



Kangerdlugssuaq 2005

The report of the
CUMC Centenary Expedition



With thanks to our sponsors and benefactors



*The Mount Everest
Foundation*

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The trip would not have possible without you.

Acknowledgements

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Thanks to you all – you helped to create the trip of a lifetime!

The compilers of this report and the members of the expedition agree that all or part of it may be copied for the purpose of private research.

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1. Summary

In 2005 the Cambridge University Mountaineering Club (CUMC) celebrated its centenary. To mark the occasion a group of active CUMC members planned a trip to the relatively unexplored Kangerdlugssuaq Mountains of East Greenland, with the aim of making alpine-style first ascents of as many peaks as possible. The expedition took place between 27th June and 24th July 2005 and was the product of over 18 months of planning and preparation.

Despite bad weather forcing a last-minute change of landing site, the team still managed to reach the intended climbing area and, with near-perfect weather for the second half of the trip, 12 new mountains were climbed by routes ranging in standard from PD to TD. Furthermore, 2 second ascents were made in the region around our actual landing site.

Kangerdlugssuaq 2005 has provided us with some of our greatest climbing achievements as well as our biggest logistical challenges, and the trip has truly broadened our horizons. This report describes in detail our Greenland experiences, from the early stages of expedition planning right through to the writing of this report. We hope it is of use to anyone planning a similar adventure and we wish you all the best in exploring this magical wilderness.



Above: The Kangerdlugssuaq Mountains as seen from the summit of Peak 11. See Page 40.

2. Background

In April 2003 George Band came to Cambridge to give a slideshow on the first ascent of Kanchenjunga (8586m), which he made with Joe Brown in 1955. George's stunning photos were made all the more inspiring because at the time he was a member of the CUMC, and his trip to Kanchenjunga took place immediately after his Geology fourth year – the year in which several of us were studying. We could never hope to match George's achievements in the Himalayas, but his lecture inspired us to look for adventure beyond the conventional mountaineering playground of the Alps. At first we considered objectives in the Himalayas, South America and the Caucasus, but a combination of bureaucracy and, in some cases, pay-per-peak fees made things awkward: our team was likely to be of variable ability and would ideally require objectives of differing standards concentrated in one region. Over time, our attention became focussed on the East Coast of Greenland, a paradise of closely-spaced, unclimbed, alpine-scale peaks with convenient (though expensive) access and a real feeling of pristine wilderness. The more we found out the better it seemed and before we knew it, idle chatter in the pub had given way to proper expedition planning.



Above: George Band on Kanchenjunga in 1955



Above: Matt during the early stages of expedition planning.

3. The Team

Our first decision was one of the most important, and perhaps the most difficult: choosing the team. The large number of initially interested people quickly dwindled when the cost of the expedition became apparent, but even then we had 14 candidates willing to commit the time and money to make the trip happen. Each plane load could carry four people plus gear from Iceland to Greenland, so to minimise costs the number of team members had to be divisible by four, and we decided to look for a team of eight. In the end, the selection was made based upon which group members had done the most climbing together and who knew each other best.

The team comprised eight friends, all past or present members of the CUMC. They are introduced below:

James Sample, 23



James graduated in 2004 and now has a job as a research assistant in the Cambridge Department of Earth Sciences. He has been a keen climber and mountaineer for the past seven years, going cragging most weekends and making numerous trips to the European Alps and Scotland. James enjoys all aspects of climbing, from bouldering in Fontainebleau to climbing in the Ladakhi Himalaya. Kangerdlugssuaq 2005 was his first trip to require serious logistical planning and he enjoyed the experience immensely. The only question now is, “Where next?” His climbing experience prior to Greenland is summarised below:

Experience: 4 Scottish winters, 3 Alpine seasons, experience in New Zealand Alps, Himalaya and Canadian Rockies, skiing in Slovakia and Kandersteg. Climbs rock to E1, ice & mixed to V.

Notable ascents: Walker Spur (ED1), Cordier Pillar (TD), North Face of Grande Vignemale (D+), Chere Couloir (D), Stok Kangri (6153m) and Second Summit of Kang Yatze (6200m) in the Ladakhi Himalaya.

Matt Harding, 22



Matt graduated in 2003 and has spent much of the intervening time carrying out research for conservation organisations such as the RSPB. A keen fell walker and naturalist from an early age, he began rock climbing in 1997 and has since had more wonderful experiences than he can remember cragging and mountaineering in the British Isles and abroad. A fantastic season in the Alps in 2004 proved to be a defining moment as, following time in Iceland and the Dolomites, Matt spent a terrific month in Chamonix and realised that this scale of mountaineering provided the ideal synthesis of technical, environmental and personal challenges. His climbing experience prior to Greenland is summarised below:

Experience: 2 Scottish winters, 1 season in European Alps, experience in Canadian Rockies. Skiing in USA, France and Switzerland (including cross-country). Climbs rock to E1, ice & mixed to IV.

Notable ascents: Mt. Edith Cavell (III, 5.3) in Rockies, N Face of Tour Ronde (D-), Rochefort Arête solo (AD), S Ridge of Aig. de la Persévérance solo (IV+), Lurking Fear (WI 3+) in Swiss Alps.

Mike Moss, 23



Mike graduated in 2004 after studying an unusual mix of two years Chemistry and a further year of management studies. He now puts all of this to good use working as a consultant at Library House, specialising in work on technology based start ups. Initially an indoor climber, Mike now prefers the outdoors, especially alpine and winter climbing. Numerous trips to Scotland and the Alps have resulted in clocking up a fair number of ascents at lower grades. His favourite routes include traverses in the Western Alps such as the Aiguille Chardonnet, Mont Blanc de Cheilon and L'Eveque. As the most able skier in the group Mike organised a number of training trips to Slovakia, Kandersteg and Chamonix in the run-up to the expedition. His climbing experience prior to Greenland is summarised below:

Experience: 4 Scottish winters, 3 seasons in the European Alps, 1 season in the Canadian Rockies. 1 week ice climbing in Switzerland. 9 weeks skiing in the Alps. Climbs rock to HVS; ice and mixed to grade IV.

Notable Ascents: Traverse of Aig. du Chardonnet (AD), SW Ridge of l'Eveque (AD), Traverse of Mont Blanc de Cheilon (AD).

Leah Jackson-Blake, 21



Leah discovered her passion for climbing and mountaineering at university, and since starting has spent as much of every weekend and holiday as possible in the wilder parts of the UK and Europe. She has extensive experience of outdoor living, and enjoys nothing more: in summer 2004 she carried out six weeks of geological mapping in the Spanish Pyrenees followed by a week's climbing in that same range. Her second Alpine season followed this: three weeks of perfect weather in the Mont Blanc massif. She is currently in the 4th year of her undergraduate degree. Leah's climbing experience prior to Greenland is summarised below:

Experience: 2 Scottish winters, 2 seasons in European Alps, climbing in Pyrenees. Skiing in Spain and Switzerland (including cross-country and some off-piste experience). Climbs rock to VS, ice & mixed to III.

Notable ascents: North Face of Vignemale (classic route) in Pyrenees (D+); S Face of Pelerin (PD), Tour Noir (PD), Midi plan traverse (PD), etc. Plus lots of climbing around the UK and sports climbing in Spain.

Jenny Marshall, 20



Jenny studied Archaeology at Girton and had to miss her graduation in order to fly to Greenland. She has always been a keen outdoor enthusiast and enjoys swimming, surfing, sailing and kayaking. However, it was not until she started university that she became hooked on climbing. She has climbed extensively throughout the UK and has also spent time climbing in the French and Swiss Alps. In 2001 she travelled to Africa to attempt Mt. Kenya. Jenny's climbing experience prior to Greenland is summarised below:

ice & mixed to III.

Experience: Climbing expedition to Mt. Kenya, 1 Welsh winter, 1 season in European Alps. Skiing in Bulgaria and Switzerland (including cross-country). Climbs rock to VS,

Notable ascents: Mt Kenya, Rochefort Arête (AD), Papillon Ridge (V), Midi-Plan Traverse (PD), S Face of Aig. de Pelerins (PD), S Ridge of Aig. Purtscheller (IV).

Tom Stedall, 23



Tom graduated as a Physicist in 2003 and now lives in Cardiff. He works as an instructor at the Welsh International Climbing Centre and teaches Maths and Physics to A Level students. He took up climbing when he went to university and has since climbed all over Britain, seeking out remote and wild places. In summer 2004 he spent two and a half months climbing in Scotland, particularly on the Western Isles and Skye, living in caves and a van. He has made numerous Scottish winter trips and has also enjoyed climbing and skiing in the European Alps. His climbing experience prior to Greenland is summarised below:

Experience: 4 Scottish Winters, 1 season in the European Alps. Skiing in Slovakia and ice fall climbing in Kandersteg. Treking in Iceland. Climbs rock to HVS, Ice and Mixed to IV.

Notable Ascents: Aiguille de Pouce (VI-), Chapelle de la Gliere (AD), The Aenoch Eagach (III), North Buttress of Stob Dearg (III), Castle Ridge (III) and the Cuillin Ridge in summer.

Alex Cowan, 22



Alex graduated in Geology in 2004 and is now studying for a PhD at the BP Institute in Cambridge. He has been a keen climber since his first year and is a particular fan of Scottish winter climbing. Alex has climbed extensively in the European Alps and has also spent time geological mapping in Norway. He loves climbing on granite and the opportunity to make first ascents on pristine Arctic granite was, for him, one of the main attractions of the expedition. His climbing experience prior to Greenland is summarised below:

Experience: 3 Scottish winters, 2 seasons in European Alps. Skiing in Slovakia and Switzerland (including cross-country and ski-touring). Climbs rock to VS, ice & mixed to III.

Notable ascents: Voie des Dalles (VI-, A1) on Aig. de Praz Torrent, Couzy Route (V) on Aig. de l'M, Midi-Plan Traverse (PD).

Alison Ingleby, 21



Having walked and orienteered in the hills from a very early age, it was only a matter of time before Ali progressed to the world of climbing and mountaineering. Ali has climbed in many places around Britain and Ireland, but the crags of North Wales are still her favourite haunt. Having caught the expedition bug on her first expedition to Ladakh, in the Indian Himalayas, at 17, Ali has since been on expeditions to Tanzania and went as a Young Leader on a BSES expedition to Iceland last summer. In addition to this Ali has spent two seasons in the European Alps and enjoys playing with her ice axes in Scotland (when conditions permit!) and on waterfall ice in Switzerland. She is also a keen runner and has competed in several KIMM events. Her climbing experience prior to Greenland is summarised below:

Experience: 2 Scottish winters, 2 Alpine seasons, expeditions to Ladakh, Tanzania and Iceland. Climbs rock to VS and ice/mixed to grade III. Ice climbing and skiing in Kandersteg.

Notable ascents: Tour Ronde (PD), Tour Noir (PD), Cosmiques Arete (PD+), Mt. Kilimanjaro, Panchung Kangri (6000m) in Ladakh.

4. Patrons

George Band



George is one of Britain's most respected mountaineers, a Cambridge graduate and a member of the CUMC. Former President of the Alpine Club and the BMC, George has undertaken expeditions to the Himalaya, Peru and the Caucasus. He was a member of the first successful Everest expedition in 1953 (while still an undergraduate!) and, perhaps most notably, he made the first ascent of Kanchenjunga (8586m) in 1955 - one of the highlights of British mountaineering. After resisting the temptation to become a professional climber, George has enjoyed a distinguished and well-travelled career with Shell Oil.

In 2003, George kindly came to Cambridge to give a fundraising lecture on Kanchenjunga in support of the CUMC's Wherry Library. It was George's enthusiasm during this lecture that inspired us to try our own expedition, albeit one with more modest objectives.

Dr. Peter Friend



A distinguished Geologist at the department of Earth Sciences and an Emeritus Fellow of Darwin College, Peter has been involved in Arctic research for most of his career. After graduating from Caius College, Peter's first major research programme included seven lightweight expeditions to Spitsbergen and three to East Greenland. Since then, Peter has continued his Arctic research, as well as working in the Middle East, the Himalayas (Pakistan and India), the Pyrenees and the Sierra Nevada.

Peter is Chairman of Trustees at the Cambridge Arctic Shelf Programme (CASP), and in 2002 he was made President of the Arctic Club. He has also been on the committee of the Mount Everest Foundation (MEF) and is currently part of the screening panel for the Gino Watkins Memorial Fund.

At present, Peter is writing a book on the scenery of the United Kingdom, as well as helping to raise money for the Sedgwick Museum of Earth Sciences. He is also unfortunate enough to be James' boss.

We would like to extend our warmest thanks to both George and Peter for their invaluable advice and encouragement throughout the organisation of the expedition. In particular we are grateful to them for supplying us with references for our grant applications.

5. Pre-Expedition Planning

5.1. Location

We decided that our ideal area should have the following characteristics:

- Be largely (preferably wholly) unexplored.
- Have several mountains within striking distance of one or perhaps two centrally-located base camps.
- Have potential for numerous first ascents at a variety of grades, but mainly in the PD-D grade range.
- Have good quality rock, allowing for mixed and rock routes as well as snow/ice climbs.

In order to identify an area meeting these criteria, we consulted a number of people. Foremost among them was Paul Walker of Tangent Expeditions in Kendal. Paul specialises in organising commercial expeditions to the Arctic and was able to supply us with aerial photos of various parts of Greenland and to offer advice on which areas were worthy of further investigation. After our first meeting with Paul, we contacted Clive Johnson at the Cambridge Arctic Shelf Project (CASP) who kindly supplied us with topographic maps from the Geodaelisk Institut (also available from Stanfords Maps, www.stanfords.co.uk). Visits to the Alpine Club Library and the Scott Polar Research Institute (SPRI) provided more aerial photographs and a wealth of previous expedition reports. We also arranged for Jonathan White (Lanchester Greenland Expedition, 2001) to come to Cambridge and give us a slide show of their trip to explore the Northern Lindbergh Mountains.

Our research indicated that the Kangerdlugssuaq Ranges offered exactly what we were looking for. These mountains are situated on the East Coast of Greenland, immediately to the southwest of the huge Kangerdlugssuaq Fjord (see *Fig. 1*). The peaks are of granite, similar to those of the more popular Lemon Mountains on the other side of the fjord, but generally smaller and more widely spaced. The whole region lies within the Arctic Circle and is heavily glaciated from sea level. The coastline is extremely rugged and often crevassed, but further inland the glaciers are wide, gentle and generally safe, which made ski-plane landings possible.

The peaks themselves are of ‘Alpine scale’, with a typical height gain from base camp to summit of between 1000 and 1500 metres. The quality of the rock was found to be highly variable, but it was never *really* bad, often good and occasionally absolutely immaculate, presenting strong lines and obvious challenges. We found the best of the climbing to be concentrated on steep mixed ridges and faces, but given the right weather conditions a number of striking snow/ice lines would also be possible. All in all, we found the area to be ideally matched to our group’s needs and capabilities.

5.1.1. Previous Expeditions

Exploration of the Kangerdlugssuaq region began in 1934 when the British Trans-Greenland Expedition skied north-south along the ice cap at the western edge of the mountains. In more recent years, three expeditions visited the area prior to us and approximately 100 first ascents were made. The first of these expeditions, in 1990, made a ski traverse across the south of the region, climbing as they went. The second, in 1998, landed just to the north of the Redekammen Massif and climbed peaks northwards towards the fjord, finishing with an ascent of Kangerdlugssuaqs Tinde.

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Then, in 2003, the British Kangerdlugssuaq Expedition, led by Brian Davison, landed near to the head of the Parallel Gletschers and made first ascents in this region and southwards towards the coast (see *Fig. 2*). This left an area approximately 25km by 30km that had not been explored, lying directly between the regions visited by the 1998 and 2003 expeditions. It was in this area that we planned to climb.

As it turned out, bad weather forced us to land approximately 60km away from our intended landing site, and it was not until about halfway through our trip that we actually reached and began to climb the peaks in our intended region. For the first part of the trip we climbed elsewhere, as shown in *Fig. 2*. A more detailed account of our exploits, with maps and aerial photos, is given in the 'Expedition' section on page 27.



Above: The view from base camp 1, after three days of white-out.

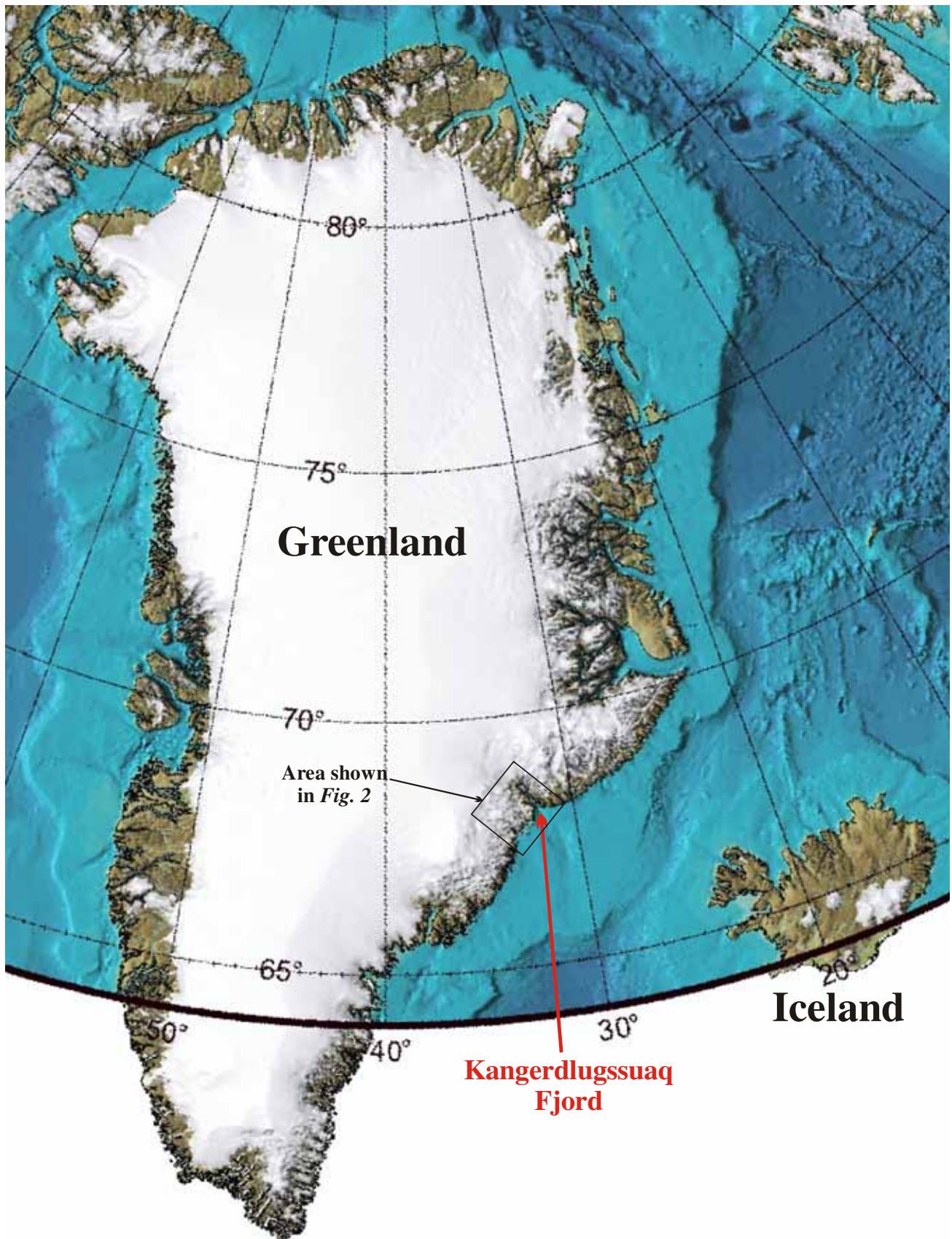


Fig. 1: Map of Greenland showing the Kangerdlugssuaq Fjord and the Kangerdlugssuaq Mountains.

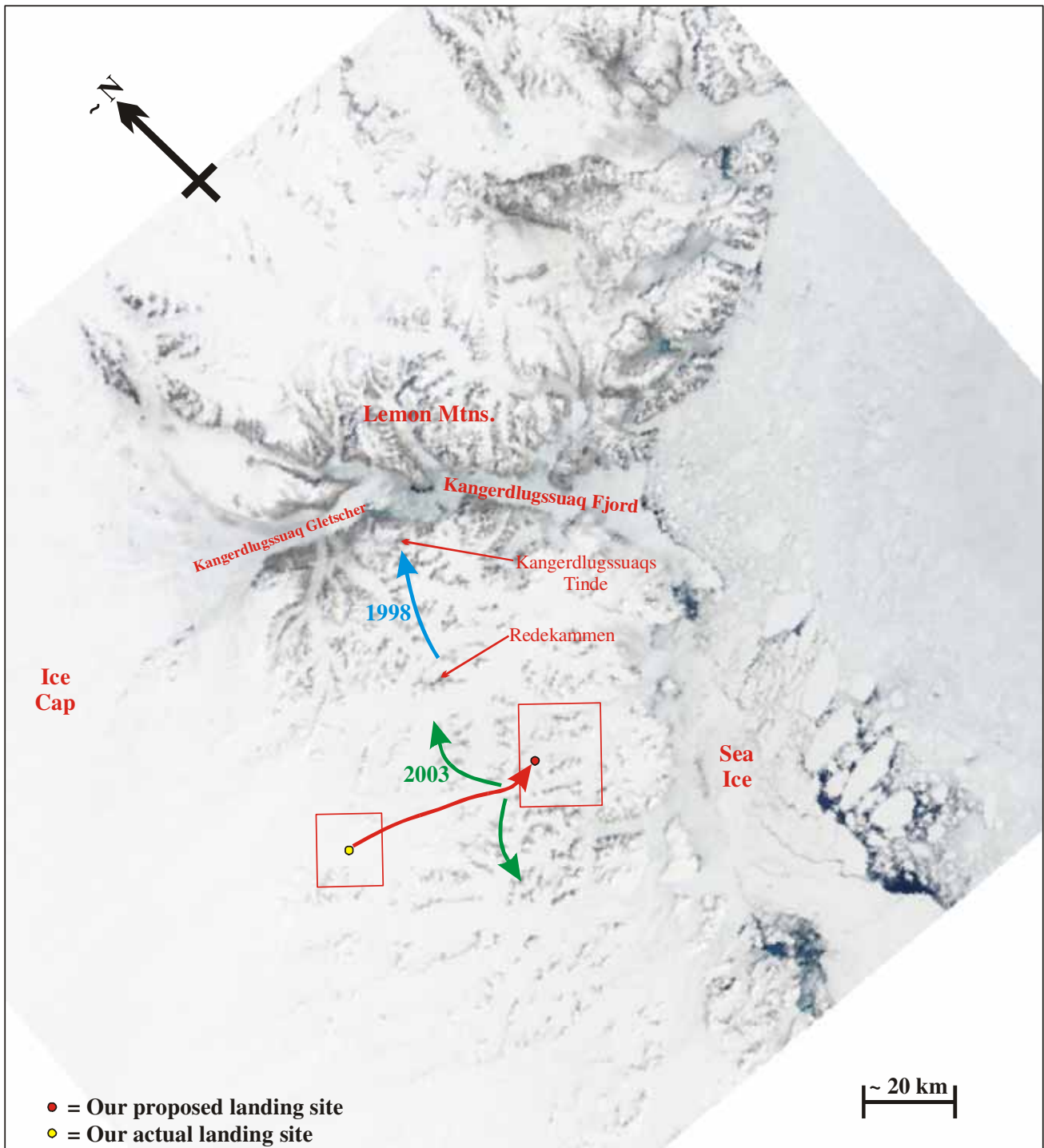


Fig. 2: Satellite image showing the Kangerdlugssuaq Mountains and the approximate regions visited by two previous expeditions, one in 1998 (blue arrows) and one in 2003 (green arrows). The red boxes and red arrow mark the area explored by our expedition. *Image from NASA.*

5.2. Logistics

5.2.1. UK to Isafjordur

We were due to fly to Greenland from Isafjordur, a remote town on the northwestern tip of Iceland. We flew to Iceland with Iceland Express, a budget airline operating daily Stansted to Keflavik flights. Internal flights from Reykjavik to Isafjordur were booked with Iceland Air.

Projected dates for flying to and from Greenland were the 27th June – 24th July. We arrived in Iceland five days before this to allow re-packing of the freight, and booked return flights five days after our scheduled return from Greenland to allow for delays due to poor weather.

5.2.2. Accommodation in Iceland

The Laugardalur (main city) campsite in Reykjavik is excellent and has good bus connections to the international and domestic airports. In Isafjordur we stayed at Tungudalur, a pleasant but basic campsite situated halfway between the town and the airport.



Above: A rainbow over Isafjordur.

5.2.3. Iceland to Greenland

Tangent Expeditions (www.tangent-expeditions.co.uk) are based in Kendal and specialise in organising all-expenses-paid expeditions to the Arctic; Fridrik Adolfsson (known as “Frissi”, tel: +354 570 3666) is the Charter Sales Manager for Air Iceland. Tangent work very closely with Fridrik.

When it comes to organising flights to Greenland, self-organised expeditions have the option of dealing directly with Frissi in Iceland or agreeing a price with Tangent.

There are pros and cons to each:

- Tangent Expeditions are based in the UK which makes them easily contactable, whereas Frissi can be quite hard to get hold of.
- By going straight to Frissi you are “cutting out the middle man”, which means that like-for-like Frissi’s flights are cheaper. However, with Tangent you may have the option of using your flight out to bring a Tangent group in

(or visa versa), thus sharing the cost of one of your plane journeys. Overall, this will probably make booking your flights through Tangent cheaper than booking with Frissi. We booked with Tangent and saved about £900.

- The problem with flight sharing through Tangent is that you lose flexibility in terms of dates as you need to fit in with a Tangent expedition. You may also find that following fresh snow the plane will not have enough fuel to land twice. If this happens then it's likely that you'll end up landing at the Tangent landing site (as happened to us) rather than your intended landing site. For us this meant a 60km ski tour that we hadn't really planned for to reach our area. This ski tour was awesome, but it did consume climbing time and wouldn't have been a problem if we'd booked with Frissi.
- In our opinion, it's probably worth the extra £900 to have the extra flexibility and independence, although Tangent did an excellent job of organising our flights.

For a single Twin Otter aircraft flying from Isafjordur to the Kangerdlugssuaq Mountains, the *total* weight allowance for you and your equipment is likely to be in the region of 700kgs. We chartered two flights and the total allowance of 1360kgs was sufficient, but only because we had weighed and planned everything very carefully in the UK.

5.2.4. Freight

Eimskip (www.eimskip.com) offer a regular and extremely efficient sea-freight service from the UK (Immingham) to Iceland (Reykjavik). They can also arrange for a truck to collect your freight from your UK address and to deliver it overland to any town in Iceland. We had approximately 2.5m³ of freight on a single pallet, weighing just over 500kgs on the way out and about 200kgs return. The total cost of collection from Cambridge and return to Cambridge, including all customs clearance etc. was £902.32. We shipped the freight roughly three weeks before we intended to fly to Greenland and it arrived in plenty of time. If you don't have time to organise freight yourself you can ask Tangent to do it for you. However, this option is obviously much more expensive.

Your freight must be securely packed: we built a closed wooden box around a standard 1m by 1.2m pallet. The freight arrived undamaged and was waiting for us in the airport hanger at Isafjordur, but it was obvious that the box had taken a bit of a battering in the process.



Above left: Alex with the finished crate in Cambridge, just before freighting. Above right: The crate and our equipment in the airport hanger at Isafjordur.

5.3. Paperwork

5.3.1. Import Bureaucracy

The rules are fairly simple, but strictly enforced. We had absolutely no problems, but several past expeditions have had difficulty in this area. Essentially:

- You are not allowed to import any food into Iceland for consumption in Iceland. All pre-packed/dehydrated food can be imported as long as it's reasonably obvious that you intend to consume it in Greenland and not in Iceland.
- You cannot import fresh produce (cheese, veg. etc.), so buy this in one of the 'Bonus' supermarkets when you get there – look out for the pink pig! Cheese in Iceland is *very* expensive, though you can get some excellent cheese spreads quite cheaply.
- Importing a rifle is a bit of a nightmare (for obvious reasons) so we hired ours from people who already had them in Iceland (Tangent and Fridrik).

5.3.2. Permits

- The Danish Polar Centre (DPC) issue permits to Greenland expeditions. You must apply at least 3 months in advance. All of the information you need is here: www.dpc.dk
- Leisure (i.e. non-scientific) expeditions to Greenland require a 'Sports Expedition' permit. Your application must include a statement from your insurance company indicating that they are willing to cover the costs of search and rescue in a region as remote as Greenland. See 'Insurance' below.
- You are required to carry an EPIRB/PLB in case of emergencies, and we strongly recommend that you take a satellite phone as well. To use these you need to apply for a radio licence from TeleGreenland. This will cost you about £70.
- If your expedition lies within the Greenland National Park you are also required to carry a rifle, for which you need a rifle permit.

5.3.3. Insurance

The BMC (www.thebmc.co.uk/insurance/index.htm) offer insurance to Greenland expeditions, as do Tangent expeditions (www.tangent-expeditions.co.uk/insurance.html). We paid £300 each for Tangent insurance and were very impressed with the way they handled Jenny's accident, rescue and subsequent hospital treatment (see page 42). Highly recommended.

5.3.4. Bank Account

We set up a dual-signatory account with Nat West that allowed internet banking which worked fine.

Gift Aid – if you get approval from the Cambridge Expeditions Committee (CEC; Cambridge University Expeditions only) you can use their registered charity number and may be eligible to claim Gift Aid (tax relief of up to 28%) on all donations to your expedition. See www.hmrc.gov.uk/charities/chapter_3.htm for more information.

5.4. Consumables

5.4.1. Food

Organising the food for an expedition such as this, where a high calorie, balanced diet has to be reconciled with low weight and cost whilst taking into account individual preferences, is always a challenge. Enough food was taken for 30 days in order to have spare rations in case of a delayed return home. Each man-day of food aimed to provide approximately 4,000kcal with a maximum weight of 1.25kg. Balancing these factors it was decided to take three different ‘sets’ of food as follows:

- 1) Dehydrated meals (18 days) – bought from Be-Well Nutrition as they were the most reasonably priced, tasty meals we could find. Each person had a breakfast, dinner and pudding per day plus a sachet of ‘B-fuel’ (energy drink). The main meals were made by simply adding boiling water to the packaged mix, a principle which would have been convenient with the breakfasts and puddings! Generally all six options were very palatable, with the Bean and Vegetable Curry proving the least popular. Meals were supplemented with snack food which provided about half the day’s calorific intake.
- 2) Army ration packs (7 days) – we managed to source these at a very low cost, although their relatively heavy weight restricted the number we could take. General opinion was good, though the meals were a bit oily and rich for some tastes, resulting in some active bowel action... The packs were stripped of certain items deemed unnecessary before the trip.
- 3) ‘Normal’ food (5 days) – To balance weight and cost and add a bit of extra variety it was decided to take some more everyday food: honey crunch cereal for breakfast, beanfeast and cous cous or pasta and sauce for dinner and cake and custard for pudding. This definitely proved popular. Again, meals were supplemented with snack food, providing half the day’s calories. These meals and the snack food were mostly purchased from the Cash and Carry.

Overall the quantity of food satisfied all, even Tom! Particularly popular were the cheese and crackers/tortillas, which kept beautifully in our igloo and are definitely recommended.



Above: Preparing a meal.

5.4.2. Fuel

120 litres of SBP fuel (essentially Coleman Fuel) were purchased off Fridrik Adolfsson in Iceland. It can be bought from Tangent Expeditions, but at ten times the price. We worked on the basis of half a litre of fuel per person per day, and this was far too much – we had a third of our fuel left at the end. Having said that, for approximately half of the trip we were able to use “solar melters” (black dry-bags filled with snow and placed on some kind of ground insulation) to provide us with at least some of our water.

5.5. Equipment

The total weight allowance for both Twin Otters came to 1360kg. This included team members, food, fuel, packed rucksacks, ski kit and group kit. To keep within this Tom compiled a comprehensive list of equipment and weighed everything very carefully. We found that personal kit had to weigh less than 20kg and ski kit less than 10kg. In the end we freighted more equipment than we expected to be able to fly with in the hope that the weight limit was slightly flexible. This turned out to be the case and we were able to take a few extra boxes without any problems.

Our equipment spreadsheet is given in *Appendix 2*.

5.5.1. Communications

Your expedition will be required to carry a Personal Locator Beacon (PLB) or an Emergency Position Indicating Radio Beacon (EPIRB). We hired a PLB from Paul Walker at Tangent Expeditions for a cost of £30 per week.

In addition to the PLB we strongly recommend that you take a satellite telephone – ours was indispensable for co-ordinating our second flight out during the storm (see page 21) and following Jenny’s accident (see page 42). We obtained an “Iridium” satellite phone and solar charger from Mobell (www.mobell.co.uk) at a rate of £9 per day for hire and £1.85 per minute for calls, and their service was excellent. It’s worth noting that the billing system rounds up to the nearest whole minute, so hang up *before* you’re connected to the answer machine or you’ll pay £1.85 just to hear “Welcome to the Orange answer phone...” or similar.

You’ll also need an air-band (not marine-band) VHF radio with which to communicate with the Twin Otter pilots at close range. We managed to borrow one from Paul at the last minute when we realised that our marine-band VHF would not be suitable.

We decided against taking walkie-talkie style VHF radios for inter-group communication, but instead obtained emergency rocket flares from Fridrik in Iceland. These worked successfully.

5.5.2. Rifle

A rifle is a requirement if you intend to visit the Greenland National Park, and may be a wise precaution regardless if you’re going anywhere near the coast. You must obtain a rifle permit in advance from the Chief Constable of Greenland; the form is available from the DPC website (see above).

If you intend to take out your own rifle or hire one in this country, get started on the paperwork very early. It could easily take 6 months or more to get permission to carry a rifle on a plane in this country. A much better idea is to hire from Fridrik or Tangent, both of whom keep rifles in Iceland and are known by local police officials. We hired a rifle and ammunition from Tangent at a cost of £50 per week.

5.5.3. Tents

Four quasars anchored with snow-filled stuff sacks were used throughout. We also took a base camp tent (hired from Jonathan White, Lanchester Greenland Expedition, 2001), but in the end didn't use it, as it requires some serious digging to erect, and we found the quasars comfy enough!

5.5.4. Skiing and Pulks

Most people bought or already owned suitable ski mountaineering kit. However, two team members hired their ski equipment from Ellis Brigham in Aviemore.

The whole group hired avalanche transceivers from the Alpine Club, and we purchased 4 pulks (sledges) from www.snowsled.com

5.6. Medical

The remoteness and serious nature of our expedition meant that much thought and planning had to go into developing our response to medical emergencies. Firstly, the occurrence of such had to be minimised. Secondly, equipment and training had to be provided to allow all team members to deal competently with any situations that arose. Thirdly, given the possibility of long term casualty management at base camp owing to difficulties in evacuation procedure (through adverse weather conditions etc.) equipment and training was required to give the team the best chance to carry out casualty monitoring successfully.

Early on in the planning of the expedition Matt was put in charge of sorting out the provision of suitable equipment and training. A risk assessment was carried out and from this a Crisis Management Plan developed, in order to consider how best to respond to medical emergency situations. This was considered a useful exercise, despite the obvious drawbacks (how can you plan for all eventualities?!), as it fed back into other areas of expedition planning, such as decisions on what non-medical equipment should be taken.

The team all had tetanus immunisations, considered a sensible precaution, but no immunisations were necessary for the expedition – www.traveldoctor.co.uk is a good site to explore this. All team members had basic first aid training, but also went on a course run by Adventure First Aid (www.adventurefirstaid.co.uk). This was excellent, providing skills and training appropriate for remote medical emergency situations, and also exploring more specific medical aspects of our expedition such as frostbite.

A number of resources were used to determine what equipment should be taken. The RGS Expedition Medicine book (see www.rgs.org) was found to be an invaluable way into this issue. Previous expedition reports were also useful. Consultations with Guy Risdon of Adventure First Aid (for medical equipment) and Dr. Lea-Cox of Trumpington Street Medical Practice, Cambridge (for drugs and medicine) were

massively helpful. Appropriate medicines were prescribed by Dr. Lea-Cox, and Adventure First Aid provided medical equipment at cost prices. Medical equipment on the expedition was divided into three: a comprehensive base camp kit (containing drugs and specialist equipment), a rapid-reaction emergency kit (kept in base camp and available to all team members in the event of an emergency situation), and comprehensive standardised personal medical kits (carried by all team members at all times). All climbing groups also carried survival equipment – blizzard bags, mountain shelters and snow shovels, as well as appropriate clothing, avalanche transceivers when appropriate etc.

Post-expedition, it was felt that our medical and emergency situation preparation had been satisfactory. Importantly, the team did not rely on one member with more knowledge. Maybe more drugs had been taken than necessary, but no serious long-term casualty management was undertaken.

Full listings of the medical equipment carried by the expedition can be found in *Appendix 3*.

5.7. Grants and Sponsorship

See *Appendix 5* for a list of Grants applied to, their deadlines in 2005 and the amounts typically awarded by each. Alex was made responsible for ensuring applications were in on time.

We looked to smaller local businesses, supermarkets, outdoor gear shops and food suppliers for sponsorship. Soreen (www.soreen.com) and Tunnock's (www.tunnock.co.uk) gave us a plentiful supply of malt loaves and caramel wafers, along with a financial contribution, and Open Air, Cambridge (www.openair.co.uk) gave us a generous discount on outdoor gear.

5.8. Skills and Training

5.8.1. Ski Mountaineering Training

It's important to have a few people in the group with half an idea of what they're doing, but it's not necessary to have a full team of ski mountaineers... The following training was undertaken:

Classroom Training: Mike was the most experienced skier, so he went on a course to Plas y Brenin by the end of which he was ready to rescue people from crevasses, avoid avalanches, kick turn, skin and ski powder.

Slovakia, a land of Vodka, a land of former communism, a land of.... Skiing?

Four of us flew EasyJet to Prague and jumped on the sleeper train to Poprad. The trip



passed in a flurry of skiing and vodka. The skiing was limited, but suited Tom, Alex and James as they grasped the basics from scratch.

Left: Alex learning to ski in Slovakia.

Kandersteg: Time passed. Mike went on an awesome two week off-piste trip to Chamonix and Avoriaz at Christmas, and followed this by joining the rest of the team in Kandersteg, where some ice climbed, some skied and some learnt to ski.

Back to Cham: Alex, Tom and Mike returned to Chamonix for a cool trip. Unfortunately, due to poor avalanche conditions, only a few trips could be made into the mountains. Otherwise much time was spent perfecting technique, edging and waxing skis, digging pits, learning about avalanches as well as (most importantly) drinking beer and eating curry.

So of the team flown into Greenland some knew the ski mountaineering skills, some didn't. This was fine - everybody picked them up as we went along as those with more skills passed them on to others. Alex, Mike and Tom could do more ski mountaineering due to their extra training, but these things need to be balanced with time and money in the run up to an expedition.



Above: Ice climbing in Kandersteg.

Lessons learnt:

- It's good to have a balanced team with a mix of skills. Decide what skills everyone needs to have as a base level, and then how many need a bit more.
- Train for pulk hauling. You never know when you might get dumped 60km from where you're supposed to be.
- Keep practicing all the skills whenever you're on skis.
- Have fun training for the expedition. It's almost as important as the expedition itself!
- Don't face plant in front of the French. Fortunately there aren't too many in Greenland.

5.8.2. Firearms

Three team members attended a training day at RAF Mildenhall in June 2005 at a cost of £100 each. They learnt about Polar Bear behaviour, how to kill one with a gun, safe use of a gun, cleaning and maintenance, and techniques for accurately and quickly firing a gun under pressure. They passed the skills learnt on to other team members.

5.8.3. First Aid

All attended a three-day residential expedition-specific first aid course run by Adventure First Aid (www.adventurefirstaid.co.uk) in Devon. This was an extremely well organised, informative course, with a sound grounding in putting techniques into practice. It focused not only on skills and training appropriate for remote medical

emergency situations, but also more specific medical aspects of our expedition such as frostbite.

5.8.4. Mountain craft – rescue techniques

Before departure from the UK all team members practiced the necessary rope rescue techniques such as abseiling with an unconscious climber, crevasse rescue, snow anchors, etc.



Above left: Leah practicing using the rifle.



Above right: Tom with the shotgun.

6. The Expedition

6.1. Getting to Greenland

As the time of our Twin Otter flights approached, it became increasingly obvious that bad weather in Greenland was going to force a change in our plans. We had arranged to split the cost of our inward flight with a Tangent Expeditions group due to leave Greenland at a similar time to our proposed arrival. The original plan had been for the plane to drop us at our landing site, and then fly approximately 60km further inland to collect the Tangent group before returning to Isafjordur. Unfortunately for us, heavy snowfall meant that the plane would not have enough fuel to attempt a landing at our (unknown) base camp before collecting the Tangent group. Instead, we would be dropped at the Tangent site and would have to ski into our area from there.

6.2. Leah's Expedition Account

On June 30th we were woken at 7am by Paul Walker, with news that it was still snowing and the chances of being flown in that day were minimal. Exasperated and resigned to another day hanging around the campsite, we went back to sleep. And so we were taken completely by surprise when Paul phoned again at 9am, saying a van would come and collect us from the campsite in an hour, and the plane would leave as soon after that as possible. A frantic hour's packing ensued and before we knew it the first group, Tom, Matt, James and Alex, were bundled unceremoniously into the van which then careered off at high speed away from camp. An odd feeling for those left behind – next time we would meet would be in Greenland. We had hoped the second group would fly in later that day or first thing the next morning. Again luck didn't go our way – first bad weather in Greenland and then a broken plane door meant we weren't reunited for another four days. Luckily northwest Iceland is a stunning corner of the world, with pristine glacial valleys sweeping down to blue Fjords; we thoroughly enjoyed exploring and familiarising ourselves with it. But the waiting was agony, raised hopes every day quickly shattered by another phone call reporting bad news.



Above: Tom, Matt and Alex load the first plane.

Meanwhile Alex, Tom, James and Matt had had a smooth packing of the plane, flight and landing. They arrived to find Paul's group scampering around, hurriedly packing up and burning their rubbish. Food was scavenged from their fire and Paul left us with his unused fuel, two pulks, maps and aerial photos to allow us to ski to our area. Shortly after the plane left the storm closed in again – tents were quickly erected in shallow pits and they settled in, hoping it would clear soon. It continued snowing for the following

three days – the tents needed digging out regularly, at times every four hours. On the afternoon of the 3rd day it cleared enough for the second ascent of a small, attractive-looking peak to be made. The following day the weather held, and finally the Twin Otter returned, bringing Leah, Ali, Mike and Jenny.



Above: Matt digs out his tent. Nearly 2m of snow fell in three days.

And so we were all finally in Greenland, 60km from where we wanted to be, and five days late. But we were there, and that evening the weather was glorious – low swirling cloud disappeared in the evening sun leaving the first cold, clear night. Alex, Mike, Tom and Leah skied off to climb another, small peak in the area, arriving on the summit at midnight. From the summit, the most beautiful panorama unfolded: To the west the ice sheet rolled endlessly away, a patchwork of golden stripes woven through dark blue, the ice alternately illuminated by streaming sun

beams or shadowed by thick cloud bands. To the east the ice carried on rolling, but down towards the sea, and in our area 60km away it was broken up by a spattering of distant pointy peaks. These grew in stature as the glaciers lost height eastwards, and on the horizon they merged into a jagged haze of lavender and grey. Looking back northwards the view was dominated by the looming bulk of a large triple-headed mountain, the most significant unclimbed peak in our immediate area. And at its foot, four tiny black dots in the midst of the vast sweep of open glacier – our lifeline for the next month.

Over the next four days the weather remained unsettled with one and a half days of snow. We managed some climbing however - Mike and Tom made a first ascent of the triple-headed mountain, which they dubbed 'Angel Peak'. Other team members climbed this, as well as local Nunataks, and we carried out several training exercises so that everyone on the team could use and maintain the rifle and shotgun, and was fully competent at avalanche awareness and



Above: The second plane lands.

rescue. After four days the weather seemed to have stabilized with a cold wind coming off the ice cap; we had climbed everything we wanted to in this area and longed for more, larger objectives, and we had eaten enough food and burnt enough fuel to be able fit our entire camp onto the pulks. And so on the 9th of July we packed up base camp and at 10pm, once a hard crust had formed on the snow, headed off on the 60km ski tour to our planned climbing area.

That first night of the ski tour was amongst the coldest, around -20°C , and with an icy wind at our backs. It was also probably the hardest – we hadn't distributed the weight evenly between pulks and we were all carrying full rucksacks, which was very uncomfortable. Fortunately the first stretch was all downhill, and it was exciting to be moving into new territory, with new mountain ranges and glaciers spreading



Above: The ski tour begins.

themselves before us. At 3:30am we stopped, well established along a new glacier, and set up camp. Skis, poles and pulk traces were used as quick and efficient pegs for the tents, a wall was made to shield the tents from the wind using Alex's handy ice saw, and a toilet trench dug. A routine we would become very familiar with and efficient at carrying out during the next few days.

The next evening we set off at 10:30pm, again once a hard crust had formed on the snow. The wind was still blowing steadily, giving rise to unending sinuous jets of spindrift which whipped along the surface of the glacier. Snow, blasted by the wind, streamed off mountain tops and shone, brilliant white trails in the sky. We had re-distributed the weight and strapped our rucksacks onto the pulks, a much comfier way of transporting them, and an easier night of skiing ensued. The first 4km were gently uphill – hard work with pulks, but again with the wind at our backs. A glorious downhill section followed, and a fresh vista, with yet another vast array of untouched mountains. Once the terrain flattened we set up camp, amongst 40mph gusts of wind.

The next evening we set off at 10:30pm, again once a hard crust had formed on the snow. The

The third night was again clear, cold and beautiful. Six hours of skiing – on and on, the rhythm becoming natural now, firstly across flat glacier, then traversing. The large, over-loaded pulks were uncontrollable and frequently toppled over. At 12pm we gathered and Matt enjoyed a somewhat balaclava-muffled rendition of 'Happy Birthday'; surely one of the more memorable birthday spots. As night wore on we reached the head of the North Parallel Gletscher and excitement grew – finally a feature we recognised and had become familiar with when planning our trip. Our area lay on the other side of the mountains bounding the north side of the glacier. The only crevassed section on the tour lay between us and our area however, so we set up camp, amid even stronger winds than the previous night.



Above: Spindrift and the early morning sun.

The following day Mike, Tom and Alex agreed to ski down the glacier to decide on the feasibility of skiing through the crevassed section with pulks, whilst Jenny, James, Leah, Matt and Ali hoped to make a first ascent of a very attractive looking ridge just northeast of camp. The wind remained strong all day however, and that night it got stronger, with 60 to 70mph gusts. It was also extremely warm, and the snow stayed slushy all night; not good conditions for crossing snow bridges or climbing ridges,

and neither of the parties were successful. The following night was very similar, but marginally colder, and at 1am we packed up camp and headed off. The way through was relatively straightforward, with only one seriously crevassed section which we belayed across one at a time using a large T-ski belay. And so to our area – up slightly to a col, and suddenly there it was before us. The final stretch was wonderful – slightly downhill, and with every glide more of our area unfolded before us. The wind lessened and stopped altogether as we left the North Parallel Gletscher, the main funnel between the ice cap and the sea.



Above: An intermediate camp during the ski tour. The tents are pitched using skis, poles, ice axes etc.



Above: Alex, Mike and Tom after their ski ascent.

At 8am we stopped. A large number of extremely attractive-looking mountains and ridges of all sizes were within an hour's ski of the spot, and it was both flat and sheltered from the wind. Considering the hour, we set to making camp with remarkable gusto. The atmosphere was very jovial as we cooked, outside in the warm morning sun, and in our area at last!

That night we awoke around 10pm, and split into two groups. Alex, Mike and Tom headed off northeast to

attempt a ski-ascent of a reasonably large and very attractive-looking peak. They managed to ski within 100m or so of the summit, and climbed up from there, and altogether it was a very enjoyable route, with a fun ski down! Meanwhile the others headed off to a col southeast of base camp. From base camp this appeared to be the low-point between two ridges – the northern one belonging to a medium-sized rocky peak, the southern lower-angled and more sinuous, but fun-looking nonetheless. In the end it turned out that the northern one wasn't accessible from the col, so all members ascended the southern one to a reasonable rocky peak, and used the climb to assess the potential of other mountains around. Overall a good day was had by all, and a good



Above: Leah, with the peaks of our area spread out behind.



Above: Matt climbing "Mt. Jaeggi". Our skis are just visible in the snow at the foot of the ridge.

learning day – it was immediately apparent that snow was to be avoided if at all possible – avalanche cones littered the snow slopes, and the snow was slushy and wet. The rock however was for the large part wonderful, hard, orange granite – lovely!

Just as it seemed we were about to get some climbing done bad weather hit again however, much to the frustration of everyone! It snowed and then rained for a day and a night. Luckily this was the last bad weather we had and the last five days were perfect – crystal clear skies,

scorching sun by day and instantly freezing when the sun dipped behind the mountain tops. A plethora of routes accompanied the change in the weather, everyone aware that time was running out and wanting to fit in as much as possible.

Mike, Alex and Tom made a second ascent of the ridge Ali, Matt, James, Jenny and Leah had gone up on the first day, and then carried on along it to a more substantial peak. That same day Ali, Leah and Jenny ascended the small but very pleasant peak, enjoying some good moderate rock climbing and scrambling. James and Matt were also within view – they returned to climb the North Ridge of Mount Jaeggi, the route we had hoped to climb on the first night in our area but had been unable to access. Overall a wonderful day was had by all.



Above: Matt climbing "The Pixie".

The following day Leah, Matt, James and Jenny skied off to climb the right hand Pixie, a pointy rock peak an hour and a half's ski from base camp. This was glorious – some technical climbing, otherwise easy scrambling, and a breathtaking view from the summit down to the sea. Meanwhile Ali went on a ski tour and Alex, Mike and Tom rested ready for a big route that night... They then spent 18 hours on the ridge adjacent to base camp,



Above: Tom leading along the ridge behind base camp.

to the south. A good effort, and very enjoyable, with some technical climbing, snow and scrambling.



Above: Abseiling back to our skis on "The Thumb".

Jenny and Leah attempted a small but steep rock peak dubbed 'The Thumb', but backed off two thirds of the way up. Ali, Matt and James completed this the following day. Other ski tours were undertaken, small summits climbed and long lunch-breaks taken in the warm sun!

The last big efforts were planned by Matt and James and Jenny and Leah – Tom and Mike planned to attempt one last long ridge, but before starting on it they decided to call it off as Tom's digestive system wasn't happy. Matt

and James headed off at midnight on the 21st to attempt the Pear Buttress of Peak 11, the largest mountain in our area. They completed the route in around 28 hours, having had to down-climb almost the whole thing.

Jenny and Leah planned on making a second ascent of the route Alex, Mike and Tom had done two days previously. They started at 8am and by 1pm were starting on the final, largest peak. They were moving together when Jenny fell – the block she had been standing on slid away from under her. She fell 8m or so, landing on a ledge just as the rope came tight. No broken bones luckily, but unfortunately she gashed the front of her shin badly. They abseiled off the ridge, and then Leah walked back to the start of the ridge to collect her skis and the pulk. She then dragged Jenny back to base camp in the pulk. Once in base camp it everyone rallied and the wound was re-cleaned and dressed. It was immediately obvious that Jenny would have to be gotten to a hospital as soon as possible, so we rang Iceland on the satellite phone. The Twin Otter could come and collect us the next day. This was ideal – Matt and James were still on The Pear and camp had to be packed up. As the original plan had been to be flown out the next day anyway, we all decided to cut our trip short by one day and fly out with Jenny.



Above: On the headwall above the Pear Buttress.

In many ways the trip didn't go to plan – we were dropped in an area we didn't want to be in several days late, and encountered unsettled weather for nearly half our time there. However, aside from Jenny's accident, I think everyone on the team would



Above: Jenny climbing along the ridge shortly before her accident.

agree that they wouldn't have changed a thing. Being confined to one area we could never have gained such a sense of Greenland. Instead, we lived and travelled through the land, from the edge of the ice cap to down near the sea, and in doing so could really appreciate the enormity, isolation and beauty of our surroundings. The ski touring in particular was something most had not

anticipated enjoying, but now purely ski-touring trips are planned for the future by some team members. Once we had arrived in our area our time there was made all the more special by the fact that it was limited, and after the first blip in the weather a bonanza of new routes followed, mostly on pristine granite. The accident at the end was a very unfortunate end to an otherwise truly wonderful trip. Happily there have been no long term effects, and Jenny is back climbing and walking.

6.3. Peaks Climbed and Area Explored

Fig. 3 shows the location of our actual landing site, the route of our ski tour and marks every peak climbed during the course of the expedition. *Fig. 4* shows an aerial photo of our main climbing area in more detail. The routes are described in *Section 6.4*.

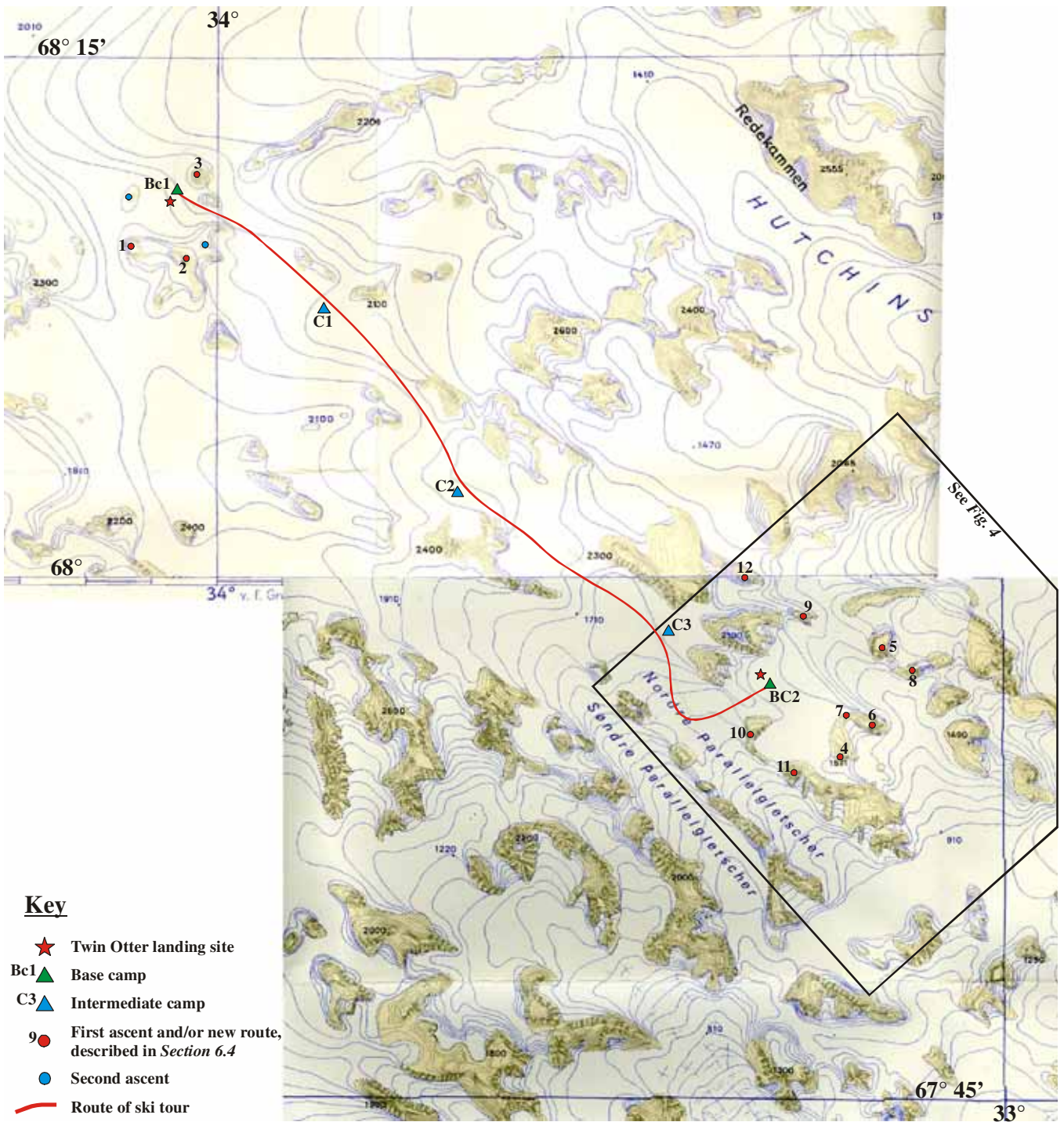


Fig. 3: Map showing the route taken and peaks climbed by our expedition. The black outline marks the area shown in Fig. 4. Numbered peaks are given more detailed description in Section 6.4. This figure has been produced from Geodetisk Institut Maps 64Φ.4 and 67Φ.1.

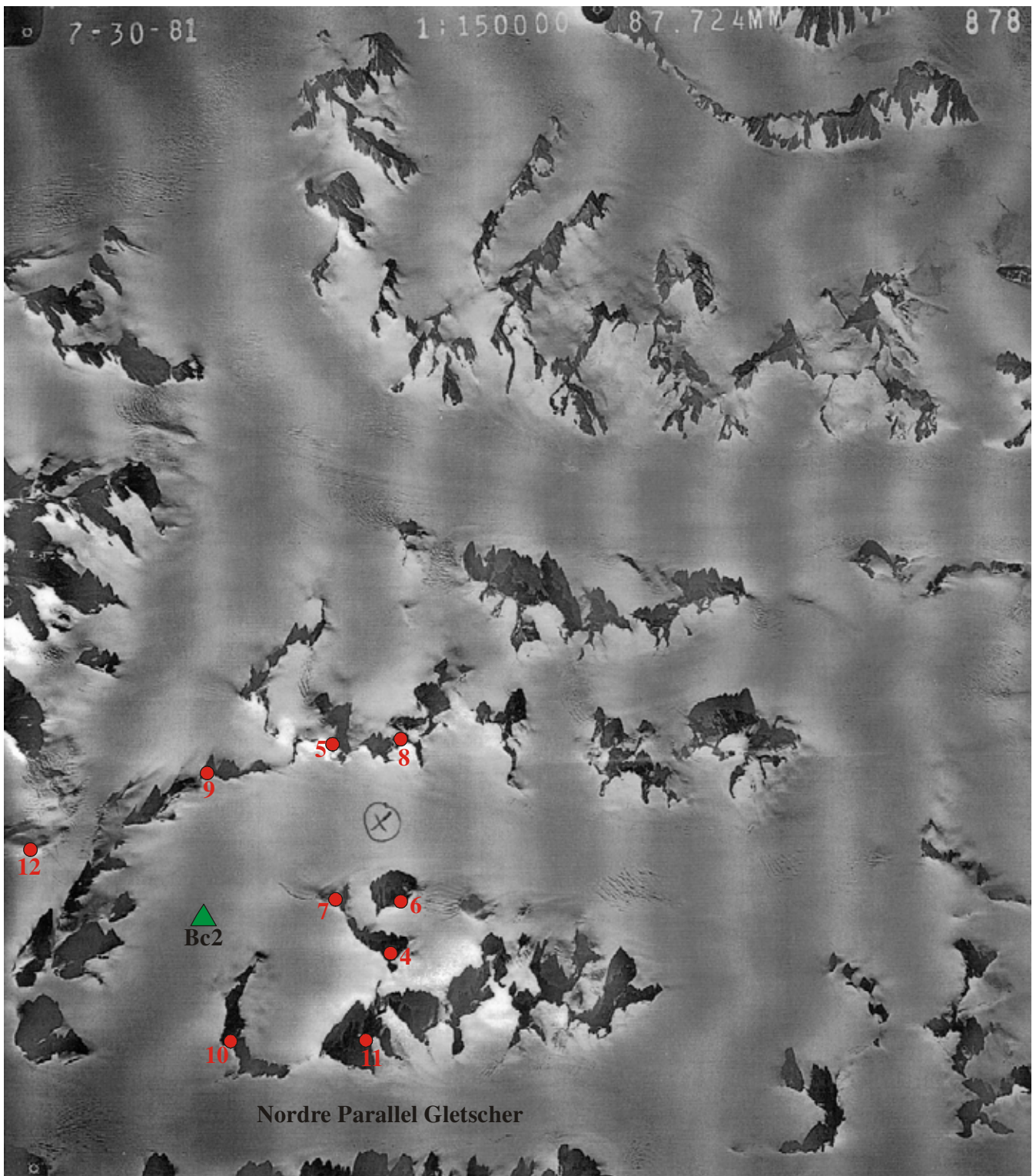


Fig. 4: Aerial photo of the region around base camp 2. First ascents are numbered and described fully in *Section 6.4*.

6.4. Route Descriptions

Peak 1



Route 1: East Ridge

Grade: F

Notes: The first ascent of this peak was probably made by a Paul Walker expedition by this route the week prior to our ascent. All members of our expedition climbed this peak at some point during the expedition.

Route 2: North Ridge

Grade: PD

Notes: Soloed by Matt.

Peak 2



Route 1: East Ridge

Grade: PD with sections of II.

Notes: Impressively loose barrel-crested ridge climbed by Alex, Matt and James. The main peak on the right of the picture is thought to have been climbed Paul Walker's expedition from the far side via a broad snow slope. The left-hand summit was left unclimbed, and our route took the easiest line to the top.

Route Description: Follow the crest of the ridge throughout, across easy-angled, boiler-plate slabs. Beware of loose rock and unstable snow. Some horrendously loose pitches of II.

Peak 3: The Three Angels



Route 1: North Ridge

Grade: PD with short steps of II.

Notes: Lovely long route on solid granite up the finest and tallest peak in the immediate area. First ascent of route and peak made by Mike and Tom, repeated the next day by Jenny and James. This is what we came for!

Route Description: Gain the north ridge by skiing into the snow bowl below the East Face. Continue easily to a steep wall, which is climbed by a steep and very exposed pitch of II to reach a ramp line. This leads to the upper ridge crest which is followed in a spectacular position with short steps of II to reach the exposed summit.

Peak 4



Route 1: North Ridge

Grade: PD+ with short steps of III.

Notes: Climbed as far as point “a” by Ali, Matt, Leah, Jenny and James to get a better view of the area. Alex, Mike and Tom returned a few days later to complete the trickier upper section of the route. Great views!

Route Description: Follow the crest of the ridge to below the first tower, which is reached via an exposed snow crest. Turn the tower by a ledge system on the left and climb to the summit of point “a”. Continue along the crest climbing a number of short tricky steps to reach the main summit.

Peak 5



Route 1: Northwest Ridge

Grade: F+/PD-.

Notes: One of the most beautiful and prominent peaks in the region. Alex, Mike and Tom skied to within 100m of the summit and then climbed to the top. The best part was the ski down!

Route Description: Ski north to centre of main col and turn right. Take care crossing crevasses and continue skiing to reach snow shoulder below the main peak. Leave skis and follow the exposed ridge to a rocky summit.

Peak 6: Mt. Jaeggi



Route 1: Treasurer's Ridge

Grade: D- with sustained III and some pitches of IV.

Notes: A wonderful and intricate route with approximately 20 pitches of climbing, often on immaculate rock. The ridge is divided into four huge buttresses separated by three sinuous and unstable snow crests. The second and third rock buttresses offer the most sustained, technical and exposed climbing. Climbed by Matt and James.

Route description: Cross the bergschrund at the easiest point. Two steep pitches (III) lead to the crest of the first buttress. Cross the first snow ridge to a point beneath a huge steep headwall which is climbed on the right. Climb loose rocks back left for two pitches (III) to regain the crest and continue in an exposed position (II) to below the crest of the second buttress. An airy traverse leftwards (II) gains easy ground and leads to the second snow crest which is crossed to a belay beneath a deep, loose chimney. Climb rocks left of the chimney and the steep corner above (IV) and follow the crest over easier ground to a notch. Descend the left side of the notch and climb a short overhung corner (IV) and exposed slab to reach the final snow crest. Easier climbing leads to the summit.

Peak 7



Route 1: Northeast Ridge

Grade: PD- with one pitch of IV-.

Notes: Climbed by Jenny, Ali and Leah.

Route Description: Cross the bergschrund and climb three steep pitches to easier ground. Scramble more easily to reach the final summit snow crest.

Peak 8: The Pixie



Route 1: South Ridge

Grade: PD with pitches of III and IV-.

Notes: The start of the route is threatened by cornice collapse and is very loose. After that the ridge becomes more defined and offers excellent climbing on perfect granite. The summit block is tiny and very exposed. First ascent of route and mountain by Jenny & James and Matt & Leah.

Route Description: Join toe of ridge near to large, open crevasses (threatened by cornice collapse from ridge above) and scramble quickly leftwards over loose ground to reach main ridge. Follow this in a spectacular position all the way to the summit, with pitches of III and IV- on immaculate rock.

Peak 9: The Thumb



Route 1: South Face

Grade: PD with sustained III and IV and some pitches of IV+.

Notes: Some of the best rock in the area. Short, technical and steep. First ascent of route and peak by Ali, Matt and James.

Route Description: Cross bergschrund and climb spur to ledge system. Two pitches of III lead to steep crack (IV) which gives excellent climbing. Continue more easily to the final headwall which is taken directly at IV+ to an airy summit.

Peak 10: Base Camp Peak



Route 1: Base Camp Ridge

Grade: AD with pitches of IV and IV+.

Notes: An intricate route with tricky climbing and some loose rock. Spectacular positions! First ascent by Mike, Tom and Alex. Leah and Jenny attempted a repeat a few days later, but Jenny fell and injured her leg.

Route Description: Gain ridge via snow slopes to S. Follow crest, turning obstacles by ledge systems on the S side to reach large notch. Abseil into notch and continue along ledges to reach main headwall. Climb this directly with pitches of IV and IV+ on some suspect rock.

Peak 11



Route 1: Pear Buttress

Grade: TD with sustained III and IV, plenty of IV+ and some short sections of V.

Notes: The biggest face of the biggest mountain in the area via an objectively safe, but long and complex route. The upper headwall is much bigger than it appears from below and includes the most difficult climbing. In the main, the quality of the rock is good and the positions and views are second to none. First ascent of route and mountain by Matt and James.

Route description: Cross the bergschrund to join a ledge system trending up and left from the bottom of the Pear. Follow this for three long, loose pitches to join the crest overlooking a deep couloir on the left (steps of III). Two fine pitches (III) along the crest lead to loose rock terraces left of the crest and then to more solid, steep walls. Climb a fine exposed slab (IV) followed by an awkward chimney (IV+) and move right through a notch to the right side of the ridge. Climb a groove and steep step to reach a ledge below a steep wall (III). Make an airy traverse rightwards and then continue up in a fine, long and exposed pitch (IV) and continue over several large steps to reach the top of the Pear (IV).

Abseil (12m) into the notch behind the Pear and cross the snow arête to a belay on the steep headwall. Make a spectacular rising traverse leftwards towards a perched block on the skyline (IV+). Climb back rightwards along a groove in the headwall to reach a steep chimney leading to the crest (IV). Follow the crest (III and IV) until stopped by a final headwall just below the impressive summit pinnacle. Follow a ledge system round to the right and climb a steep layback corner crack (V) to a narrow arête. Follow this and a series of corners (III and IV) to reach the summit rocks. One long, easy pitch along an exposed snow crest leads to the true summit. On the first ascent, reaching the summit took 14 hours and the descent (by the same route) took 11 hours.

Peak 12

Route 1: South Ridge

Grade: F+

Notes: Primarily a ski ascent climbing steeply to reach a col north of base camp. First ascent by Matt and Ali. The ski down was particularly good fun!

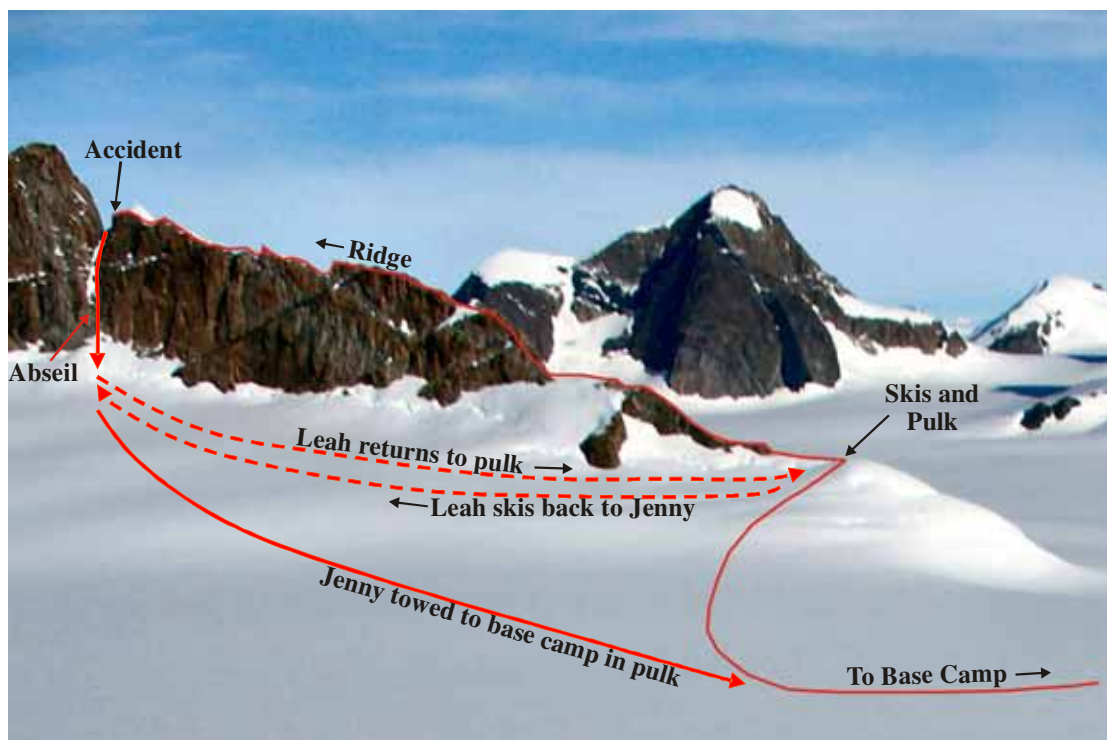
Route Description: Head north from base camp, climbing steadily to reach the col. Contour north and cross a bergschrund to reach the summit of a small rocky peak from the south. The exposure to the north is breath-taking!

7. Post-Expedition

7.1. Jenny's Accident

The accident occurred at about 1pm on July 21st while Jenny and Leah were attempting a long mixed ridge shown on the maps at 33°18'W, 67°56'N (Peak 10). They had been climbing for about 5 hours and were moving together when a foothold broke unexpectedly and Jenny fell about 8m down a steep wall. She sustained a deep wound to her left shin, removing all the skin and flesh down to the bone over an area about 5 inches long by 3 inches wide, along with plenty of minor cuts and bruises. Leah climbed down to her, gave her some pain killers and bandaged the wound with a large NATO wound pad (which seem to fix just about anything!). Unable to climb back along the ridge they began a multi-pitch abseil down a steep couloir, eventually crossing the bergschrund to reach safe snow slopes. Jenny was unable to walk in the deep snow, so Leah left her and waded back to the start of the ridge, collected the skis and the pulk and skied back to Jenny. She then put Jenny in the pulk and towed her back to base camp.

At base camp the wound was cleaned with saline solution and re-banded with non-adherent dressings. She was also given antibiotics and more pain killers and then put to bed. Tom contacted Paul Walker in Iceland using the satellite phone and Paul arranged for him to speak to a doctor in the UK. Tom also contacted the insurance company and arranged for the plane to collect us next day. Meanwhile Alex and Mike skied towards the mountain that Matt and James were climbing and set off flares to recall them to base camp.



Above: Approximate diagram of Jenny's accident and evacuation to base camp.

We were collected on the evening of the July 22nd and returned to Isafjordur. A policeman arrived to take the guns and also gave Jenny a lift to the hospital, where the surgeon was called. The time between the accident occurring and the surgeon first

inspecting the wound was approximately 37 hours, which is pretty fast considering our location. On the morning of the 23rd the surgeon operated to close the wound and attempt to minimise scarring. Jenny spent a further three nights in hospital and then returned to the UK. The hospital staff sorted out most of the medical insurance and we just had to make a few phone calls and fill in the odd form. The total medical expenses were in the region of £5000, which must bring the total cost of the rescue to in excess of 10 grand, so we certainly got value for money out of the insurance!

Jenny's getting along fine now as (luckily) the injury didn't involve any bones, muscles or tendons etc., so it's healing pretty fast. If the weather hadn't been perfect and a plane immediately available then the situation would have been much more serious, but as it was everything worked well and we were never overly worried.

7.2. Returning Home

After just a few days back in Isafjordur the team split up for the first time in about 6 weeks. A couple of days were spent re-packing the freight crate and updating the inventory, amusing Jenny in hospital, consuming as much fruit and veg as humanly possible, and generally enjoying the smell and feel of grass and earth. Matt, Alex and Leah remained behind the longest to make the final freight arrangements.

The freight arrived back in the UK approx. 6 weeks later, following a paperwork hitch at customs. The problem arose because our inventory listed equipment for eight people (Leah's boots, Matt's boots, Ali's skis etc.), whereas the delivery note specified only one person (Mike). We have no idea why this caused problems, but we recommend that future expeditions list their inventory anonymously in the format "8 x ski boots, 2 x skis etc."



Above: The Kangerdlugssuaq coastline as seen from our Twin Otter on the flight back to Isafjordur.

7.3. Finance

The table below shows the expedition's income and expenditure. It assumes that team members already had the necessary personal equipment to mount a climbing expedition to the Arctic. In reality, we each had to spend several hundred pounds more on personal kit, but we often obtained it at discount "expedition" rates and will make full use of it in future. It is therefore not included here as a "Greenland expense", but rather is seen as an investment in good quality kit which will last for years.

Expenditure	
Item	Amount (£)
Charter flights to Greenland	-£24,000.00
Flights to and from Iceland	-£2,408.90
Insurance	-£2,400.00
Expedition food	-£1,601.12
Eimskip freight	-£902.32
Satellite phone hire and calls	-£662.95
Group equipment	-£640.55
Pulk purchase and pulk hire	-£434.00
Food in Iceland	-£397.73
First aid equipment	-£331.77
Camping in Iceland	-£270.90
Rifle hire	-£200.00
Equipment repairs	-£185.00
Stove fuel	-£180.00
PLB hire and flares	-£176.07
Production of report	-£125.00
Phone calls in Iceland	-£91.15
Basecamp tent hire	-£75.00
Radio licence for satellite phone and PLB	-£69.68
Advertising and sponsorship	-£61.46
Airport charges (skis etc.)	-£51.24
Transport in Isafjordur	-£27.09
Maps etc.	-£13.80
Total	-£35,305.73
Income	
Item	Amount (£)
Gino Watkins	£1,500.00
BMC	£800.00
Anonymous benefactor	£500.00
CEF	£500.00
Andrew Croft Memorial Fund	£500.00
Donation from Ali's Church	£100.00
Augustine Courtauld Trust	£500.00
Soreen sponsorship	£200.00
Personal contributions at £3838.22 each	£30,705.73
Total	£35,305.73

7.4. Report, Lectures and Presentations

Since returning from Greenland the team has put together a slideshow and short talk about our expedition, as well as producing this report. If you would like any further information regarding our trip, or would like to see our photos, or if you require extra copies of this report, please do not hesitate to contact us:

James Sample, jes57@cam.ac.uk, 07901 621625

Matt Harding, mdmharding@gmail.com, 07790 916197

Mike Moss, mike.moss@libraryhouse.net, 07863 108414

7.5. Final Comments

During the second half of our trip we climbed the majority of the nice peaks in an area about 4km by 6km, but there is still huge potential for exploration and new routing, even in our area. In the region immediately surrounding our area the scope for new climbs is almost unlimited, and routes at all grades abound. Enjoy!

8. Appendices

Appendix 1 – The Gantt Chart

A Gantt chart is a planning document used to help schedule and prioritise tasks in order to meet a given completion date. Compiling this chart really helped to focus our attention on expedition details and we found the process extremely useful.

Appendix 2 – Equipment Spreadsheet

What we took and how much it weighed.

Appendix 3 – Medical Supplies

A list of the drugs we took to Greenland and in what quantities.

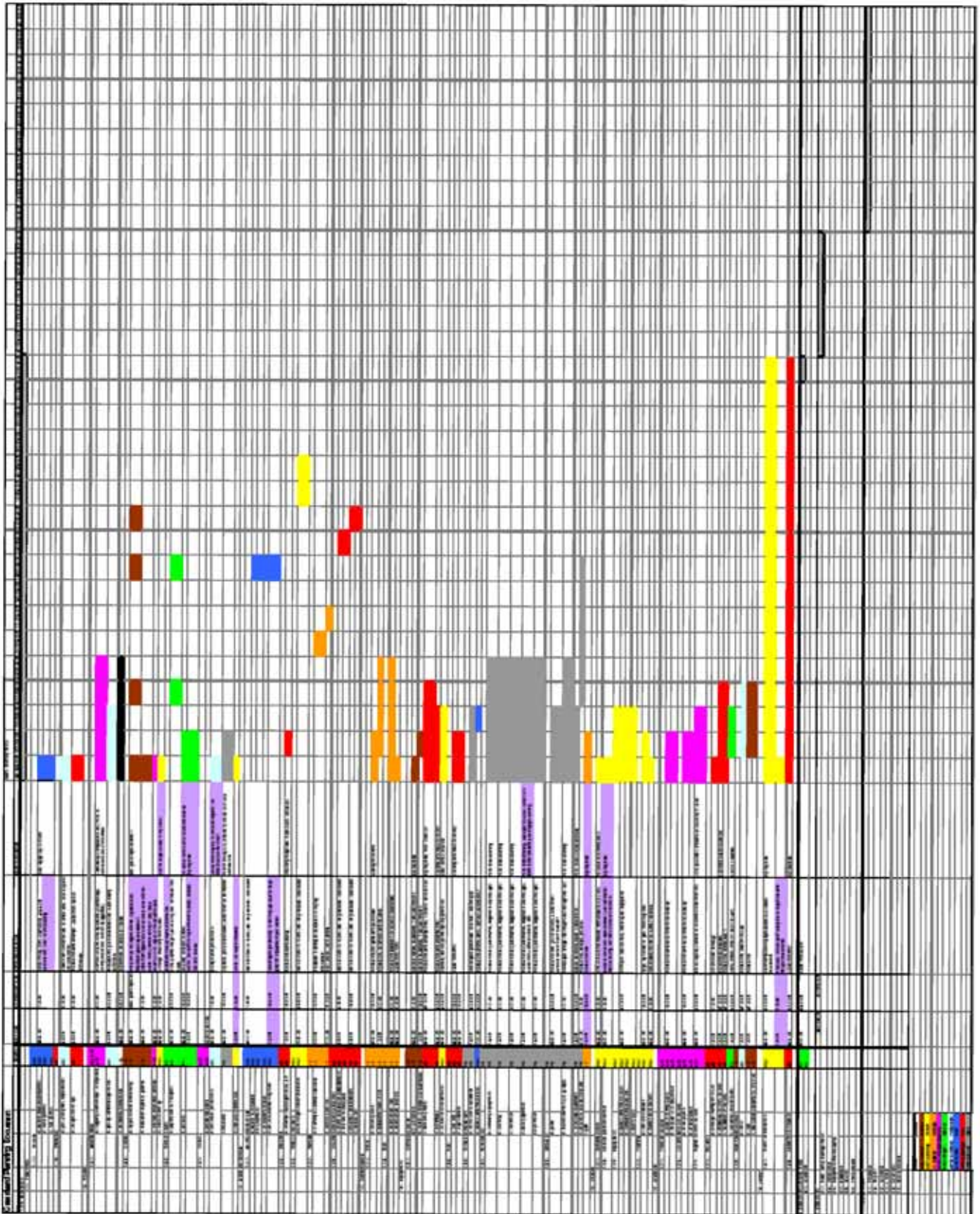
Appendix 4 – Risk Assessment and Emergency Plan

Many grant applications now require an emergency strategy to prove that you are considering risks carefully. Our plan is here.

Appendix 5 – Grants and Funding

A (non-comprehensive) list of funds relating to expeditions generally and Arctic expeditions in particular. Deadlines given are for 2004/2005 and may have changed.

Appendix 1 – The Gantt Chart



Appendix 2 – Equipment

Item	Quantity	Weight (kg)	Total (kg)
Ali	1	55	55
Alex	1	89	89
James	1	69	69
Mike	1	79	79
Tom	1	75	75
Matt	1	64	64
Jenny	1	60	60
Leah	1	58	58
Mountain Boots	8	2.5	20
Essential Kit	8	20	160
Rucksack + Liner			
Axes			
Leashes			
Crampons + spare bolts			
Anti-balling plates			
Harness			
Basic hardware			
Helmet			
Snow goggles + sun glasses			
Spare laces			
Underwear			
Socks			
Thermal layer			
Fleece layers			
Waterproof layer			
Down layer			
Glove systems			
(Hand warmers)			
Head gear			
(Gaiters)			
Sleeping bag + Inner			
Thermarest			
Rock boots			
Water Bottle			
Cup			
Spoon			
Compass			
Sun Cream			
Lip Cream/Moisturiser			
Wash kit			
Dry Bags			
Lighter			

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Eye pads (+ Ear plugs)			
Watch + spare batteries			
Leatherman/Swiss army knife			
Ski Kit	8	12	96
Skis			
Ski Ties			
Skins			
Leashes			
Ski mountaineering boots			
Poles			
Avalanche Probe			
Touring bindings			
Snow Shovel			
Personal Kit	8	3	24
Rack	4	2.9	11.6
Rope	4	5	20
Pulks	4	7	28
Tents			
Expedition Tent	4	4.3	17.2
Blizzard Jackets	4	0.25	1
Blizzard Bags	4	0.35	1.4
Mountain Shelters	4	0.65	2.6
Plastic Sheeting	1	1	1
Mats (2)	1	0.55	0.55
Base Camp Tent	1	5.3	5.3
GPS	4	0.1	0.4
Tat 60m 6mm	1	1.65	1.65
First Aid			
Base Camp First Aid Kit	1	5	5
Mountain First Aid Kit	8	0.5	4
Binoculars	2	0.3	0.6
Rifle + Ammo	1	4	4
Stoves			
Stove inc. Fuel bottle + Heat shield	4	0.7	2.8
Flint + Striker	4		
Cooking			
Pan Set + Lid	4	0.5	2
Pan Handles	4		
Vacuum flask	4	0.45	1.8
Communications			
Transceiver	6	0.3	1.8
PLB	1	0.26	0.26
VHF Radio	1	0.5	0.5
Satellite Phone	1	0.4	0.4
Flares	8	0.3	2.4
Useful Stuff	1	5	5

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Boot proofer			
Sewing kit			
Superglue			
Epoxy Resin			
Seamseal			
Dry Bag			
Small Stuff Bags			
Large Clear Bags (10)			
Small Clear Bags (20)			
Ducktape (50m)			
Sharpening Stone			
File			
Omnifuel Parts Kit			
Dragonfly Parts Kit			
Edge File			
Ski scraper			
P Tex			
Binding Tool			
Skin Glue			
Spare Skins			
Platypus			
Cleaning Kit			
String			
Plywood Off-cuts			
Aluminium Tape			
Spare Crampons	1	1.2	1.2
Dry Bags	4	0.2	0.8
Power			
Solar Panels	1	1.2	1.2
Batteries	1	0.8	0.8
Re-charger	1	0.1	0.1
Toilet			
Toilet roll	16	0.1	1.6
Jerry Cans	4	0.5	2
Man Day Food	240	1.25	300
Man Day Fuel	240	0.3	72
Total			1349.96
Weight Limit			1360

Appendix 3 – Medical Supplies

Name	Purpose	Quantity
Paracetamol tablets 500mg	Painkiller	96 tablets (in day kits)
Ibuprofen	Painkiller	96 tablets (in day kits)
Co-codamol 30/500 tablets	Painkiller	100 tablets
Tramadol hydrochloride capsules 50mg	Painkiller	60 tablets
EpiPen (Adrenaline) 0.3mg	Anaphylactic shock	1 auto-injector
Telfast (Fexofenadine) 168 mg	Antihistamine	30 tablets
Salbutamol inhaler	Allergic reactions	1 inhaler
Deltacortril enteric (Prednisolone) tablets 5mg	Allergic reactions	100 tablets
Buccastem (Prochlorperazine) tablets 3mg	Nausea and vomiting	50 tablets
Setlers Antacid tablets	Indigestion	36 tablets
Senokot tablets	Constipation	20 tablets
Ciprofloxacin tablets 500mg	Antibiotic	20 tablets
Co-amoxiclav tablets 375mg	Antibiotic	42 tablets
Erythromycin tablets 250mg	Antibiotic	56 tablets
Flucloxacillin tablets	Antibiotic	56 tablets
Metronidazole tablets 400mg	Antibiotic	42 tablets
Minims (Amethicaine) eye drops 1%	Eye anaesthetic	60 units
Chloramphenicol antibiotic eye ointment	Eye antibiotic	2 tubes
Motilium (Domperdone) suppositories 30mg	Nausea and vomiting	10 suppositories
Eurax (crotamiton) ointment	Itching/skin irritation	1 tube
Daktarin (Miconazole) cream	Fungal infection	1 tube
Flamazine (Silver sulphadiazine) cream 20g	Burns	2 tubes
Throat lozenges (Bradosol and Strepsil)	Sore throats	25 lozenges
Arnica cream	For bruises	1 tube
Cetrimide cream	Antiseptic	1 tube
Ibuprofen gel	Muscle pains	1 tube
Loperamide capsules 2mg	Diarrhoea	20 tablets

Appendix 4 – Risk Assessment and Emergency Plan

Introduction

By definition, an expedition to the uninhabited, mountainous regions of East Greenland exposes its members to a multitude of risks, as identified in the above Risk Assessment. There are no local amenities such as hospitals, no additional personnel to appeal to in the event of an emergency, and any full-scale evacuation procedure will not only take a minimum of two days (involving as it does the organisation of flights from Iceland) but is weather-dependent. It is therefore essential that the team be optimally prepared to deal with a crisis, be it an injury to a team member, the disruption of supplies or whatever. The proposed structure of the expedition, divided as it is into climbing pairs, creates stresses on intra-expedition communications and increases the need for sound skills and clear judgement from every individual on the team.

With these points in mind, this crisis management plan intends to consider a number of things, namely:

- Clearly defining what constitutes a crisis as regarding our expedition
- Minimising the likelihood of a crisis situation occurring
- Minimising the impact of a crisis situation on team members and the expedition as a whole
- Establishing a clear chain of command to be mobilised in the event of an emergency, enabling individuals to act with confidence according to a predetermined general strategy, but in a way that is responsive to the situation on the ground
- Ensuring a speedy and efficient response to a crisis situation through the development of an emergency communications strategy
- Ensuring immediate and follow-up medical treatment of any casualties, with a defined medical strategy and chain of responsibility
- Developing an emergency evacuation procedure
- Ensuring post-evacuation medical care, liaison with the relevant authorities and family members, and correct insurance coverage.

What constitutes a crisis?

It is crucial that this question is answered clearly and in full, prior to the expedition leaving British shores. Instilling a clear definition of what constitutes a crisis into the minds of all team members will prevent any indecision and vacillation, which could conceivably be fatal in the event of an emergency. Immediate recognition of a true crisis situation, conveying the responsibility to act, will greatly increase the expedition's safety.

The following seven scenarios are considered to be the basic forms a crisis may take in regard to our expedition:

- A climbing pair failing to return to base camp; defined as their failure to reappear within a period of 24 hours after their estimated time of return (as recorded in the base camp log)
- An injured team member/climbing pair; defined as one or both of the party suffering an injury resulting in their inability to continue with their objective, return to base camp or effect a self-rescue from their objective; usually

resulting in their failure to return to base camp within the allotted time (see above)

- A team member suffering illness, whether during an activity or at base camp, serious enough to demand the abandonment of their objective if one is being undertaken, and requiring immediate medical treatment; this may result in the failure of that individual's climbing pair to return to base camp within the allotted time (see above)
- The recognition of an emergency signal (such as the detonation of a flare) set off by a climbing pair or the team members at base camp
- The sighting by any team member of a polar bear, whether made from base camp or during the undertaking of a mountaineering objective
- The disruption/loss of supplies or equipment (particularly the loss of food and destruction of tents), for whatever reason, which would result in the team running out of supplies before the designated pick-up date or team members being unsuitably equipped to remain on the ice cap for the designated period
- The failure of the team to rendezvous with the Twin Otter plane at the designated pick-up place on the designated pick-up date.

Should any of these scenarios occur, the team must be able to respond speedily and efficiently, assessing the situation individually and collectively and establishing relevant communications to enable a rescue or evacuation strategy to be followed. However, before focusing on how these situations may be dealt with, it is well worth considering how they may be avoided. The mantra of 'prevention, rather than cure' is one that must be followed at all times.

Avoiding a crisis

Crisis management begins at home. There are a number of considerations that, if built into the expedition framework prior to departure to the chosen region/objectives, are guaranteed to reduce the probability of a crisis occurring, or of a non-critical situation developing into a critical one.

1. Team selection:

The correct choice and blend of personnel is essential for a safe and successful expedition. Team members must be known to have good mountaineering skills, sound judgement and level heads – these three characteristics, in all team members, will go a long way towards minimising the risk of a crisis situation developing and vastly improve the ability of the team to manage any crises that do occur. We are confident that the eight team members all exhibit these three characteristics. All have mountaineering experience, both in the UK and in Alpine environments, and all have taken responsibility for themselves and their climbing partners in Alpine situations. Past crisis situations have been dealt with competently and successfully, and all team members have climbed with each other on a regular basis, both at home and abroad. Final team selection was considered with a view to picking the most harmonious, as well as competent, team, and as such we believe we have an excellent blend and balance of personnel.

2. Training and preparation:

The more skills and experience a team has at its disposal, the more likely it is to successfully deal with the range of hazards and associated risks to be found in isolated mountainous regions. It is therefore essential to maximise team members' range of

mountaineering, first aid and rescue capabilities prior to the expedition, ensuring that all are operating at an acceptably high base level of competence. Whilst common sense is the prerequisite upon which all emergency procedure is based, other specific factors can mean the avoidance or minimisation of a crisis situation:

- Physical fitness – a team that is physically capable of achieving the proposed objectives is absolutely essential. All team members have a good level of basic fitness, and have successfully demonstrated their ability to deal with demanding physical challenges in mountaineering situations. Inevitably, fitness will vary between individuals, and this will be taken into account when assigning objectives and loads (see the Risk Assessment for further details). Team members are following/intend to follow training programmes in the build up to the expedition, to optimise their fitness, safety and consequent enjoyment during the expedition, and all team members are climbing regularly and intend to do so up until the expedition
- Emotional fitness – often overlooked, this is a key part of a successful expedition. A month on an icecap with little or no communication with the outside world and constant physical stresses places considerable demands on an individual's emotional well-being. All team members have experience of extended bouts of mountaineering over the course of an Alpine season, and some team members have already completed month-long expeditions in remote regions. We are confident that the expedition has the mental resources to deal with the conditions, hazards and potential crises of our destination
- First aid skills – all team members already have a basic knowledge of first aid. However, in light of the isolation and hazards involved in the expedition's destination, all team members are enrolled on an Expedition First Aid course on the 18th-21st February, which specifically covers Arctic first aid and survival techniques. Prior to the expedition, all team members will therefore have a sound knowledge of relevant first aid, which will reduce the likelihood of a minor injury or cold-related syndrome developing into a full-blown crisis, and will of course enable team members to make correct decisions when dealing with a casualty situation
- Emergency survival skills – prior to the expedition it is our intention that all expedition members will be fully briefed on how to cope with emergency situations, such as an enforced bivouac. As well as studying such skills in theory, it is our intention to carry out practical training, either through a series of practise sessions or through an organised training event. Such skills are clearly necessary for a safe and successful trip, and as such will be emphasised in our build up to the expedition
- Emergency rescue procedures – drawing on first aid and survival skills, a sound knowledge of rescue techniques is absolutely essential for a safe and successful expedition. All expedition members will be thoroughly briefed in such skills, and it is our intention to carry out practical training, either through a series of practise sessions or through an organised training event. All team members will be fluent in casualty evacuation techniques and avalanche search procedure, in order to prevent incidents developing into full blown crises and to ensure that all team members have the tools to deal with such crises should they occur
- Rifle training – all team members will receive rifle training prior to the expedition, as preparation for the event of a polar bear encounter. This is essential. Information on previous polar bear confrontations, bear signs and

bear behaviour will be studied, to help reduce the risk of an encounter and a confrontation

- Risk Assessment – although stating the obvious, it is clearly important that all team members are fully aware of the risks they are likely to face during the expedition, and the most appropriate ways of minimising/dealing with these risks. The recommendations in the above Risk Assessment are based on common sense and up-to-date mountaineering, and all team members must act in a way that is consistent with these recommendations at all times.

3. Expedition organisation, structure and strategy:

An expedition that is well organised, has a clearly defined hierarchical and geographical structure and a prepared but flexible emergency strategy maximises its safety and chance of success. Clear divisions of responsibility allow a team to respond to an emergency situation with speed and efficiency, minimising uncertainty and mistakes that can potentially be fatal. This topic shall be thoroughly investigated in the section headed ‘Dealing with a crisis’, but is included here because it has an important role to play in reducing the probability of a crisis situation occurring:

- A well-organised expedition involves delegation and division of labour. This is essential prior to, during and after the expedition to ensure that all preparation is done thoroughly and that no one individual has too much to concentrate on at one time or too much physical work to do. Regular team meetings and communications are being used to assign team members portfolios of work and to coordinate information gathered. In this way we intend to prepare as thoroughly as possible for the expedition on all fronts. This will be continued during the expedition, with regular, organised discussion of objectives, conditions and strategy, to enable the team to adapt successfully to realities on the ground. Without the flexibility conveyed by constant team communication, the likelihood of team members becoming tired or dispirited will increase, in turn increasing the probability of a crisis situation developing
- The expedition has designated a team leader (James Sample), who as the most experienced mountaineer on the expedition has an overarching responsibility for ensuring that the expedition proceeds safely. As such, all objectives and expedition strategy should be approved by him whenever possible. The position of deputy leader will also be assigned, thus preventing the incidence of a ‘command vacuum’ during a crisis situation. However, the expedition believes that responsibility for each team member’s safety lies first and foremost on their own shoulders, as all members will have sufficient knowledge and skills to make informed safety judgements whilst climbing. Nevertheless, a form of hierarchical structure to the expedition is viewed as important, as it creates a chain of command that allows crises to be dealt with in a more efficient manner
- Similarly, the expedition has designated a medical officer (Matthew Harding), who will endeavour to ensure the medical well-being of team members whenever possible. A deputy medical officer will also be designated. Again, the expedition believes that all team members should be medically fluent to an acceptable level, and as such be able to take primary responsibility for their own medical well-being, but by assigning overarching responsibilities to one

individual it is hoped that the probability of crisis situations developing as a result of poor healthcare will be reduced

- The geographical structure of the expedition when on the icecap is extremely important. By having a rigorous and systematic plan of expedition procedure not only can a chain of communication be preserved but climbing pairs can be provided with backup pairs, operating in a similar region and able to provide 'nightly' contact and assist in the event of an emergency. The tighter the lines of communication hold, the more responsive the team will be to any incidents and the less likely a crisis situation is to develop. See below for more details
- A prepared strategy of responses to clearly defined crisis situations will ensure that any incidents will be dealt with efficiently and that the effects of any crisis situation are minimised. See below for more details.

Dealing with a crisis

Should a crisis situation occur, the team would follow a prepared system of procedures that will minimise the effects of the crisis on the team member(s) in question, maximise the efficiency of any rescue operation and ensure the safety of members of the team involved in any rescue operation. However, to enable the successful evacuation and treatment of any casualties, the situation and divided structure of the expedition (into climbing pairs) require a carefully considered expedition strategy to be followed at all times. This must be flexible, to adapt to realities on the ground, but also reliable, to ensure that team members are fully aware of what procedures to follow to provide the safest outcome for the expedition, even when not in receipt of full details of any casualty or rescue operation.

1. Base camp structure:

The expedition base camp is the point around which the expedition communications – and therefore its ability to respond to a crisis – pivot. As such, measures must be followed to ensure that it is always informed and capable of responding to any emergency:

- All team members leaving base camp will be required to leave a detailed written description of their proposed objective, chosen route and return date/time in a route book, which must remain at base camp at all times. Aerial photographs used by the team will be covered by a grid prior to the expedition, allowing a form of grid reference to be cited for attempted objectives – a feature that may potentially save considerable amounts of time in the event of a search and rescue operation being mounted. All climbing pairs must also inform at least one other team member of their proposed objective, date/time of return etc.
- Base camp should be manned at all times. To this end, the departure of climbing pairs will be staggered to ensure that one climbing pair is always at base camp (an activity that allows rest, recuperation and essential maintenance of equipment). This maximises the chance of line of sight emergency signals being detected (a consideration that must be weighed when choosing an objective) and a rescue operation mounted, as well as ensuring that should a climbing pair fail to return within a certain time, a rescue operation may be (where considered safe to do so) mounted immediately
- Base camp shall house an EPIRB, enabling it to be triggered immediately should it become clear that a full-scale evacuation is required, and also

emergency flares, enabling the base camp pair to recall other climbing pairs should a crisis situation develop.

2. Climbing pair structure:

The safety of climbing pairs and their responsiveness to an emergency can be maximised in a number of ways:

- All team members will carry a portable VHF radio set with them at all times. This provides the possibility of contact between climbing pairs, allowing team members to make radio contact with each expedition member at a designated time at the end of each climbing day (Arctic 'night') as well as enabling members to alert each other to any crisis situation speedily. The reliability of VHF radio in the region is uncertain, so it may be unwise to instigate a system of radio checks, eventually triggering the classification of a crisis situation, on the basis of zero radio contact with a climbing pair. However, should the situation on the ground prove favourable, a system can be set up where if any one climbing pair fails to make radio contact at a designated time, the other pairs will be required to perform a radio check every two hours until no longer necessary or the situation is resolved. Similarly, any pair not in need of assistance but unable to make radio contact at the designated time must continue to attempt a radio check every two hours until successful
- Climbing pairs will, wherever possible, operate in similar regions, maximising the possibility of radio contact with other pairs and the detection of audio and visual emergency signals. This enables the speedy assessment of and response to crisis situations, bypassing the necessity of returning to base camp to discover the nature of the emergency
- All team members will carry whistles and emergency flares, enabling them to alert nearby climbing pairs or, if it is in line of sight, base camp to any emergency situation. One climbing pair will carry a second, portable EPIRB device, enabling a full scale evacuation to be summoned from the field as well as from base camp

3. Basic emergency strategy:

In the event of a crisis, the following basic strategy should be considered and adapted to meet the individual demands of the situation:

- Initial first aid must be administered as soon as possible, by the partner of the injured climber and/or by members of the search team
- The climbing pair in trouble should alert base camp and adjacent climbing pairs to its predicament
- All mountaineering objectives must be abandoned for the duration of the crisis (unless impractical, i.e. advance is faster than retreat)
- The climbing pair in trouble must be located as swiftly as possible, but without undue endangerment of the lives of the searchers and with due attention to the issues raised in the Risk Assessment
- If evacuation to Iceland is required, trigger an EPIRB device as soon as possible
- Evacuate casualty from mountain to base camp if at all possible (bearing in mind that exposure of a casualty to the prevailing conditions for too long a period of time is likely to have fatal consequences)

- Treatment at base camp by medical officer/a designated deputy medical officer. Should the casualty's condition deteriorate, evacuation to Iceland must be initiated (bearing in mind that it may take two or more days).

4. Specific emergency strategy:

Of the seven forms of crisis identified as potentially impacting on our expedition, the first four may be grouped together for the purpose of developing an emergency strategy. These four crisis situations are as follows: a climbing pair failing to return to base camp within a certain time, an injured team member/climbing pair, a team member suffering illness, and the recognition of an emergency signal. All these scenarios revolve around the fact that a climbing pair/individual is incapable of self-extraction and requires rescue by other members of the team. Below is an emergency strategy plan that will allow the expedition to organise and execute such a rescue as efficiently and speedily as possible, whilst minimising the danger presented to all team members.

- Initial first aid should be immediately administered to the casualty by their climbing partner, so long as it is safe to do so. Efforts must be made to remove the casualty from any persistent source of danger (e.g. rock fall), and to prevent the casualty suffering from exposure to the weather and temperature conditions.
- The climbing pair in trouble should assess its predicament and determine if assistance is needed. Based on this assessment, they should then either attempt a self-rescue, attempt to alert both base camp and all adjacent climbing pairs to their need for a rescue, or trigger the portable EPIRB device if they are carrying it and the severity of the situation is judged to be high enough. If a full-scale evacuation is required but they are not carrying the portable EPIRB, the climbing pair should attempt to communicate the need for its use as soon as possible, either by VHF radio or by detonating a specially coloured emergency flare.
- Communication with adjacent climbing pairs and base camp should be attempted as follows. Emergency flares should be detonated and emergency signals blown on whistles to attract the attention of adjacent climbing pairs and base camp. All should then switch their VHF radios on and the stricken climbing pair should attempt to communicate the nature of the emergency to their listeners, with details of any injuries, objective dangers that may hamper a rescue operation and best means of access to the casualty.
- Assuming that a rescue operation is required, all mountaineering objectives must be sensibly abandoned. If communication with base camp is achieved by any of the climbing pairs, a flare will be lit at base camp to alert any further climbing pairs of the existence of an emergency and radio contact will be attempted with any team members who are unaware of the crisis. Upon receipt of emergency signals, these team members must return either to base camp or, if radio contact is made, to assist in a rescue operation
- If the rescue operation is initiated from base camp (i.e. if a climbing pair is overdue by more than 24 hours), the base camp pair must attempt to recall the other pairs using flares and then VHF radios (in the manner described above). All other pairs must then return to base camp, to be informed of the nature of the crisis and the location of the missing climbing pair (either by the base

camp pair or through the base camp route book). Provided communication of the emergency to other team members is successful, the base camp pair may form a search party if it is safe to do so. However, as the communication pivot of the expedition they should take no unnecessary risks.

- All recalled team members should then set out to search for and rescue the missing climbing pair, unless the missing pair has the portable EPIRB with them. In this case, one member (the least experienced) of the team must remain at base with a VHF radio to activate the base camp EPIRB if necessary.
- To ensure constant communication with the base camp during the rescue operation (and so keeping a constant link to the base camp EPIRB), team members should if necessary be stationed at intervals to ensure a chain of radio contact or used as runners to relay essential information.
- Organisation of a rescue operation will not necessarily revolve around the expedition leader, but will depend on available personnel. Once the need for a rescue operation is determined, be it from base camp or carried out by adjacent climbing partners, an assessment of available personnel should be made and those present matched to the demands of the situation. A rescue operation leader should be assigned (the expedition leader or his deputy where possible), who should coordinate rescue efforts and assign tasks such as that of providing a communications link to base camp if direct radio contact cannot be made. The medical officer or his deputy should attempt to reach the casualty as soon as possible, to back up the first aid work done by the casualty's climbing partner and where possible provide more specialised medical assistance. A member of the base camp pair should take responsibility for the triggering of an EPIRB if required.

Upon reaching the casualty and administering emergency first aid, a plan of action must be determined and implemented, based around a number of considerations. The rescue operation leader must evaluate the human and material resources available at the accident site and decide whether or not the party has the capability of evacuating the casualty without outside assistance (i.e. full scale evacuation to Iceland). Whilst the varying forms of injury/casualty defy description here, the following factors must be taken into account when planning the rescue:

- The nature of the casualty's injuries: if the injuries are such that evacuation is feasible with sufficient numbers, every effort must be made to coordinate the casualty's removal successfully. If however the injuries are too severe to admit movement of the casualty, they must be made comfortable, kept sheltered and warm and evacuation procedures instigated
- The state of the party: it is a mistake to focus all attention on the casualty. The expedition leader (or rescue operation leader where different) has a responsibility for the rest of the party, who may be particularly vulnerable to cold and anxiety at this time. Failure to attend to them may lead to additional casualties. The leader must reassure, consult and assign positive tasks to maximise the team's efficiency and morale
- The time available: time available is always too short! Ensure that tasks are undertaken efficiently and in a way that maximally exploits the available personnel, and note that time spent making the casualty comfortable is time well spent. If evacuation is required or will probably be required based on anticipated changes (e.g. in the casualty's status or weather) an EPIRB must

be set off as fast as possible, bearing in mind the time taken for evacuation to be completed

- The weather: bad weather conditions are frequently associated with accidents. Conditions may be so bad that immediate evacuation to a lower, more sheltered location overrides all other considerations. The rescue leader and medical officer must make a decision to this end based on their assessment of the environmental conditions and the condition of the patient
- The availability of assistance: how many team members can be summoned, and how fast, will affect a rescue leader's or climbing partner's assessment of a casualty situation. It may be better to wait for reinforcements than attempt an under-strength rescue operation that could endanger the life of the casualty and the rescuer(s)
- The terrain: always determine the best route out for messengers who may be sent to summon help/other team members coming to assist the rescue operation, bearing in mind environmental conditions. The rescue leader should give careful consideration to the division of personnel (i.e. who is most valuable with the casualty, who is most valuable as a messenger etc.).

The remaining three forms of crisis identified as potentially impacting on our expedition involve different features to the 'casualty scenario', and so demand separate analysis:

a) The sighting of a polar bear by any team member

- The climbing pair concerned must immediately evacuate the area and return to base camp, where the expedition rifle is situated
- Emergency signals (flares, followed by radio communication) should be instigated to tell all other team members to return to base camp
- If the polar bear was sighted at base camp the camp must be immediately evacuated, and other team members informed through emergency signals (flares, followed by radio communication) not to return to base camp. The expedition rifle must be taken with the base camp pair when evacuating base camp
- Following the reuniting of the team, either at base camp or at a safer site, the situation will be reassessed and the base camp may be dismantled and moved to higher ground, or the expedition moved to a different region
- If the threat is deemed to be severe, the portable EPIRB will be activated to initiate evacuation procedures

b) The disruption/loss of supplies or equipment (particularly the loss of food and destruction of tents)

- Emergency first aid must be provided to any team members injured in the crisis event (fire, tent collapse etc.)
- A damage assessment must be carried out by members of the team present at base camp/any auxiliary camp where damage/loss of supplies has occurred
- Attempts should be made to ensure that further damage does not ensue, e.g. by separating fuel and flammable objects from the main camp if a fire has occurred, re-securing tents in the event of a storm or even moving the camp should damage be avalanche related
- Repairs should be carried out as soon as possible, to ensure equipment does not suffer further damage and prevent team members being unduly exposed to the environment

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- Should supplies be affected, members of the team present at base camp must assess whether the team has enough food and fuel to subsist on whilst maintaining a reasonable safety margin (in case of delay in pick-up, a further crisis situation etc.)
 - If supplies are considered inadequate, flares and radio contact must be used to recall all absent team members to base camp. The expedition leader, if not already present, must confirm the temporary quartermaster's interpretation and the whole expedition must be informed of the situation
 - A decision will then be made whether or not to trigger the base camp EPIRB, initiating an evacuation procedure. The timing of this evacuation will depend on the team's assessment of the remaining supplies and desired safety margin, but in all cases caution should be employed, given the potential for a further crisis event
- c) The failure of the team to rendezvous with the Twin Otter plane at the designated pick-up point on the designated pick-up date
- Failure to rendezvous with the Twin Otter plane will almost certainly be due to a prior crisis situation developing. If this is the case, an EPIRB must be triggered before the expected pick up time to provide the plane with details of the whereabouts of the team and maximise the probability of the team being evacuated on that flight
 - Radio contact must be attempted with the plane when it is known to be in the area or, if its arrival time is unknown, at regular intervals until no longer necessary or the situation is resolved
 - If the team is engaged in a rescue operation, it must continue its work whilst also ensuring that a designated team member is either at base camp (if the EPIRB there has been triggered) or at the designated pick-up point to coordinate evacuation efforts with the plane team
 - In the event of a failed evacuation, the team must remain at or near to the pick-up point and ensure the EPIRB remains on, to maximise the probability that the next attempt is successful
 - Emergency supplies must be taken with the expedition to provide for a potential delay in evacuation, either caused by a crisis event or by poor weather conditions.

Following a crisis

The management of a crisis event by the expedition does not end with successful rescue and evacuation of the team. Upon return to Iceland, various factors must be considered:

- Ensure that any casualties receive immediate and competent medical treatment
- Designate at least one healthy expedition member to remain with a casualty during their treatment, for example in hospital
- Inform expedition contacts in the UK as soon as possible of the crisis, evacuation and casualty treatment
- Inform next of kin of the condition, treatment and whereabouts of any casualties
- The expedition leader and medical officer must ensure that all expedition members are looked after appropriately at a time when they are likely to be suffering from shock and feeling extremely vulnerable. If necessary, counselling should be arranged upon return to the UK

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- Ensure proper reporting of the crisis and evacuation through liaison with the appropriate authorities (i.e. the Danish Polar Centre)
- Inform insurers of the relevant details of the crisis, condition of any casualties and costs incurred during the evacuation procedure.

In the tragic event of a death whilst the expedition is still in Greenland, the expedition will not be in a fit state to continue and should be evacuated immediately. Consideration should be given to the recovery of the body, but only if it is deemed safe to do so. At all times the priority of the expedition must be to ensure the safety of its members.

Appendix 5 – Grants and Funding

Name of Grant	Deadline	Typical grant
MEF	31st Aug	£200-1700
BMC	31st Aug	£1,500
Polartec Challenge	15th Sep	\$2000-8000
Eagle Ski Club Georgina Travers Award	1st Oct	£150
Cambridge Expeditions Committee	mid-Lent 05	
Winston Churchill Memorial Trust	21st Oct	£3000+
Andy Fanshawe Memorial Trust	?	£500
Andrew Croft Memorial Fund		£500
Adrian Ashby-Smith Memorial Trust	1st May	
The Captain Scott Society	end of March	£1,000
Wilderness Award	31st Nov	£500
Alpine Ski Club Awards (2 of them)	31st Dec	up to £500
PERMITS	27th March	
Gino Watkins Memorial Fund	31st January	< £1500
Explorers Club Exploration Fund	31st January	< \$1200
Timmissartok Foundation	Jan-05	\$5000-
National Geographic Society	Jan-05	35000
Augustine Courtauld Trust	1st March	£800
Shipton/Tilman Grant	3rd March	\$2000
Cambridge Expeditions Fund	15th May	£500
Edinburgh Trust No. 2	?	£3,000
Nick Estcourt Award	?	£1,000
Albert Reckitt Charitable Trust	?	£750
The Reserve Forces Ulysses Trust	?	£900
Shell Personal Development Award	?	£500
Katy Choules	?	?
Paul Vander-Molen Foundation	?	£200-1000
Wort's Travel Fund	1.3.05	?
Donald Robertson Fund - Leah + Ali	4.5.05	?
Young Explorers' Trust	?	?
RGS	?	?