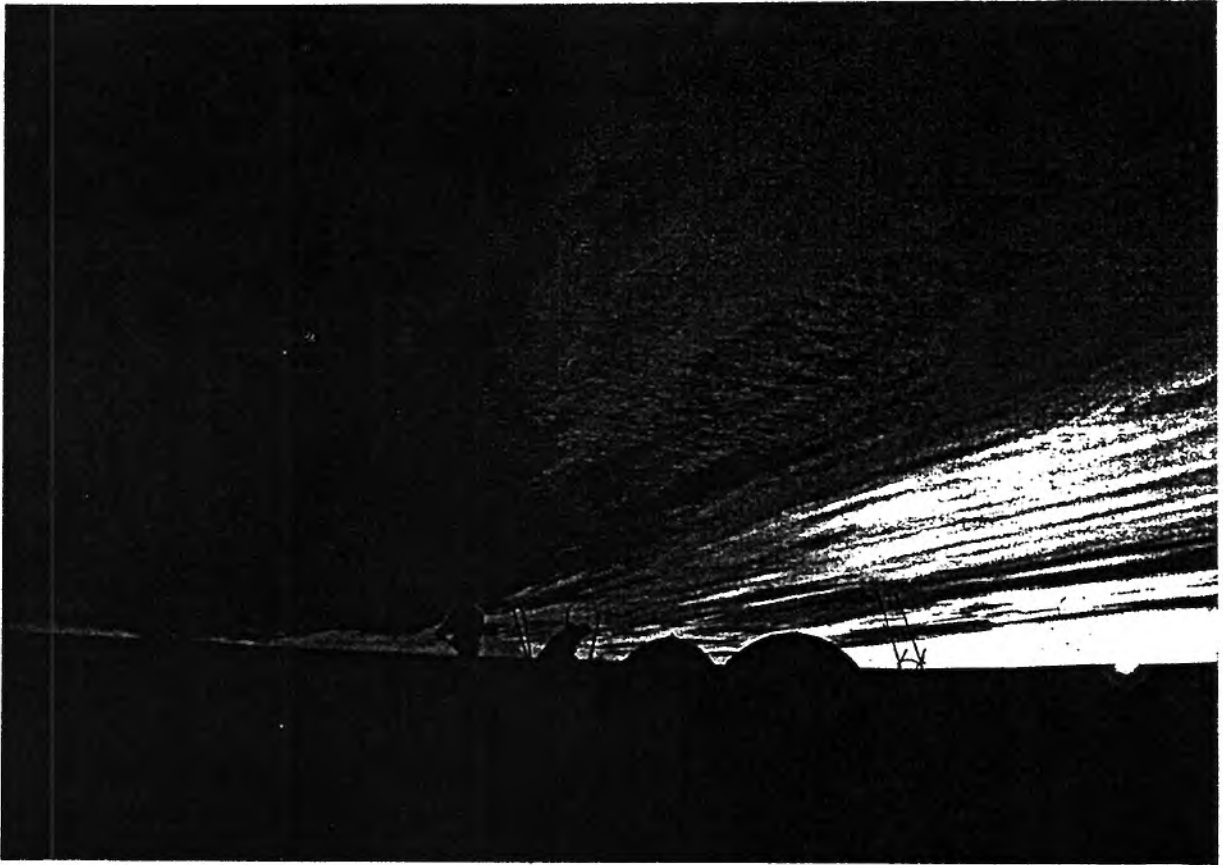
We camped that night by the edge of a lake and, after Pete made another carry from 660, were joined by Steve and Carl. They regaled us with tales of bars, fresh food, hot showers and beautiful Danish girls. The last two were, sadly, unconnected. Still suffering, I wimped out of the final load carry that brought the last of the kit down. The rest allowed my knee to recover and, with the pack weight up to as much as fifty kilos again, the four of us climbed to a saddle and descended to a Land Rover track that would lead us over the final twenty five kilometres to civilisation. Typically, it was a sweltering day at plus twelve degrees and our ice-cap-adjusted bodies poured sweat under the toil of the loads.

On the path, I met a number of tourists, out for a walk from Sondre who all asked where I had come from. The reply "Ammassalik" left them all rather bemused. By the way in which they said they would see me in Sondre that night, I realised that this was not the huge conurbation I had thought it might be.

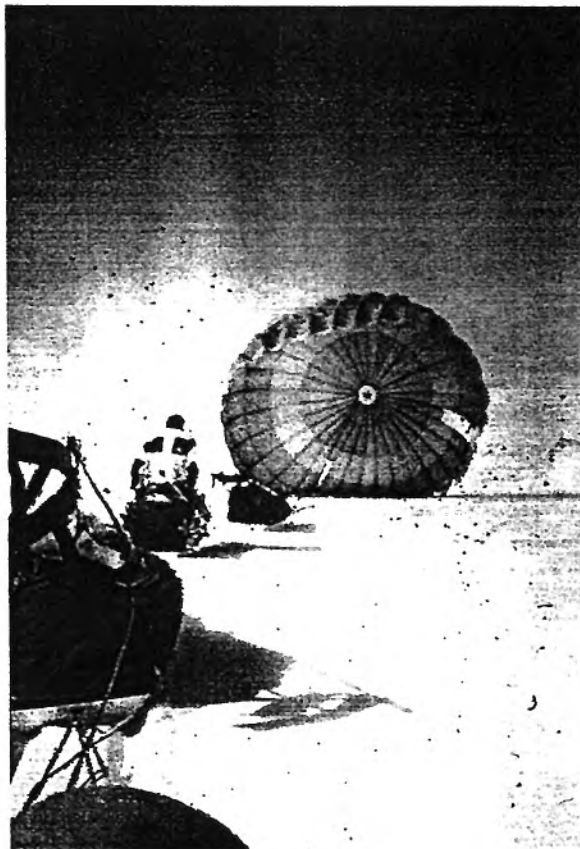
Seven kilometres from the town, the track improved and I met some Innuits in a jeep who asked if I would like a lift. I would have loved a lift but the others were behind and I could not get a free ride and they not. I declined the generous offer and, blisters squelching beneath, resolved that if I could walk four hundred-odd miles then I could certainly manage the last seven kilometres. An hour later Carl zipped past me, clinging to his and Pete's packs in a cloud of dust in the back of a jeep. He shouted that Pete had gone back to help Stephen. The last couple of kilometres took an eternity but I finally stumbled into the campsite to be met by Carl. Just as I took my pack off, the other two arrived in the back of a pick-up, Pete explaining that he had found Stephen asleep in a river bed.

Hot showers, plenty of food and lots of sleep formed the routine of the next few days as we waited in this one horse town for our flight. A trip to the check-in desk's scales told me that I had lost more than a stone in weight. At the hotel reception I found a letter from Petre, describing how they had ended up in trouble, having to dump their skis, sleds and so on to make a dash for the coast and then Sondre. He described how, even after showers, they had been asked to leave the bar because they smelled so badly. They had flown out on the previous week's flight. When we had met him on the ice he admitted that he did not think that such a young expedition as ours would make it. Many expeditions, he said, reached Kulusuk and no further and so he had been very surprised to meet us twenty miles from the western coast.

Happy in our success, we lifted off from the American air strip at Sondre, heading east and homewards. We had soon floated over point 660 and the lakes, streams and crevasses that had caused so much toil. I thought of the transatlantic vapour trails that we had watched crossing our sky. Now we were one of those white streaks and I gazed down on the great white expanse that had been our challenge.



- Start of the "day" at Camp 7, 6417 ft on the ice-cap.
Temperature -16 C; 275 miles to point "660".



- A "free ride"; 2pm on the 1st August. 8300 ft on the ice-cap.
Temperature -8 C; 179 miles to point "660".



- River crossing the hard way. 4pm on 19th Aug. 3850 ft on the ice-cap. Temperature -4 C; 10 miles to point "660".



- Land!. View on the evening of 20th Aug from Camp 20. 2800 ft

EQUIPMENT REPORT

Jamie Miller

Group Equipment

Item	Quantity	Manufacturer and Comments
Tent	2	Wild Country, Mountain Super Nova. Very strong tents that are palatial for two, comfortable for three and cramped for four. The poles, unfortunately, bent in the cold, one breaking, and were often difficult to separate after condensation froze in their joints. The mosquito net door gets in the road and caught on stoves and some of the eyelets for the pole ends ripped out but otherwise the tents stood up brilliantly to the battering. Lines may be strung inside for drying clothes and the pockets in the inner tent are very handy. Continuous pole sleeves would be a great improvement for when pitching in wind.
Stove	3	MSR XGK and Whisperlite. The XGK's are incredibly reliable, powerful and noisy. They never failed to light first time, required no separate priming fuel and melted snow incredibly quickly. Their only bad point is that most food ends up as "barbecue flavour" as simmering is an elusive state only reached by our spare stove: the Whisperlite. The pump is badly designed in that, when pumping with gloves on, the collets invariably undo and fall off into the snow. These should be glued together around the pump. Vaseline is needed for the seals and plunger.
Tray	2	Used to prevent the stove melting down into the snow.
Fuel	120L	Unleaded petrol was used at the rate of approximately 0.5 litres per tent pair per day, using the stoves rather extravagantly. Unleaded fuel required the jet to be pricked approximately every three uses.
Fuel container	24	5-litre oblong metal oil containers with double metal caps proved to be ideal and, with one exception, did not leak.
Funnel	1	
Cooksets	2	MSR. These included the heat exchangers which did save time and fuel in melting snow. The pans were rather heavy and had no spout in their rims, often causing water to go everywhere when filling flasks. The pan handles are pathetic and led to one scalding and umpteen dropped dinners.
Water container	7	Nalgene 1 litre, wide-necked containers. The wide neck allows melted snow to be poured from the pans. One metal Sigg bottle was taken but it soon split when its contents froze, proving the value of Nalgene plastic. Two old bottles were used as piss-pots.
Thermos	4	Unbreakable one litre flasks. The tops proved difficult to clean
Snow shovel	2	One metal and one plastic. The advantage of the metal one is that it may be used as a stove base.
Snow saw	2	Camp. Not mandatory but certainly used a great deal.
Snow stake	4	Perfect and necessary for anchoring the tents.
Ice screw	8	Used to anchor the tents on dry glacier.
Harness	4	Not entirely necessary as the pulk harnesses could be used in desperation.
Rope	2	50m, everdry, 9 mm climbing ropes. One would be enough.
Prussik	8	One short, one long per person.
Crampons	4	Worth their weight for the last ten miles.
Ice axe	4	One was a hammer for snargs, stakes, repairs etc.
Skis	5	Kahru GT. Very good at going in a straight line but not much else! They seemed quite strong, even in the cold, and had no problem in supporting 14 stone over crevasses. This meant that there was no need for our spare pair of alpine skis which should have been left behind.
Skins	4	Coll-Tex. We chose the narrow skins that give less forwards drag. They had plenty of grip initially but wore out to become unusable in as little as ten days and left the wearer floundering around. The wider pair in the spares kit showed less damage when used.
Skin Adhesive	1	Aerosol can by Coll Tex. This was next to no use at all and a stick should have been taken instead.

Wax		Swix. A spectrum of waxes were taken and these performed brilliantly or disastrously but never consistently.
Klister		Swix. Its only real use was in sticking the skins back on!
Bindings	4	Rottfella Telemark. Simple and sturdy, these bindings showed no sign of wear or tear. Spray painting the bindings some colour other than their natural white before departure would mean that the annoying snow build-up could be seen.
Sticks	6	Swix Mountain. The strongest poles I have ever used and, although they did not break, we did manage to bend them and drop them into crevasses. Fortunately we had two pairs of Leki Telemark adjustable poles which were fine, although less strong and sometimes difficult to adjust.
Sled	2	Snowsled 1.6m man-haul pulks. These fibreglass sleds are tried and tested and we only found minor faults with them. The cross bar on the traces broke making the sleds less stable in rough terrain and the buckles on the harnesses all slipped and needed sewn. If the padded waist belt was wider at the hip then it would be more comfortable in rough terrain. Towards the end of the journey, all four pulks developed cracks, and then holes, in their hulls.
Parachute	2	Only one was used as a large military round canopy is sufficient to pull four pulks in around 15 knots of wind.
Rifle	1	7.62 mm SMLE. The rifle was taken because our initial plan was to land in the fjord and ascend a glacier from there. The Eskimos expected polar bears in that region at that time of year but, on reflection, it was an unnecessary ten kilos when thunderflashes or similar would have done.
First aid kit	1	A comprehensive kit including antibiotics, dental repair kit, dressings, bandages, blister tape, Algipan, painkillers etc. Most useful, and an enjoyable read, was "Medicine for Mountaineering". Do not read this before departure as it may make you concerned and your first aid kit unliftable!
Locator beacon	2	Joltron. Hired from a sailing supplier, we didn't have the pleasure of testing whether or not these worked but for their weight and size they are the most valuable pieces of equipment we had.
Compass	4	Silva. These sighting compasses had safety pins to attach the compass horizontally from the chest and allow hands-free use. Great but rather fragile. The mirror was used for shaving and picking spots.
Nav. System	2	Magellan Nav 1000 M. Robust and easy to use, this almost pocket size GPS proved to be very accurate. It uses six AA batteries and these lasted about ten days but, like the screen, they became uncooperative below around -15 Celsius. Sony Pyxis. This was much quicker and, I believe, used less battery power. It also has the advantage of being able to calculate easily how much closer one has moved to a target point. Again it is very accurate; within 50 metres, but perhaps less sturdy.
Sextant	1	The sextant worked fine...as long as you were at sea level!
Camera	2	Canon. Two SLR's were taken and performed well with UV filters and hoods. The Canon EOS 1000F was operable with mitts on but occasionally the batteries were too cold to work happily and the display was sluggish and faint. The auto wind on was good in that no films were torn as might have been expected at those temperatures.
Film equipment	1	National Geographic supplied us with a Hi8 video camera, tripod, recharger and solar panel. The solar panel only succeeded in recharging one battery on a particularly warm day and the camera was particularly sensitive to spindrift and Peter. The tripod was unnecessary and an ice-axe camera attachment would have been fine.
Spares Kit	1	Spare hat, gloves, goggles, glasses, harness pins and skins
Repairs Kit	1	Araldite, pliers, tent pole tubes, duck tape, needles and carpet thread, sewing kit, para cord, tent material, rope for traces etc.
Toilet Paper	25	Flat pack boxes with 100 sheets. Also used for mopping up spillages in the tent.
Gas lighters		Refused to work when wet. Approximately nine were used.
Puritabs		Used "on land".
Windproof matches		
Brush	2	Cut down nylon pot-cleaning brushes used to clean snow from boots as well as food from bowls.

Personal Equipment

Item	Quantity	Manufacturer and comments
Sleeping bag	1	4 season down bag. This was fine until it got wet towards the end and then life became pretty miserable! Drying out is not really an option.
Bivi-bag	1	Gore-Tex. A BB makes the sleeping bag much warmer and is also one's insurance against the tents blowing away.
Vapour barrier	1	The North Face. Never used.
Sleeping Mat	2	Ridge Rests. These mats are much more comfortable than an ordinary one. One mat, of any type, just isn't enough.
Rucksack	1	Only used in the final stage.
Oversuit	1	The North Face Mountain Jacket and Salopettes. Absolutely ideal and a very well designed and made suit. The ventilation slits are useful and the drop seat indispensable. The pouch in the salopettes served well to defrost chocolate, suncream etc.
Fleece layer	1	Fleece trousers or salopettes, a thick fleece jacket and a thin fleece top formed the "fleece layer".
Thermal layer	2	North Cape thermal long johns and shirts were incredibly warm for their thickness, very comfortable and remarkably pong-resistant!
Down Jacket	1	Rab. These were worn at almost all times when we weren't skiing and were really incredibly warm.
Down Boots	1	Rab. A little bit of luxury but worth their almost negligible weight and packed size. The ones with sticky soles dragged snow into the tent.
Balaclava	1	Fleece. A large face hole allows it to be worn on the neck.
Gloves	4	Four layers: silk inner gloves, thin acrylic gloves, thick fleece mitts and then a goretex shell. Hands were regularly cold, even with this lot, but no fingers were lost.
Socks	3	Thorlo mountaineering socks and winter liners proved to be very comfortable and reasonably warm but just two sets would have done. A pair of vapour barrier socks made a great difference to the warmth.
Underpants	3	Cotton. Two would do.
Goggles	1	Vuarnet. Very comfortable goggles that worked reasonably well in flat light. One must be careful not to get steam between the lenses as it is very difficult to get rid of it.
Glasses	1	Vuarnet: the business. The quality of the lenses is really quite superb and the necessity for glasses at all times became a pleasure rather than being awkward.
Face mask	1	Neoprene. This is a small, vital piece of clothing which most definitely saved noses, lips and cheeks from frostbite.
Boots	1	Allico Teletour. These leather, telemark boots had a substantial lining of Thinsulate which meant comfort down to around -20 Celsius when they were dry. Had vapour barrier socks been worn from the start, the gaiters been glued down and the boots' seams sealed then our boots could have remained bone dry and therefore much warmer.
Sun cream	1	Factor 30! Waterproof would have been better.
Lip salve	1	
Nivea	1	Not used.
Penknife	1	Scissors are handy for cutting nails.
Spoon	1	Three were lost so spares are needed!
Towel	1	Pertex: about as effective as a carrier bag but at least it will dry out and it doesn't weigh much.
Soap	1	Liquid soap for clothes, hair, body etc.; better than a bar.
Toothpaste	1	
Toothbrush	1	
Book	1	Margins sawn off to reduce weight!
Diary	1	
Stuffsacks		

Equipment : On Reflection

Having completed the crossing, it is now clear that the skiing is the easy part and that getting off the ice is the most tiring and frustrating part. Doing this in the future, I would sacrifice all comforts or aids on the ice in order to have a single, carriable load when the pulks become unusable. A considerable proportion of our weight could and should have been left at home. For instance, we need not have taken the parachutes which weighed almost twenty kilos. The rifle is unnecessary when being flown on the ice-cap but some sort of polar-bear deterrent ought to be taken for a fjord-based start. Much of the spare equipment could have been left because one can mend and improvise greatly. Hats, gloves, etc. could all be made from other articles of clothing.

If doing the same route again, I would take the absolute minimum for travel and survival and make sure that all the luxuries were edible or burnable ones. However, things that I would consider for next time include ear-plugs to sleep through storms and an electric toaster with a plentiful supply of Mighty White and strawberry jam.

RATIONS REPORT

The food for the expedition was split into two main types: Gluten-Free and Arctic Compo rations. The Compo was provided by the Territorial Army and the Royal Air Force and made up 140 man-days of food while the Gluten Free constituted 100 man-days.

The Gluten Problem *Peter Price Thomas*

To have to prepare a menu for three people whom you'll be living with for the next two months, particularly when one of them has a gun, is a daunting prospect. To have to prepare one which contains 6000 KCals. is light and, most importantly, free from gluten is nigh on impossible!

"So you're saying you can't eat any flour at all?". Steve, having answered this question and gave me a small book published by the British Celiac Association detailing everything that he could eat. It was rather lacking when it came to dehydrated meals. Thankfully, we had scrounged a menu plan from our patron, who had apparently been on some jaunt earlier on in the year.

Based on this, we eventually had a menu that was tailored to our needs. The porridge, nuts and biscuit were chosen to provide us with our complex carbohydrates to keep us going through the day: the chocolate to give our blood sugar level a boost at each break time and the butter to provide us with the required calories. This was based mainly on personal experience, rather than scientific research, but it seemed to work well.

Item	Quantity	Calorific Value
Breakfast		
Porridge	100g	377
Cappuccino	1 sachet	48
Break I		
Yorkie	65g	341
Soup	2 sachets	150
Peanuts	50g	300
Lunch		
Salami	62.5g	250
Gluten-free biscuits	4	96
Break III		
Yorkie	65g	341
Peanuts	50g	300
Break IV		
Flap-jack	80g	399
Supper		
Beef Risotto	2 packs	774
Smash	50g	230
Chocolate Break	1 sachet	112
Butter	150g	1106
Yorkie	97.5g	511
Total	1250g (approx.)	5948 KCal

Compo Rations *Jamie Miller*

The rations were taken apart and then repackaged with supplementary butter and peanuts but minus unnecessary components. An inordinate number were of "Menu B" which was fortunate as it was by far the most tasty of the four. Although it said "B" on the box, the contents did not correlate with any MOD paper work that I have seen and it suffices to say that it is the one with Chicken Supreme. Some might argue that the same meal for two months is unhealthy but, I can assure you, a little bit of garlic, curry powder or mixed herbs can make the most incredible transformation. Since our return, some expedition members have started to grow feathers and walk in a jerky manner whilst clucking.

Item	Wt g	Moist. g	Protein g	Fat g	CHO g	KCal
Breakfast						
Rolled Oats Mix	70	5.3	11.6	10.6	40.3	293
Chocolate Drink Mix	95	2.6	15.4	9.2	53.3	344
Snacks						
Biscuits Brown	84	3.0	7.2	11.0	61.5	359
Biscuits Fruit	95	9.0	5.0	4.0	75.0	341
Beef Spread	50	33.6	7.9	6.3	0.9	92
Chocolate (Yorkie)	60	1.0	4.4	17.4	36.2	310
Rolos (2 pkts)	88	4.0	4.7	18.2	59.8	407
Nuts & raisins	42	4.5	5.1	8.6	23.0	184
Dextrose Tablets	38.3	0.0	0.0	0.0	38.3	144
Main Meal						
Soup Vegetable	42	2.1	5.2	3.5	23.9	142
Chicken Supreme Granules	70	2.6	6.2	24.7	30.5	361
Pre-Cooked Rice	35	6.5	6.4	0.9	71.1	300
Dried Peas	43	2.4	9.8	0.3	26.0	139
Apple & Apricot Flakes	28	1.0	0.6	0.0	25.9	99
Supplements						
Peanuts	100	-	-	-	-	600
Butter	150	-	-	-	-	1106
Total	1140					5221

Note: Anything else that is normally found in arctic compo was not taken.

General

In addition to the 240 man-days of rations, the following were taken:

Sugar	4 Lbs
Herbs	-
Chilli	-
Challenge-hot curry powder	-
Salt	2 pots
Pepper	2 pots
Powdered milk	2 tins
Emergency rations	25 x 250g butter 40 x 50g peanuts

Rations - Handy Hints *Peter Price-Thomas*

If your stomach turns at the thought of eating so much butter then do not worry, for it is an acquired taste. Towards the end of the expedition we were eating 250g of butter per person per day and, with a great deal of imagination, we could make a "biscuit, fruit", with a half-inch thick slab of butter on top, taste like a Devon Cream Tea. What cholesterol?

All powdered drinks and soups can make up far more than they claim on their packets. A cup-a-soup requires "exactly" a third of a pint but we found it to be more palatable when two packets were mixed to a litre. In contrast, the Vesta meals that we ate were supposed to be for two but could be stuffed by one. The rice that came with these meals takes for ever to cook, as do dried vegetables. I doubt that any nutritional value is gained from dried vegetables.

Dried fruit would have been very welcome and could have been mixed in with porridge or custard. If a bowl-type thermos was taken then hot meals could be eaten throughout the day. A Scandinavian expedition used some sort of flour-based, thick liquid in this manner and it seemed to work well. The dextrose tablets only served to give a short high followed by a very noticeable blood sugar low.

As time progressed, and our rubbish accumulated, I was aware of the significant weight in packaging. On a future expedition I think that I would consider taking zip-lock bags, as found in stationery stores, to contain the dried food. This could be done for soups, rice, pasta and so on and would have the great advantage that the amount used at each meal is variable. If falling behind time then the volumes can be cut to conserve food; if ahead then one can be rewarded by a larger meal. Over the period, what we needed to fill us up almost doubled. I suggest "zip-lock" bags because we had great difficulty in untying knots in bags with numb, freezing fingers. Those with wire ties were more manageable.

STRESS ANALYSIS PROJECT

Jamie Miller

A stress analysis project was undertaken for Professor Hugh Simpson. to provide a profile of each team member's physiological stress level throughout the expedition. The method in which samples were taken and the associated exertion levels perceived by the team at the time of each sample are described and given below.

General

It was noted that, due to the constraints of an expedition in such an environment, the scientific projects were to be lightweight and manageable while wearing mitts. In addition, they were not to take up an inordinate amount of time in the daily routine which could have led to the project being abandoned or not completed should it have begun to compromise the completion of the main expedition objective.

An ideal project, which satisfied the demands described was to take sputum samples three times a day throughout the expedition in order to provide a profile of the physical stress levels of each team member. These have yet to be tested, but the method in which the samples were taken and the time of each sample is described below.

Method

A testable and practical amount of sputum that one can produce without too much effort is between 1 and 1.5 ml and an ideal container for this seemed to be Eppendorf tubes¹ manufactured in clear polypropylene. Initially, 1 ml tubes were tried, but proved too difficult to spit directly into and, although 5 ml plastic syringes (sans needles!) overcame this, they introduced the possibility of sample contamination and made the task considerably more awkward.

The method settled for and adhered to for both the expedition and control was as follows: 1.5 ml Eppendorf tubes were spat into until full (or as much sputum as was humanely possible had been produced). The samples were taken thrice daily: immediately on waking, immediately before sleeping and approximately half-way between these two times. The tubes were taped in strips of 21, to provide a week's supply, with each subject having a distinct colour of tape. On the tape, the date and time to the nearest hour was written in indelible pen for each Eppendorf tube. On reaching the end of the strip, a new one would be issued and the tubes in the completed strip would have a three figure serial number and the letter of the subject's first name carved into the lid.

On return, the strips were ordered and joined to form one large strip for each subject.

Subject Details

Subject	Height	Weight at start of expedition	Weight at end of expedition	Date of Birth
C	171	10 St	10 St	09/12/71
J	184	14 St 7 Lbs	13 St 6 Lbs	01/05/72
P	178	11 St 4 Lbs	10 St 7 Lbs	14/02/72
S	177	10 St 7 Lbs	10 St 5 Lbs	22/11/66

All subjects are male. Subject S is celiac, otherwise all are physically fit and healthy.

¹Supplied by Scotlab Ltd, Kirkshaws Road, Coatbridge, Strathclyde, ML5 8AD £19.95, per 1000

Data Pertaining to the Collection Of Samples

Notes:

[1] These numbers are carved into the lid of the samples

[2] Date and time given by the first two digits representing the day of the month and the remaining four digits as the time, to the nearest hour on the 24 hour clock that the sample was taken. Times are local.

[3] The perceived level of physical exertion over the period between the sample and the previous sample. Low: resting or sleeping; Medium: walking or skiing with light packs; High: Carrying, lifting or pulling heavy weights for a considerable portion of the period; V. High: As for High, but with particularly heavy weights and/or awkward terrain.

[4] The main activity during the period and any pertinent notes.

Serial	Date / Time (DDHHMM)	Perceived Exertion	Notes & Activity
[1]	[2]	[3]	[4]
001	July 09(1)	Low	Sleeping
002	09(2)	Med	Pack up camp, flight
003		Med	Arrive in Greenland
004	10(1)	Low	Sleeping
005	10(2)	Med	Administration
006		High	Moving equipment
007	11(1)	Low	Sleeping
008	11(2)	High	Loading Equipment on to boat
009	11(3)	Low	On boat, travelling towards ice-cap.
010	12(1)	Low	Sleeping
011	12(2)	Low	On boat, travelling towards ice-cap.
012	12(3)	Low	On boat, travelling towards ice-cap.
013	13(1)	Low	Sleeping
014	13(2)	Low	Being tourists
015	13(3)	Low	Waiting in Ammassalik
016	140900	Med	Loading equipment on to helicopter
017	141200	Low	Helicopter flight
018		Med	Unloading equipment, pitching camp
019	150700	Low	General administration
020		Med	4-5 hours skiing, light packs
021	152100	Med	Note: sleeping to reverse day/night
022	162100	Med	Ski with medium packs to coast (5 hours)
023	171000	Med	C,S rest and sleep J,P climb and ski
024	172100	Low	Sleeping
025	180300	Med	Return by ski to camp
026	182000	Low	Sleeping
027	190500	High	First day pulking
028	190900	High	Pulking
029	191900	Low	Sleeping

Serial	Date / Time (DDHHHH)	Exertion	Notes & Activity
[1]	[2]	[3]	[4]
030	200300	High	Pulking
031	201000	High	Pulking
032	202000	Low	Sleeping
033	210300	High	Pulking
034	211000	High	Pulking
035	212100	Low	Sleeping
036	220300	High	Pulking
037	221000	High	Pulking
038	222000	Low	Sleeping
039	230300	High	Pulking
040	231000	High	Pulking
041	232000	Low	Sleeping
042	240400	High	Pulking
043	241100	High	Pulking
044	242000	Low	Sleeping
045	250300	High	Pulking
046	251100	High	Pulking
047	252000	Low	Sleeping
048	260300	High	Pulking
049	261100	High	Pulking
050	262000	Low	Sleeping
051	270300	High	Pulking
052	271100	High	Pulking
053	272000	Low	Sleeping
054	280300	Low	Rest Day
055	281100	Low	Rest Day
056	282000	Low	Sleeping
057	290300	High	Pulking
058	291100	High	Pulking
059	292000	Low	Sleeping
060	300300	High	Pulking
061	301100	High	Pulking
062	302000	Low	Sleeping
063	310300	High	Pulking
064	311100	High	Pulking
065	312000	Low	Sleeping
066	Aug 010300	High	Pulking
067	011100	High	Pulking
068	012200	Med	Pulled by parachute
069	020800	Low	Change to move during daylight. Sleeping

Serial	Date / Time (DDHHMM)	Exertion	Notes & Activity
[1]	[2]	[3]	[4]
070	021500	High	Pulled by parachute
071	021900	High	Pulking
072	030300	Low	Sleeping
073	031100	High	Pulking
074	031900	High	Pulking
075	040300	Low	Sleeping
076	041100	High	Pulking
077	041900	High	Pulking
078	050300	Low	Sleeping
079	051100	High	Pulking
080	051900	High	Pulking
081	060300	Low	Sleeping
082	061100	High	Pulking
083	061900	High	Pulking
084	070300	Low	Sleeping
085	071100	High	Pulking
086	071900	High	Pulking
087	080300	Low	Sleeping
088	081100	High	Pulking
089	081900	High	Pulking
090	090300	Low	Sleeping
091	091100	High	Pulking
092	091900	High	Pulking
093	100100	Low	Sleeping
094	100900	High	Pulking
095	101700	High	Pulking
096	110100	Low	Sleeping
097	111000	High	Pulking
098	112000	High	Pulking
099	120100	Low	Sleeping
100	121000	High	Pulking
101	122000	Low	Sleeping
102	130300	High	Pulking
103	131100	High	Pulking
104	132000	Low	Sleeping
105	140300	High	Pulking
106	141100	High	Pulking
107	142000	Low	Sleeping
108	150300	High	Pulking
109	151100	High	Pulking

Serial	Date / Time (DDHHHH)	Exertion	Notes & Activity
[1]	[2]	[3]	[4]
110	152000	Low	Sleeping
111	160300	High	Pulking
112	161100	High	Pulking
113	162000	Low	Sleeping
114	170300	High	Pulking
115	171100	High	Pulking
116	172000	Low	Sleeping
117	180300	High	Pulking
118	182200	High	Pulking
119	190600	Low	Sleeping
120	191400	High	Pulking
121	192200	High	Pulking
122	200600	Low	Sleeping
123	201400	High	Pulking
124	202200	High	Pulking
125	210600	Low	Sleeping
126	211400	V.High	Load Carrying
127	212200	V.High	Load Carrying
128	220600	Low	Sleeping
129	221400	Med	Walking (light packs)
130	222200	Med	Walking (light packs)
131	23??00	Low	Sleeping
132	23??00	V.High	Load Carrying
133	23??00	V.High	Load Carrying
134	23??00	V.High	Load Carrying
135	240800	Low	Sleeping
136	241500	High	Load Carrying
137	242200	High	Load Carrying
138	250800	Low	Sleeping
139	251500	High	Load Carrying
140	252200	High	Load Carrying
141	260800	Low	Sleeping

METEOROLOGICAL STUDY

Carl Holt

During the planning stage of the expedition, we had offered to undertake a study of ultra violet radiation for Dr Ann Webb at the University of Reading. Along with the equipment to take UV measurements, we expected to be loaned some meteorological equipment. Only by poor preparation did we manage to leave the UK without either the UV measurement equipment or any meteorological equipment whatsoever.

On reaching Iceland, we spent a day exhausting both ourselves and possible sources of equipment in Reykjavik, with only a max/min thermometer to show for our trouble. Ideally we would have liked to have taken an anemometer and altimeter as a minimum, but by now we had no choice. The day after, 10th of July, we departed Iceland for the east coast of Greenland.

Weather observations began on the 15th of July, the day we were helicoptered onto the icecap. Observations ended when we reached land on the West coast (10 Km from which the thermometer had broken). Observations were made twice a day: on waking up and going to bed. A typical observation would firstly measure the ambient temperature and the max and min temperatures since the last reading. Wind direction would be measured with a compass and the speed estimated. Cloud cover and general observations such as the passages of fronts were also made as appropriate. During the time spent pulking, the thermometer was attached to the outside of my pulk which would serve two purposes: encouragement - when it showed to be colder than it felt and secondly, and more usefully, it gave a guide as to the best ski wax for the snow conditions.

There was not a single day when the weather was so bad that travel became impossible. Generally one would wake up and be convinced that from the noise of the wind against the tent that you would be lucky to stand up outside, never mind pulk. Once out however, it was never as bad as it had first sounded and a good day's pulking was perfectly possible. Spindrift was present on most days, except when totally calm, and would build up to impressive mounds around obstacles such as tents and pulks in very short lengths of time. We soon learned things left unmarked on the snow when going to bed could easily be lost by the time one woke. More than once, someone would say "Where the hell did I leave the ...?".

Precipitation was very rare and most occurred once we had reached the meltwater lakes on the west coast. There were 3 days of snowfall; each time being only a few cm depth and 3 days of rain. There were also 5 days when we suffered whiteout conditions while skiing for all or part of the time.

We found the best temperature for pulking was between -5 and -20 °C. Above this range, one suffered from the skins on the skis "balling-up" with snow and below about -20°C the snow seemed to be in a completely different phase. The snow would easily crumble, making pulking a much greater effort than normal. It began to feel as if the surface was sand, not snow!

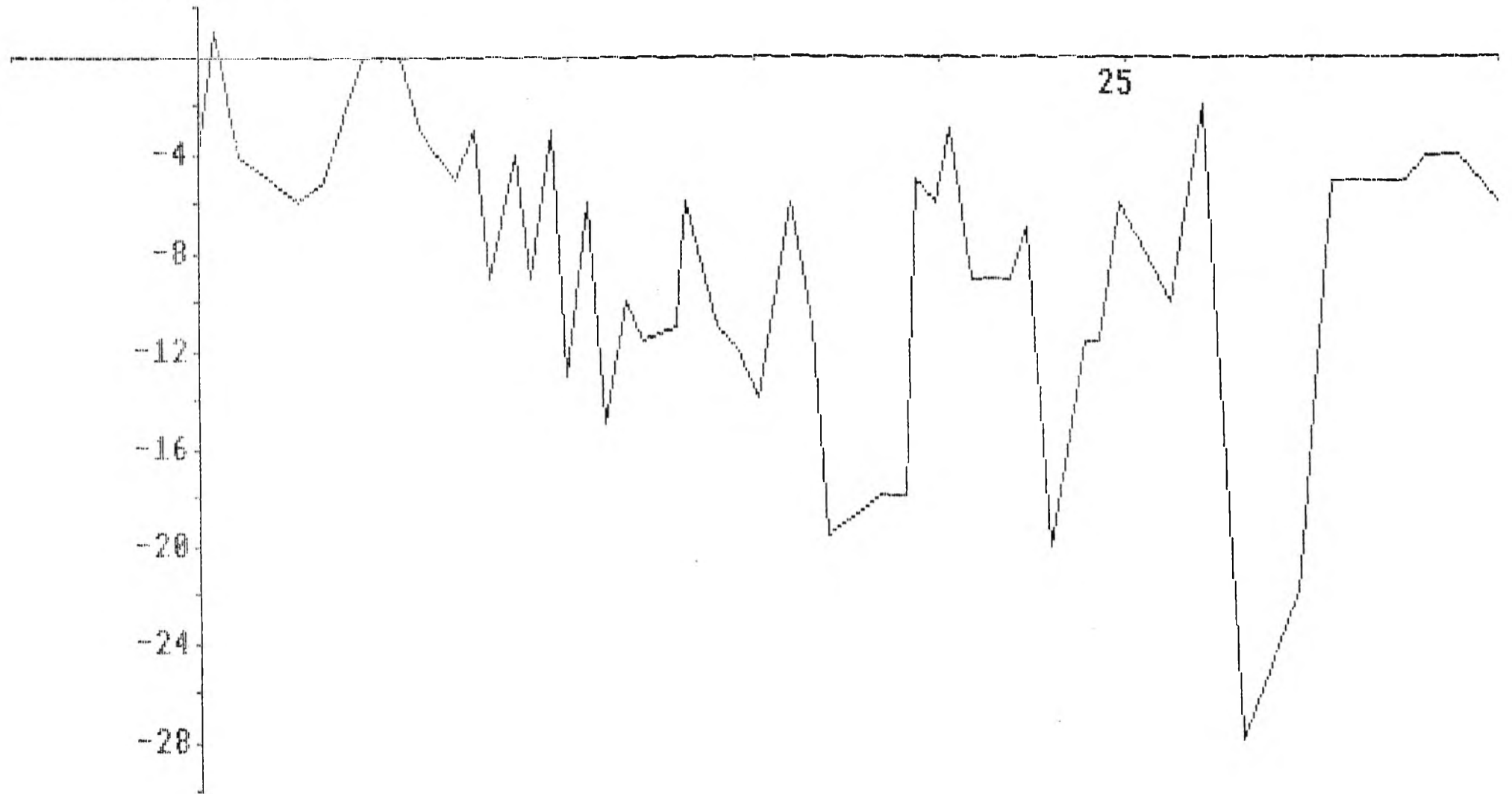
Two diagrams in the text show firstly the variation in temperature (in degrees Celsius versus time in days) and secondly the average direction of the wind on the crossing.

The average temperature for our time on the ice-cap was -9 °C.

In conclusion, the weather observations made were by no means as full and accurate as I would have wished. It was lucky that we managed to acquire a thermometer, if not only just for making sure the correct wax was used, but to confound any thoughts of how it must be an exceptionally cold summer where it must surely be -50 at least. The lesson to be learned is of course to make sure that you sort your kit out before you go.

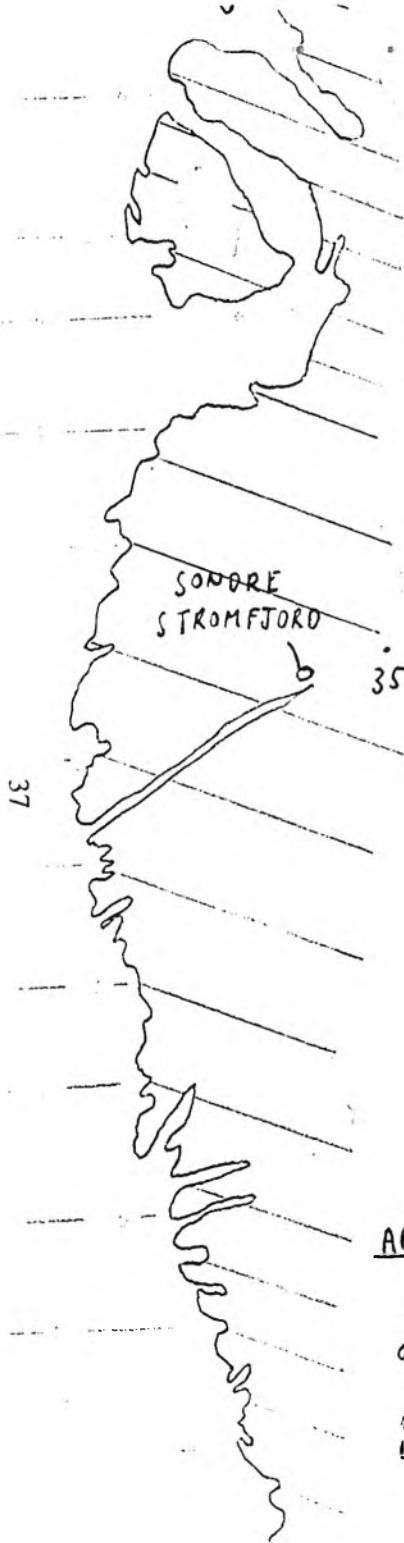
TEMPERATURE

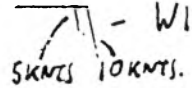
Degrees C






25

Time (Days)

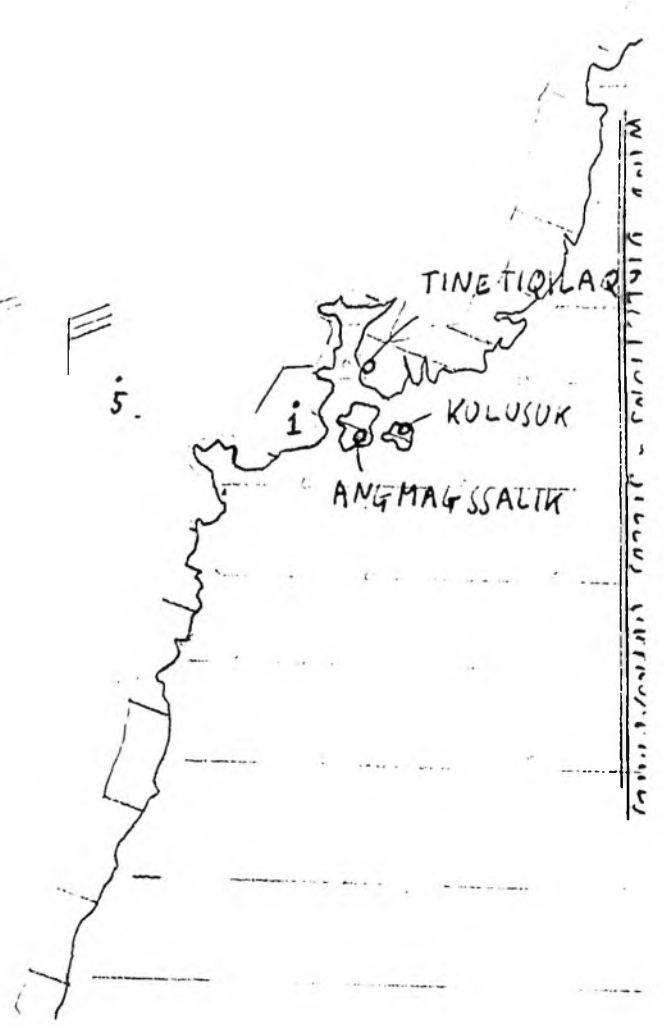
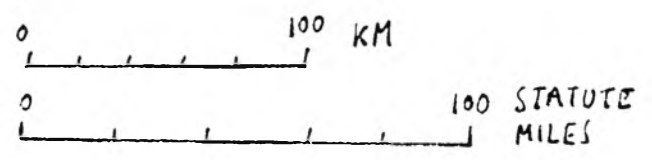


KEY: $\overset{23}{\circ}$ - APPROXIMATE POSITION OF CAMP WITH REFERENCE NUMBER.
 \circ - SETTLEMENT.
 - WIND DIRECTION AND SPEED (ESTIMATED). (IN THIS EXAMPLE AN EASTERLY AT 15 KNTS)
 SKNTS 10KNTS.

-  - ICE-CAP
-  - LAND (FREE FROM ICE-CAP)
-  - WATER



APPROX. SCALE:



Day by Day Analysis

Notes :

Pos. - Position. Latitude (N) and Longitude (W).
 Alt. - Altitude of the ice-cap above sea level (in feet).
 TRACK - Distance (in miles) and overall heading for the day.
 NAVIGATION - Distance and heading to go to ref. point "660".
 Para - Parachutes used.

Date	Camp No	Position (Lat/Lon)			Alt. (feet)	TRACK		NAVIGATION		NOTES
		Degrees	Minutes	Seconds		Dist. (miles)	Heading (Deg.)	To go (miles)	Heading (Deg.)	
July 18	Camp 1	65	50	24.1	4020	---	---	327	287	
		38	37	56.1						
19	Camp 2	65	53	40.6	4224	7.5		319.6	287	
		38	51	48.9						
20	Camp 3	65	56	14.7	4944	6.5		313.1	287	
		39	4	3.1						
21	Camp 4	66	0	12.2	4905	10.9	295	302	286	
		39	25	28.1						
22	Camp 5	66	2	52.9	5559	10.2	288	291.8	286	
		39	46	29.4						
23	Camp 6	66	4	36.1	5502	6.4	289	285.5	286	
		39	59	19.7						
24	Camp 7	66	7	25.8	6417	9.9	290	275.5	286	
		40	19	29.4						
25	Camp 8	66	11	36	6402	10.2	298	265.4	285	
		40	39	1.2						
26	Camp 9	66	15	16.1	6480	9.1	298	256.3	285	
		40	56	34.2						
27	Camp 10	66	18	56.4	6639	8.7	299	247.7	284	
		41	13	6.2						
28	Camp 10	Rest	Day			0	---	247.7	284	
29	Camp 11	66	21	32.6	8106	9.2	289	238.4	284	
		41	32	3.1						
30	Camp 12	66	24	18.6	6642	9.3	290	229.1	284	
		41	50	42.5						
31	Camp 13	66	26	41.6	7311	9.5	287	219.6	284	
		42	10	34.9						
Aug. 1	Camp 14	66	29	38.5	7050	8.9	290	210.7	283	
		42	28	38.9						
2	Camp 15	66	51	55.5	8691	37	314	178.9	277	Para
		43	27	12.9						
3	Camp 16	66	58	29	8136	7.9	340	174.9	275	Para
		43	33	34.1						
4	Camp 17	66	59	36		7.6	280	167.2	275	
		43	50	21.1						
5	Camp 18	67	0	8.6	7821	7.5	275	159.7	275	
		44	7	7.1						
6	Camp 19	67	0	50.1	7662	10	275	149.7	275	
		44	29	11.9						
7	Camp 20	67	1	22.5	8595	10.5	273	139.1	275	
		44	52	0.3						
8	Camp 21	67	3	10.9	7680	9.9	283	129.2	274	
		45	14	20.3						
9	Camp 22	67	4	28.1	7386	12.2	277	117.1	274	
		45	41	9.9						
10	Camp 23	67	4	20	7032	10.5	270	106.5	274	
		46	4	42.3						
11	Camp 24	67	4	20.9	6378	7.1	271	99.4	274	

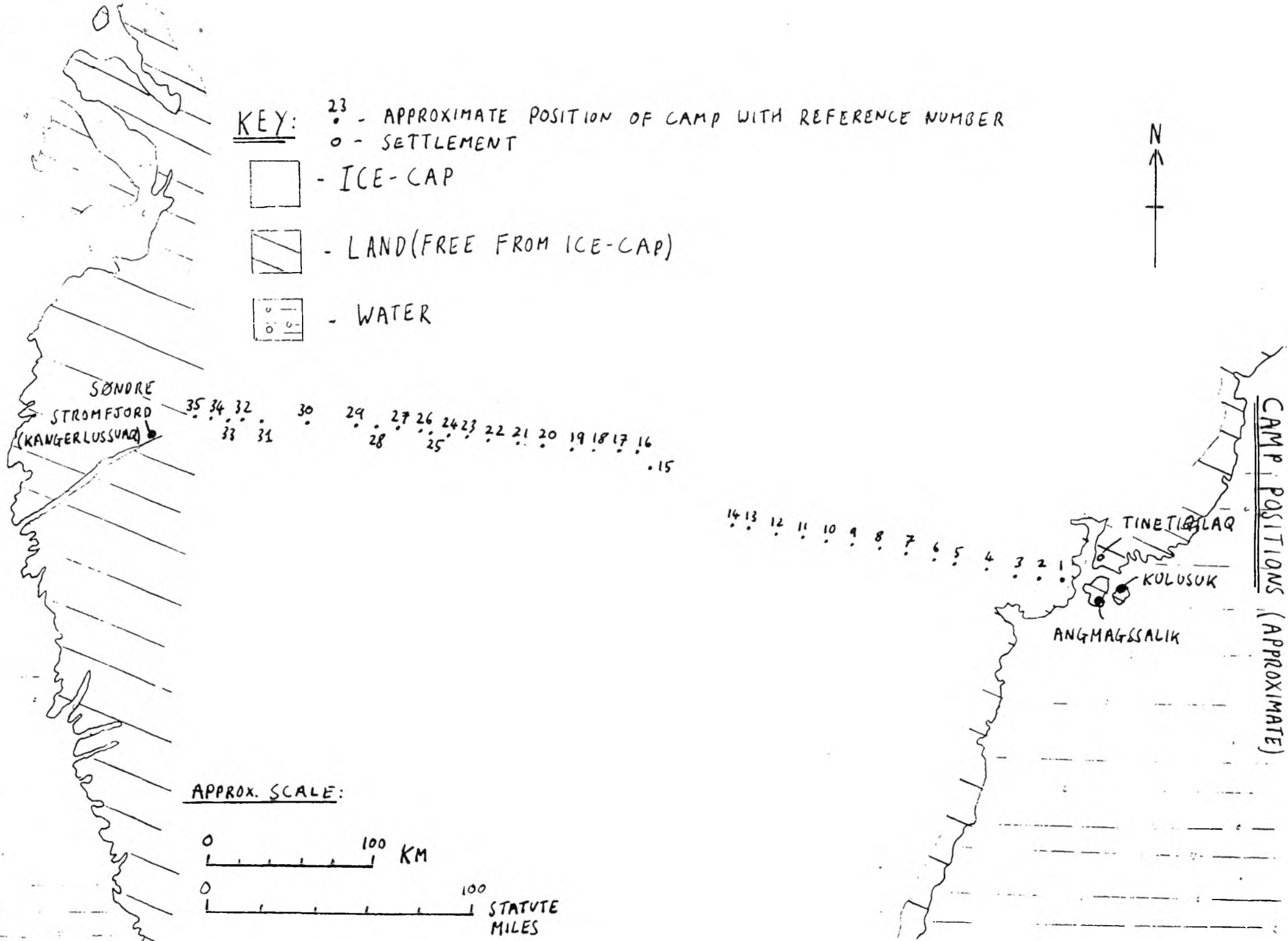
	46	20	44.1					
12 Camp 25	67	4	25.5	6804	5.5	270	93.6	274
	46	33	28.7					
13 Camp 26	67	5	41.9	6651	10.8	274	82.8	274
	46	57	32.7					
14 Camp 27	67	6	5.4	5334	11.2	275	71.6	274
	47	22	30.1					
15 Camp 28	67	7	2.8	5517	10	276	61.5	274
	47	44	36.7					
16 Camp 29	67	8	36.3	5415	16.3	277	45.1	272
	48	20	54.2					
17 Camp 30	67	7	16.2	3459	12	263	33.2	276
	48	47	55.4					
18 Camp 31	67	8	14.8	4338	6.5	280	26.7	275
	49	2	21					
19 Camp 32	67	11	21.2	3807	6.8	302	20.8	266
	49	15	21.3					
20 Camp 33	67	10	44.4	2799	4.5	266	10.3	266
	49	38	48.5					
21 Camp 34	67	11	12.2		2.3		8	
	49	43	24.6					
22 Camp 35	67	10	32.8	2817	6	263	2.3	255
	49	56	51.5					
23 LAND	67	9	20.3	1980	4		0	
	50	3	3.8					
23 Camp 36	67	6	47	795	7.5			
	50	10	54					
24 Camp 37	67	1	4.6		15.5			
Sondre	50	42	8.9					
25 Camp 36					15.5			
26 Camp 36					15			
27 Camp 37					15.5			

TOTALS

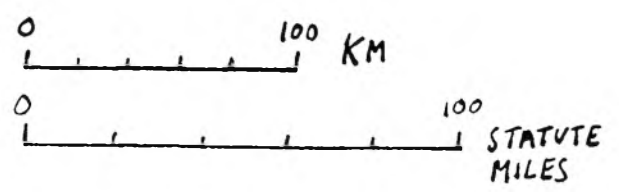
401.4 Miles

KEY:

- 23 - APPROXIMATE POSITION OF CAMP WITH REFERENCE NUMBER
- o - SETTLEMENT
- [] - ICE-CAP
- [/] - LAND (FREE FROM ICE-CAP)
- [o o] - WATER



APPROX. SCALE:



40

Ice-cap

Height (ft) $\times 10^3$

8.0

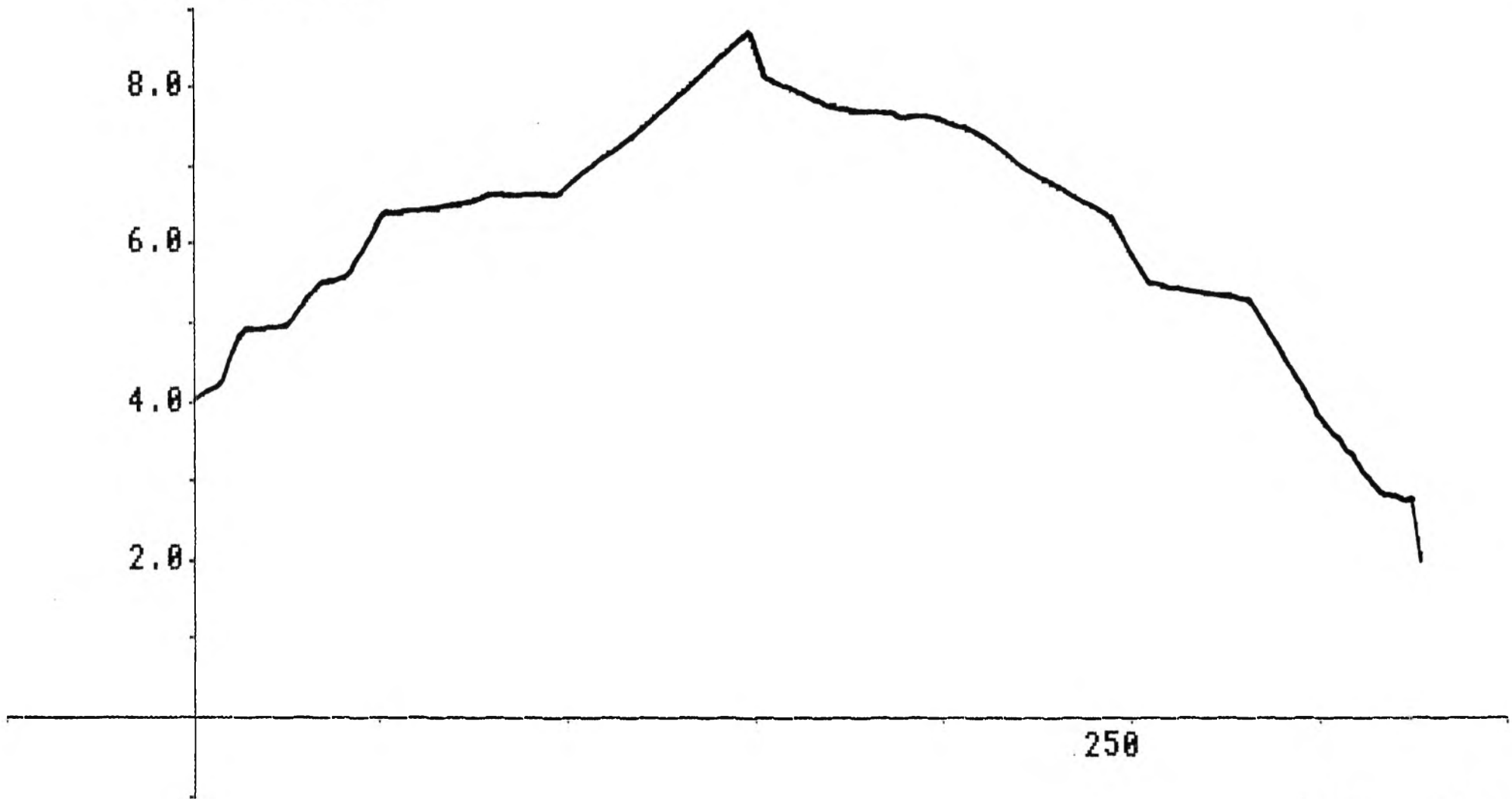
6.0

4.0

2.0

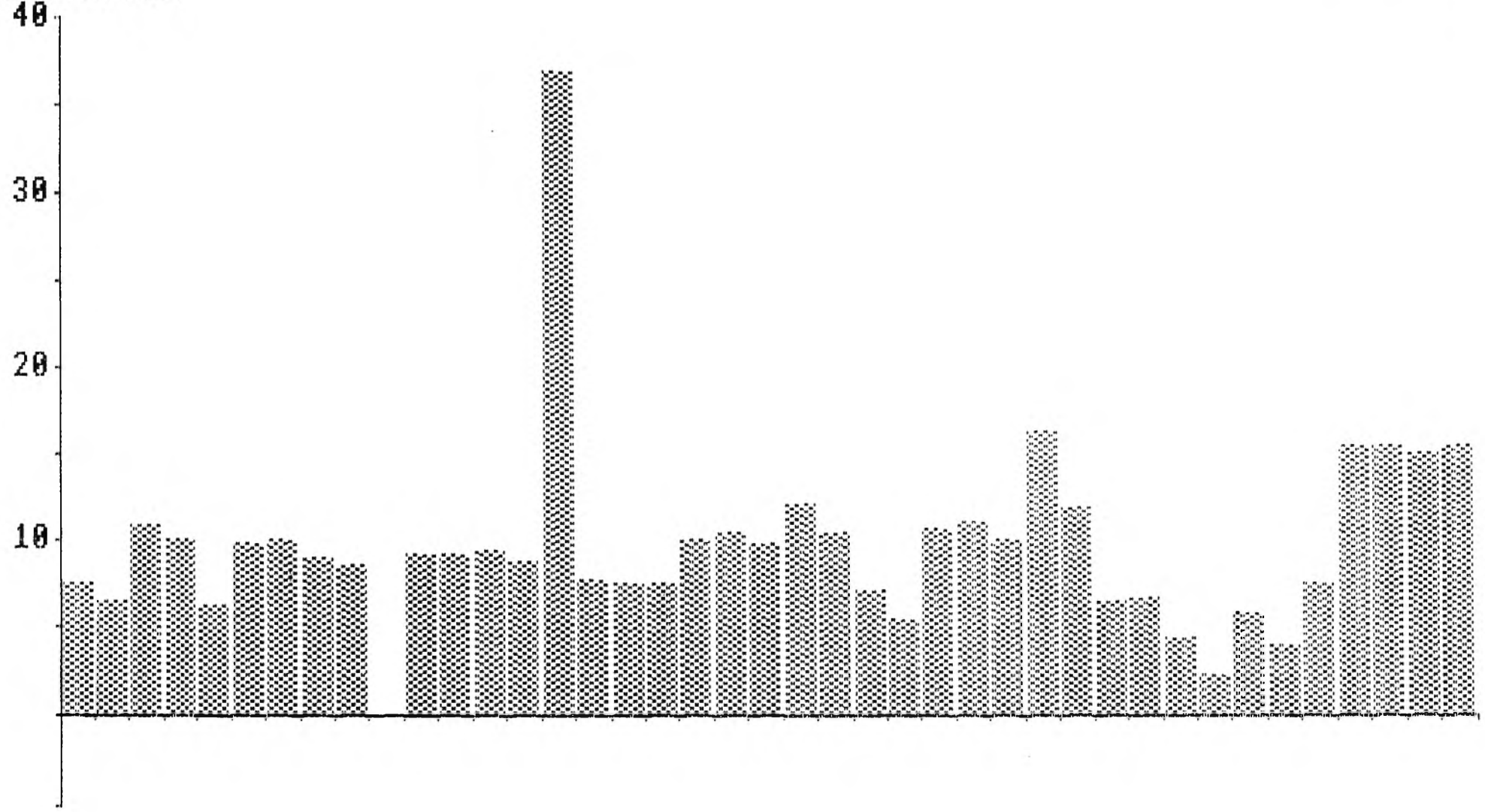
250

Dist. miles



Dis. (Miles)

Dist./Day



12

Distances

Dis. (Miles)

400

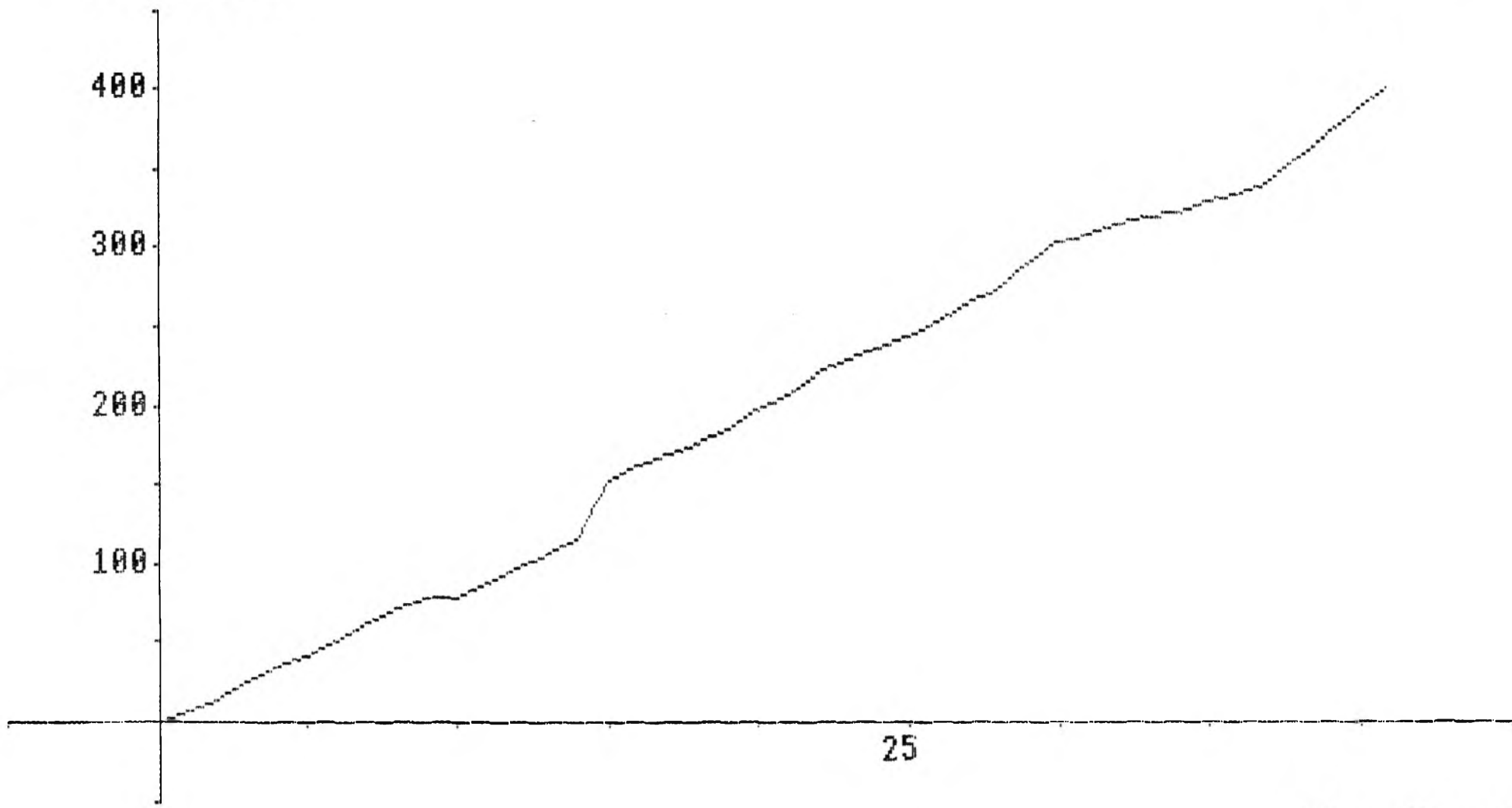
300

200

100

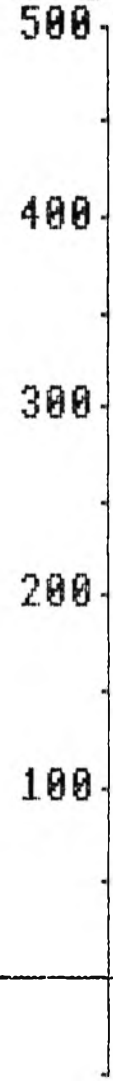
25

Time (Days)



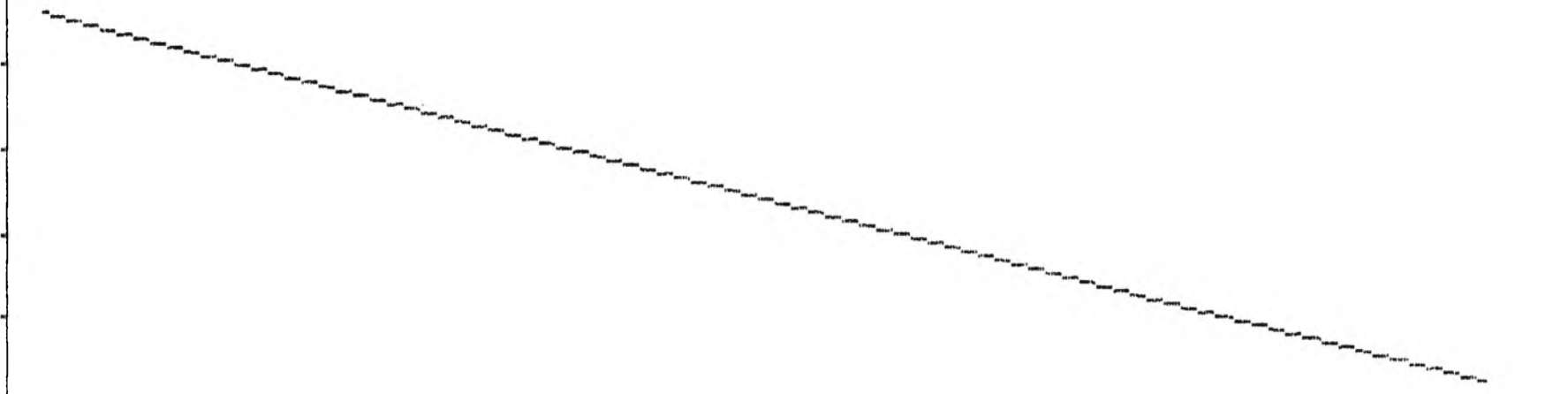
TOTAL WTS.

Weight (Kg)



25

Time (Days)



DIARY

Peter Price-Thomas

- 19.07 Start pulking westwards towards Sondre Stromfjord
20.07 Novelty of pulking beginning to wear off. Redistribute some weight to balance up speeds.
21.07 Going difficult, pulks breaking through crust. Discussed ways to pay for the expedition. Lost sight of land.
22.07 Reasonable day, a tenth of the way there.
23.07 Started going markedly uphill, Peter realises he's lost his ice axe, Jamie skis back for it whilst the others put up camp.
24.07 Cold and windy. A tough day
25.07 An excellent day, everybody daydreaming.
26.07 Snow gravelly. Starts to level after 3 hours. Jamie's ski skins damaged, had to walk for last hour.
27.07 A difficult day, all of us tired. Jamie & Peter attempt to build an igloo. Unsuccessful, official reason wrong sort of snow.
28.07 Rest day, entertained by Stephen's stories of mountaineering and by Jamie having his hair cut by Valentine Price-Thomas
29.07 Had difficulty locating the buried supply of butter due to spindrift. Everyone's pulks feel heavier. Stephen starts to suffer from upset stomach.
30.07 Discussion about race across Greenland. Jamie has problems with his skins. Burnt some rubbish.
31.07 Carl's arm scalded with boiling water. Rearranged pulk loads to have most of the fuel in one pulk. Conditions good once clouds had cleared.
01.08 Cold. Still uphill. Excellent chicken Kiev for supper. Wind is easterly for the first time and its time to try sailing with the parachutes. Pulled westwards by parachute. Initially Carl and Stephen on the pulks with Jamie and Peter on tow behind. Later all four sitting on pulks pulled along by one parachute.
02.08 Wind swings to the north, so stopped and put up tents. Decide to swap to moving during the day.
03.08 Very hot, Peter ill, stopped after four hours. Carl and Jamie strip off for a wash.
04.08 Wind in our faces, spindrift makes life unpleasant.
05.08 Weather improves, complete 6 hours pulking. Jamie powers off into the distance in the last hour.
06.08 Visibility very poor. Start taking turns to do one and a half hour shifts.
07.08 Tried to use the parachutes. Stephen's feet on verge of frostbite until warmed in Peter's armpits! Snow surface very good.
08.08 Cold, Peter finally has a wash.
09.08 Very hard going on powder snow. Shooting practice in the evening.
10.08 Surface much improved, and now under 100 miles to go
11.08 Short day, due to bad weather.
12.08 Very cold (-28c) but an incredible sunset and shooting stars. Filming despite the intense cold in the last hour.
13.08 Hit first down-hill section. we're on our way home.
14.08 Sticky snow underfoot, Stephen tried moving without skis. Down-hill.
15.08 Extremely windy start, excellent surface for fast travel until first signs of melt water and surface cracks.
16.08 Snow sticky and a lot of surface melt visible, decided to travel during the day to make it easier to avoid lakes and hummocks.
17.08 Hit first major meltwater stream, get across it by a series of islands. Then some filming and plodding on until we got to another river. Met some Scandinavians who we had met in Angmagssalik (first people for over a month).
18.08 Crossed the river barefoot, and had ll's with the Scandinavians whose tracks we'd followed. Roped up and started to make our way through crevasses. The start of ice hummocks. Camped on 4 inch thick ice.
19.08 Very bumpy so took skis off. Problems encountered crossing rivers. Sight land for the first time. Very close. Ended the day by running across on 8m wide river towing the pulks!
20.08 Steve's trace broke so in a majorly crevassed region made a food dump and decided to stay the night there.
21.08 Tidied up and set off carrying 6 days food each. Carl and Steve on one rope in the lead, Jamie and Peter on the other. Made our way through crevasses and ice hummocks until finally admit defeat 2.5 km from point 660.
22.08 Tried to make our way back to the food dump, but had to take a massive diversion due to a huge melt-

water river. Eventually got to the dump and stuffed our faces. Jamie and Carl spend the night in their pulks.

23.08 Big carry down. Jamie won the nutter prize at 53 Kg! Got back to the tents after a very hard day. Carl sick due to eating too much in the morning.

24.08 Headed for 660 in 2 pairs. Steve's crampons broke. Eventually got to 660 (unbelievable how long 2.5 Km can take). The excitement tempered slightly by the fact that we had to find our way back to the tents.

25.08 Better day, we all set off for 660. Get there for lunch. Carl & Steve then headed for Sondre, whilst Jamie and Peter returned to the ice to do the final carry.

26.08 Stephen and Carl complete the last 25 kilometres to Sondre. Jamie and Peter strike camp and carry everything left down to 660 then continue down to the lake.

27.08 Steve and Carl return to the lake from Sondre. Peter does another load carry from 660. Jamie moves camp and rests his knee.

28.08 Carl, Stephen and Peter go up and collect the rest of the gear from 660. Sacks very heavy.

29.08 The final push into Sondre, 25 Km, very heavy sacks, total hell. Jamie walked all the way turning down a lift the others of us had managed to cadge.

30.08 Showers and a rest.

31.08 All fly Sondre to Keflavik. Peter and Stephen to Heathrow. Have to take boots off in customs, back home.

01.09 Carl and Jamie in Reykjavik.

02.09 Carl and Jamie fly from Keflavik to Heathrow. The team polish off a full roast and a McDonalds for dinner!

LOGISTICS

Stephen Jones

The following information may be useful for planning future expeditions.

Freight was sent to Iceland with:

Constantine Liner Agencies

East Gate

King George Dock

Hull

HU9 SPS

Air charter from Reykjavik to Kulusuk Leiguflug hf Reykjavik Airport PO Box 291 IS-121 Reykjavik Iceland contact Mr Isleifur Ottesen tel + 354-(9)1-628011 fax + 354-(9)1-628420

Greenlandair Sales Department Box 1012 3900 Nuuk Greenland tel +(299) 2 88 88 fax (+299) 2 88 36

Maps were obtained from Stanfords 12-14 Long Acre Covent Garden London WC2E 9LP tel 071 836 1321

MEDICAL LIST

Stephen Jones

Analgesics	ibuprofen paracetamol dihydrocodeine DF118 pethidine
Antibiotics	4 courses. Septrin or other broad spectrum antibiotic erythromycin 500 mg ampicillin 500 mg amoxil/amoxycilin flucloxacilin
Dressings	4 sterile wound dressings selection of elastoplast plasters 2 triangular bandages selection of melolin dressings zinc oxide tape 3 crepe bandages 2 packets Steristrip wound closures cotton wool gauze
ENT	throat lozenges pseudoephedrine (sudafed) 60 mg Piriton antihistamine (20)
Gastrointestinal	lomotil (diphenoxylate) imodium (loperamide) 2 mg capsules antacid
Miscellaneous	antiseptic liquid anusol 1 tube Betnovate for sunburn inflatable splint sterile needles scissors & tweezers (on Swiss army knife) safety pins

BGE 93 ACCOUNTS

INCOME

Item	£
Mount Everest Foundation	750.00
Foundation for Sports & Arts	750.00
Durham University	500.00
The Russell King Fund	500.00
The Cawkwell Family	223.00
Royal Air Force	200.00
Grey College, Durham	100.00
Hulme Hall, Manchester	100.00
Sponsorship	5000.00
Loans	5500.00
Members contributions	5359.93
Sale of t shirts & equipment	1190.00
less repayment of loans	(5500.00)

sub total	14672.93

EXPENDITURE

Item	£
Travel	7204.92
Food	899.05
Insurance	720.00
Navigation kit, maps etc	335.62
Freight	540.61
Stationery	122.74
Medical	75.60
Rifle	227.70
T shirts	893.00
Group equipment	3819.14
Personal equipment	1359.93
Field & misc. expenses	851.41

sub total	17049.72

income	14672.93
less expenditure	(17049.72)
cash at bank	861.07

outstanding balance (1515.72)

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Cawkwell Family

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Mr S Pearson

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Malcolm Sales

Dr Michael Stroud

Rebecca Stephens

Margaret Thomas

Mike & Suzanne Thomas

John White

Peaks & Passes

Scottish Staunings Alps Expedition 1991

Loan of equipment

Mount Everest Foundation referee

Loan of 2 parachutes

Nautical Almanac

Loan of skis

Scottish Bersaerkertinde Expedition 1992

The Greenland Milne Island Expedition 1989

Pentland South Pole Expedition

Mount Everest Foundation referee

Upski Ltd