Cambridge University East Greenland Expedition 2006 Report

www.greenland2006.org.uk

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Expedition Members:

Mark Reid, Lachlan Low, Stephen Mounsey and James Dynes
(clockwise from top left in above photo).

Summary

This report is an account of the Cambridge University East Greenland Expedition 2006.

This document is intended to describe the entire expedition, beginning with the planning stages, in the hope of providing helpful guidelines to anybody planning a similar expedition in the future.

The expedition was to the Schweizerland Alps region of East Greenland, specifically the area to the east of the Knud Rassmussen Glacier. In this area the expedition party made eight first ascents over a period of five weeks. The expedition was unsupported and aimed to leave a minimal environmental footprint, using locally chartered boats to reach the area and buying supplies locally. The climbs were done in an alpine style in a single push, so that each only took a day.

1 Acknowledgements

We would like to thank everyone who made this expedition possible.

In no particular order these people and organisations were:

UK Sports Council

Mount Everest Foundation

British Mountaineering Council

The Shipton/Tilman Grant

Gino Watkins Memorial Fund

The Augustine Courtauld Trust

The Andrew Croft Memorial Fund

Ernest Kleinwort Charitable Trust

DMM Climbing

First Ascent

Equip Outdoor Technologies (Rab)

BBC Cambridgeshire

Janet Cameron

William Owen

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2 Initial Stages

2.1 Who We Are

The earliest stages of planning (late September 2005) involved only two people; Mark Reid and Lachlan Low (then both Undergraduates at Cambridge University). They decided, more or less from the start, that a team of four would work well, and so went about finding a further two like-minded climbers within the university. About ten people (most of whom were members of the Cambridge University Mountaineering Club) expressed interest in joining the expedition. By December 2005 the team had been chosen, the remaining two members being James Dynes and Steve Mounsey. Having read numerous expedition "horror stories", it was extremely important to us that team members, as well as having sufficient climbing/mountaineering experience, were compatible in terms of their personalities. The team was chosen carefully in light of this.

The four team members were:

Mark Reid: Prior to the expedition, Mark had been rock climbing for four years and mountaineering for the last three of these. This took him on four trips to the French, Swiss and Italian Alps and also to the Italian Dolomites, climbing routes up to Alpine AD. His favorite ascents include those of Mt Blanc de Cheilon (Swiss Valais), and Cima della Vezzana (Dolomites).

Figure 1: Mark Reid

Back home in the UK Mark enjoys trad. rock climbing (leading up to VS), as well as winter climbing in Scotland (although appalling weather in the past has resulted in more Scrabble games being played than Scottish winter routes climbed!). Mark also has a great deal of long distance trekking and scrambling experience in the UK, Poland and Andorra.

Lachlan Low: Lachlan's first introduction to climbing was at his local crag of Harrison's rocks on the Kent/Sussex border. Away from sandstone, he particularly enjoys climbing in Wales and the South West. Lachlan's experience prior to the expedition included two seasons mountaineering in the Alps (climbing up to Alpine AD) especially enjoying climbs on Pointe de Moiry (Valais

Alps) and La Tresenta (Gran Paradiso National Park). He has also experienced two seasons of Scottish winter climbing (leading up to Scottish grade III), with particular fun being had on Dorsal Arete.

Figure 2: Lachlan Low

Lachlan's first expedition was to Alaska in 2001 with BSES (British Schools Exploring Society). He has also led novice trekking groups on expeditions throughout the UK. His leadership skills were further developed through completion of the Frimley Park Army leadership course.

Following an extremely tough selection process, Lachlan was chosen for the BBC TV programme "SAS: Are you tough enough?". Unfortunately his first year exams coincided with this, and the university was having none of it!

James Dynes: James has been climbing seriously since he started University, predominantly climbing with the Churchill College Mountaineering Club. During this time he has spent at least a week in the Cairngorms (Scotland) and at least a fortnight in Chamonix (French Alps) every year, building his climbing experience. He has also completed an ISM Alpine climbing course to consolidate his experience.

Figure 3: James Dynes

He has completed routes up to 'AD', including such alpine classics as the Plan du Midi Traverse, Mont Blanc du Tacul and the Cosmiques Arete.

Whilst in the Alps he has also climbed trad. rock routes up to grade V+ (e.g. l'M and Arete du Papillons) and sports rock routes up to French grade 6a. A keen winter climber, James has also enjoyed countless Scottish routes, leading up to grade III (e.g. Trident Gulley, Red Gulley). He has climbed rock extensively throughout England, leading trad. routes up to HVS 5b.

In addition to the above, James has led groups of novices on trips to Scotland, Chamonix and the Peak District, handling the logistics, training and safety of all concerned. He has also completed a St John's Ambulance first aid course.

Steve Mounsey: Steve has been rock climbing for as long as he can remember, although he started climbing more seriously about five years ago. Much of his rock climbing experience was gained at his local crags on the North Yorkshire Moors, where he now leads up to E1 on a good day. Progression to bigger things led him to many long and arduous routes in the Lake District and Snowdonia, which have nurtured his enjoyment of bad weather!

Figure 4: Steve Mounsey

Steve is relatively new to winter and Alpine climbing, but prior to the expedition had gained experience of mixed climbing in Scotland and mountaineering in the French Alps. He is a keen rower and graduated from Homerton College Cambridge in 2006 after studying Materials Sciences.

2.2 The Birth Of The Idea

Mark and Lachlan first discussed the idea of putting together an expedition whilst on a flight to the Alps in August 2005. The idea was discussed quite a bit during their subsequent week of climbing, but was then put to the backs of their minds for a month in the midst of other commitments.

They had both hoped for the opportunity to take on a mountaineering expedition since they first started climbing. Both were very aware of the fact that once they left university, long periods of free time would be much scarcer. Within

a year they might be working, and limited to only a few weeks of holiday per year. The feeling that the summer of 2006 presented such a perfect opportunity spurred them into action, and serious planning began in late September 2005.

2.3 Ethos

From the very start of the expedition we adhered to a motto of "physical rather than financial hardship" in order to make the very most of the resources we had, and to climb to our last penny. For all of us this expedition was a chance to realise two long-standing dreams; to establish new routes on unclimbed peaks and to spend time climbing in a remote, beautiful and unspoilt Arctic wilderness.

Despite a high level of interest in participating in the expedition we made a concerted effort to align to a small team philosophy, namely to utilise a simple, lightweight Alpine expedition style as we believed this would keep our costs down and maximise our chances of meeting our initial aim of memorable first ascents.

2.4 Initial Ideas

So far we had a team of four, all of whom wanted to go on a climbing expedition somewhere. It was now time to decide upon a destination.

Rather than heading to a region with a definite objective (i.e. a particular route on a particular peak) we preferred the idea of choosing a region where there would hopefully be a number of unclimbed mountains, or at least previously climbed mountains with new-routing potential. We hoped to be able to explore an area and choose climbing objectives once we were out there. This was to be our first climbing expedition and we wanted as much flexibility as possible as far as picking routes was concerned.

We wanted to be able to travel around our expedition area on snow (as much as possible). This would facilitate covering larger distances as it would be possible to drag all our equipment in sledges/pulks rather than having to carry it all. Setting up base camps on snow would also mean that we could build large snow walls to protect tents and dig shelters/snow caves etc.

Although we wanted snow cover, we hoped to minimise the likelihood of having to contend with seriously harsh conditions and extreme cold. We thought the Patagonian winter, for example, would be better left for a future expedition!

Because this was to be our first expedition, we decided to avoid altitude related complications. This pretty much ruled out the "greater ranges" (Andes, Himalaya etc.).

We felt it was important for our first expedition to strike a balance between choosing adventurous and challenging objectives and being overly ambitious. Not only would achieving this balance greatly increase our chances of success but it would also enable us to gain more funding etc. It was very important to be able

to convey to funding organisations that our plans were within our capabilities and were appropriate to our level of experience as a team.

Taking all of the above points into account we decided that cold regions within the Northern Hemisphere would be a good place to start looking. Three possible destinations grabbed our attention:

1. Greenland (specifically the East coast since this is very mountainous, unlike the West coast and ice-capped interior).
2. The Canadian Arctic (islands such as Ellesmere Island).
3. Spitsbergen (Svalbard archipelago).

It quickly became apparent that an expedition to the Canadian Arctic would be massively expensive because of the huge cost of chartering a plane to get us there; scheduled flights can only get one so far. Given our ethos and financial limitations we soon ruled this out as an option.

We soon discovered that Spitsbergen is often considered the polar bear capital of the world - apparently expeditions here typically involve watches all through the night. Having studied many photos we also found ourselves less inspired by the potential climbing in Spitsbergen, particularly when compared with what we had seen of East Greenland in photos.

So we came to focus our attention on the East coast of Greenland. Now all we had to do was decide where on this incredibly vast coastline we would go.

2.5 Why We Chose The Schweizerland Alps

There are essentially two places on the East Coast of Greenland that can be reached by normal scheduled flights. These are Kulusuk (near the larger settlement of Tasiilaq, just South of the Arctic Circle) and Constable Point, which is considerably further north (slightly South of the boundary of the North-East Greenland national park).

To reach anywhere on the East coast beyond these two places necessitates chartering a plane/helicopter/boat, or overland travel e.g. by ski if conditions permit. Chartering is very expensive, especially in the cases of planes and helicopters, for which you could certainly expect to pay upwards of $1000 per hour. Boat chartering costs a great deal less than this. The downsides are that it is only possible for a few months each summer (when the sea is passable - i.e. not iced over) and range is more limited than that of aircraft.

Helicopters can be chartered within Greenland (Kulusuk/Tasiilaq or Constable Point) whereas Twin Otter planes have to be chartered from Iceland as none are based in Greenland (please note - this may no longer be true at the time of reading!). There are sections of the East coast of Greenland that can only be reached (neglecting long distance skiing) by chartering a ski-equipped Twin

Otter aircraft from Iceland. These parts are beyond the range of helicopters based in Kulusuk/Tasiilaq and Constable Point. This is a popular strategy with many expeditions but costs a fortune given the flying distances involved and the charter rate per hour. We know of several other expeditions that have chosen to go down this route (unlike us) - their overall budgets were roughly double that of our expedition for similar sized teams spending similar lengths of time in the field.

Since we were working to a tight budget we sought to minimise any necessary chartering in an effort to constrain costs. We knew we wouldn't be able to cover too much distance overland (by ski) with only five weeks in the field (which we wanted to mostly spend climbing rather than trying to reach our climbing area!) and likely unfavourable late summer snow conditions (potentially making skiing problematic and slow). We therefore went about trying to find a suitable expedition area within a few hundred kilometres of either Kulusuk or Constable Point.

Immediately the Schweizerland Alps, approximately 150km North of Kulusuk, stood out as a possibility. Knud Rasmussen Land (South-West of Constable Point) was an alternative. Our research led us to believe that there was significant new-routing potential in both areas (see sections 1.6, 2.1 and 2.2 for details). We ultimately chose the Schweizerland Alps for two main reasons:

> Firstly, it became apparent that this region would be the more accessible of the two; we eventually discovered the best option was to charter Inuit boats. By contrast it looked highly likely that reaching Knud Rasmussen Land from Constable Point would involve expensive helicopter chartering; this would only have been to cover a short distance, but it could easily have cost about $4000.
>
> Secondly, we were simply much more inspired by the Schweizerland Alps. The many photos we had seen showed the Schweizerland Alps to be much more jagged and imposing. We had also read that the quality of the rock was generally very poor in Knud Rasmussen Land and not good enough for rock or mixed climbing. We read reports that the rock quality is often better in the Schweizerland Alps, although it was likely to be variable. Ultimately, gut-feeling played a part. It is obviously very important to make sure that the expedition you plan really inspires you, and this played a big part in our choosing the Schweizerland Alps.

In many ways the Schweizerland Alps is the perfect destination for a first expedition. It is a huge area of vast glaciers and inspiringly jagged peaks. It is remote enough for there to be great potential for making first ascents / putting up new routes, yet it is near enough to civilisation to be relatively cheap and easy to access (at least when compared to other parts of East Greenland). It

is far enough from civilisation for expeditions to experience the isolation that most climbers long for, but it is near enough to civilisation for the possibility of helicopter evacuation in the event of a serious emergency (a rescue service operates in the Schweizerland Alps).

2.6 Logistics Support

During the course of the planning we had contact with two expedition logistics companies:

Tangent Expeditions[1] logistics packages revolve around the chartering of a ski-equipped Twin Otter aircraft to take your team to remote parts of East Greenland. They can also help with equipment hire, supplies e.g. fuel, insurance etc. The cost is likely to be pretty high; your overall budget will probably end up being about double that of a team that opts not to charter a Twin Otter aircraft. If you don't want to charter a Twin Otter, Tangent Expeditions is probably not the logistics company for you.

Greenland Expedition Specialists (GES)[2] is able to offer extremely flexible, reliable and cost-effective logistics packages for a huge range of different Greenland expedition objectives. Their local expertise and connections are unrivalled. Through GES you can charter motor boats, Twin Otter planes, helicopters and dog-sleds. GES also provide superb advice and specialist information, hire of a huge range of expedition equipment (including electronic items such as satellite phones and EPIRB beacons), help with obtaining the various permits you may require, booking of normal scheduled flights to Greenland, expedition insurance, fuel and dehydrated food supplies, accommodation when in transit, maps, high-quality aerial photographs, and you can even hire a GES guide should you wish to.

We initially chose to work with Greenland Expedition Specialists because they were able to arrange the charter of Inuit boats for our expedition (much cheaper than planes/helicopters) and they provided excellent advice (e.g. suggestions for areas with excellent new-routing potential). We quickly became very glad that we chose GES, as the support and service we received was outstanding. Quite apart from arranging boat charter, permits, supplies, equipment hire, accommodation (in Kulusuk and Reykjavik) and aerial photographs, GES promptly answered about a hundred questions we had, providing us with the excellent information needed when planning an expedition (especially if it's your first one); we highly recommend the company.

[1] Tangent website: www.tangent-expeditions.co.uk
[2] GES website: www.expeditiongreenland.com

3 In-Depth Planning

3.1 Past expedition reports

During the planning of the expedition we visited several libraries which held past expedition reports as well as thoroughly searching the internet. Being based in Cambridge, our first port of call was the Scott Polar Research Institute (SPRI) which in its library has copies of a large number of past Greenland expedition reports. When reading these we mainly looked for sponsors, logistics information, climbing area, nutritional and medical information. A brief list of the expedition reports we found useful is listed in the appendices.

We also paid a visit to the Royal Geographical Society (RGS) in London to read some more expedition reports. However most of them were just duplicates as most people send them to both of these institutions.

One of the best documented expeditions we came across on the internet was the Lanchester expedition[3]. In the report it had listed every minute detail of their planning, which sometimes bordered on excessive; however, it will be very useful to anyone planning a similar expedition.

3.2 Evolution of the plan

We wanted to incorporate a certain amount of overland travel into our expedition plan. One of the earliest ideas was therefore to fly to Kulusuk on scheduled flights via Reykjavik, to take a scheduled boat or helicopter to the settlement of Isortoq (west of Tasiilaq), and then to travel overland on skis up the edge of the Greenland icecap to access the Mount Forel area of the northern part of the Schweizerland Alps. We hoped that this might save us quite a bit of money as we could quite possibly avoid having to pay for boat/helicopter charter altogether.

It was at around this time that we first got in touch with Matt Spenceley of Greenland Expedition Specialists (GES). We actually came across him on an internet forum[4]. Reading several posts it became clear that Matt knew a great deal about this area of Greenland so we contacted him hoping for some advice on the feasibility of our plan. Matt advised us that our plan would be much more suited to an expedition in the Spring (when snow/ice conditions on the icecap are generally much more suited to cross-country skiing) than an expedition in the summer (when exposed crevasse fields and large pools of surface water could make skiing very problematic).

Matt suggested instead that we consider chartering Inuit boats, which would be much easier and quicker than a long-distance ski-approach yet much cheaper than plane/helicopter charter. Prior to contacting GES we had pretty much discounted the possibility of boat-chartering since other people (including one

[3] http://www.greenland2001.freeuk.com/

[4] www.eastgreenland.com

previous East Greenland expedition) had led us to believe that the fjords would be too full of ice; this was not the case.

We then began working more closely with GES; they could, amongst other things, arrange the boat-chartering for us. They advised that the region east of the Knud Rasmussen glacier showed a great deal of climbing potential and that it could be accessed by landing a boat near the snout. They didn't know of any other climbing teams that had visited the region. Our own research (see section 3.1 on previous expeditions) uncovered no evidence of climbing teams having previously visited the area, although a few ski-touring expeditions had; one such expedition even landed by boat at the end of the Knud Rasmussen glacier in late Spring and skied up it.

We still wanted to attempt some peaks further north and investigated splitting our climbing time between two different regions, one of which was north of the Arctic Circle and the other was the region east of the Knud Rasmussen glacier. We were especially keen on this plan as we would be able to ski between the two areas, covering a lot of ground and having a great deal of choice as to which mountains we would attempt routes on. Eventually, however, we decided not to travel to the more northern region for reasons of cost. Staying within 150km of Tasiilaq would mean that we wouldn't need an expedition permit and could obtain drastically cheaper insurance (see sections 3.19 and 3.20). Whilst the region east of the Knud Rasmussen glacier lies within this limit, the second region further north did not, and hence we opted to stick to the former. This area turned out to be more than large enough once we were in the field.

At a relatively late stage we decided that we would use snow shoes rather than skis. The reasoning behind this was that snowshoes are lighter than skis, and we thought they would be safer for relatively inexperienced skiers on potentially heavily crevassed terrain. It is also cheaper to buy a pair of snowshoes than it is to hire skis for six weeks. The trade-off in opting for snowshoes is that they are a less efficient method of overland travel, but for the sort of distance we expected to cover on our expedition we felt that this trade-off was worthwhile.

Our final plan was as follows. We would fly to Kulusuk on scheduled flights via Reykjavik. From here we would charter Inuit boats (two would be required for four people with gear and enough food and fuel for 6 weeks) to take us to the end of the Knud Rasmussen glacier (our planned landing point was on the east side of the fjord near the snout of the glacier). We would then travel overland up the Knud Rasmussen glacier (ferrying loads over crevassed dry glacier). Next we would turn off the Knud Rasmussen glacier onto one of its tributaries (e.g. the Idraac glacier) which could take us into the heart of our proposed climbing area. We hoped to encounter the snow-line soon after turning off the Knud Rasmussen glacier. At this point we would be able to drag all of our gear in pulks/sleds much more efficiently than by ferrying it in rucksacks. This sledging would allow us to travel relatively freely around our expedition area, establishing base camps wherever we felt there was significant new-routing potential. We

expected, having closely studied maps, to be able to travel around our climbing area without having to drop back down below the snowline until the end of the expedition. At the end we would essentially reverse the entire procedure that had enabled us to reach our area. Collection by chartered boats was arranged prior to setting off on the expedition, so that we knew when we would have to be back at the snout of the Knud Rasmussen glacier, ready for the journey back through the fjords to Kulusuk.

3.3 Patrons

We decided that, much like other expeditions in the past, if we had some patrons for the expedition then that would lend us more credibility for fund raising. As such we had to write to potential patrons and wait for responses before going about any fund raising. Since we anticipated a less than fifty percent success ratio we applied to six people initially.

Of the six people that we applied to, we tried to make sure we had a good selection of celebrities who would be known by most potential sponsors. As such we wanted a patron who was well known by the climbing community and also one who was less associated with climbing, but more of a generally well known figure.

We only got three replies; a hand written letter from Sir Ran Fiennes giving us his patronage, a letter from Ray Mears' company giving us his patronage and an email from Doug Scott wishing us luck with our expedition and keen to know how we got on.

Encouraged by the patronage of such eminent gentlemen, we commenced our search for funding.

3.4 Grants and donations

Before we sent off applications for funding we put together a double sided A4 leaflet detailing our plans for the expedition and headed note paper on which to write the applications.

We accumulated a list of funds to apply for by searching the internet, reading past expedition reports, and from a book entitled The Directory of Grants. The latter is a comprehensive list of various charitable organisations, grouped by their cause and location, to which parties can apply for funding. A copy should be available in every public library.

A full list of bodies applied to, as well as which applications were successful, is included in the Appendix.

3.5 Sponsorship/support

As well as seeking money for the expedition we also sought companies to give us discounts. To this effect we wrote to a number of gear manufacturers asking for discounts in return for gear reviews or publicity photos while we were out in Greenland.

A table of the companies we wrote to is included in the appendix. The companies which agreed to give us discounts allowed us to put in one order for the group, upon which we would pay trade prices.

The companies by which we were sponsored were DMM, First Ascent and Rab. DMM offered us trade price kit as did First Ascent, and Rab allowed us to purchase equipment at their staff store. First Ascent are a UK distributor for various American makes such as Black Diamond, Platypus and MSR.

3.6 Full detailed budget

Upon reading past expedition reports, with an expedition to Greenland in mind, it was evident that costs could run as high as $34 000. Further analysis of past reports and some preliminary investigations into the more expensive components of the expedition, particularly transportation, showed us that we could not achieve our expedition aims on a budget less than $10 000.

The $10 000 budget we had set ourselves was to include all group equipment. Different expeditions will spend different amounts on gear depending on their circumstances. Although we had estimated around $1000/person, different team members spent different amounts depending on the standard of their existing gear.

The tables below aim to give an indication to future expedition groups as to the cost of the main components of an expedition and how much they can expect to receive in sponsorship. As a group of impoverished students, we placed a high importance on gaining sponsorship and spent a lot of time and effort searching for and filling in application forms. We are very grateful to all our sponsors, without whom this expedition could not have taken place. Different expeditions raise very different amounts of sponsorship depending on their type of expedition, as this determines which sources of funds are available. Time and dedication is needed if sponsorship is to reap rewards.

3.6.1 Income

Item	**Amount**
Gino Watkins Memorial Fund	$1500
The Shipton/Tilman Grant	$2677 ($5000)
The Mount Everest Foundation	$650
The British Mountaineering Council	$600
The Andrew Croft Memorial Fund	$600
Ernest Kleinwort Charitable Trust	$1000
Augustine Courtauld Trust	$500
Janet Cameron	$100
Estimated sum of personal contribution	$3053
Total	**$10 680**

Table 1: Finances, income

3.6.2 Expenditure

Item	Description	Sub Totals	Total
Accommodation	4 nights in Iceland per person (Payment through GES) 5 nights in Greenland per person (Payment through GES)	$76 $80	$624
Insurance	BMC	$605	$605
Food	Shipped food from UK (Payment through GES) Food bought in Greenland	$320 $700	$1020
Fuel	13.5 Litres (Payment through GES)	$80	$80
Communications	Satellite phone (Returnable deposit of $750 was required)	$309	$309
Transport	London – Iceland return Approx. Iceland – Greenland return (Payment through GES) Approx. Boat Charter (Payment through GES)	$590 $1400 $2000	$3990
Printing/Publicity	Includes: Domain name, colour printing, paper, postage, report distribution.	$70	$70
Medial Kit	See 3.14 for medical kit section	$200	$200
Equipment	Group equipment includes: Stoves and cooking equipment, crampons, walking poles, ropes, racks, tents, solar panels, radios, medication. The amount each team member spent on personal equipment varied.	$3452	$3452
Greenland Expedition Specialists	Sundries – including expedition and logistic planning and advice. Equipment hire (pulks and pulk bags, flares, satellite photographs, maps, EPIRB and permit etc.)	$330	$330
Total			**$10 680**

Table 2: Finances, expenditure

3.7 Maps and aerial photos

We used a 1:250000 map of the Tasiilaq area published by Sagamaps and purchased through Stamfords of London. We were also able to acquire high resolution aerial photographs of the area, provided by GES.

Only a small part of the map was relevant to us, so we scanned it into a computer and printed off expanded copies of our climbing area. On the other side of these maps we printed our aerial photographs. We laminated these sheets, resulting in a handy map card, showing our whole climbing area, which could be left in the side of a bag.

3.8 Expected weather and conditions

Having looked at previous expeditions' reports, most of which had been in the spring, we thought that the temperature in the area we were travelling to would be between 20 C and +5 C, and that from satellite photos and expedition reports that the snow line would be at approximately 700m.

We studied the weather for the area over the past few years in detail. We obtained the records from www.wunderground.com, and also from weather.noaa.gov.[5]

From this we had surmised that it would be a reasonable temperature during the day and pretty cold at night. Based on this we chose our sleeping bags and other warm items to be comfortable at these temperatures.

When we actually got to the area we discovered that it was fairly warm on the whole, and that when there was precipitation it fell as rain. This meant that our waterproofs were absolutely indispensable to avoid getting all our clothes completely soaked. It also meant that if it rained then we sheltered, as we had no other option other than hanging out clothes to dry in the sun and wind, and because of our light-weight approach we only had one change of clothes each.

3.9 Getting to and from our expedition area

The nearest settlement to our expedition area was the main airport on the east coast of Greenland and the town of Kulusuk. We flew to Kulusuk on standard commercial flights via Reykjavik, Iceland.

From there we chartered two local hunting boats which dropped us off at the end of the glacier and picked us up at the end of the trip. The boat journey was about one and a half hours each way, at the limit of the range of the boats we were using.

The area in which we were planning to climb required moving up a large glacier and then heading up one of its tributaries. In our initial planning we had a map and aerial photos. The problem was that the map proved to be inaccurate and had an unhelpfully large scale for our needs (1:250 000) while the satellite

[5] Web ref to kulusuk weather reports.

photos had no scale at all! This meant that judging distances and terrain was very difficult.

We planned to head up the Knud Rassmussen glacier to the Idraac Glacier and then up that to our climbing area. However when we got to the Knud Rasmussen we discovered that it was very heavily crevassed and that moving up it was slow and indirect. From this we decided to try and get to the snow line as soon as reasonably possible, which meant heading up the unnamed glacier before the Idraac.

Once we had crossed the snow line and were pulling sledges, rather than load-ferrying as we had been all the way up the Knud Rasmussen, our rate of progress increased massively and so did morale. Whilst load carrying, we were carrying the absolute maximum we sensibly could (upwards of 40 kg), and this required us to cover each distance seven times to get all the kit in one place. This meant that we were averaging about 1.5km per day, as the crow flies, up the glacier but actually covering about 12km on foot. When we switched to pulking we were able to cover over 14km on a good day.

3.10 Strategy

From the outset of the expedition we had decided to adopt a light-weight alpine style approach. This meant taking the minimum of kit and load-ferrying it all ourselves.

Figure 5: Pulking from Base Camp 1

During the initial load-ferrying, we set up camp at the end of each day to try and keep all our kit in the same place should the weather come in. As mentioned

in the previous section, the initial aim was to reach the snow line and then travel dragging sledges in order to establish base camps at interesting climbing areas.

For the climbing we planned to attack routes in two roped pairs moving together alpine style wherever possible to maximise the speed of ascent. For most of the climbs there were only a couple of pitched parts, and these were mainly only because we were being cautious. Due to the mountains being completely unexplored we took full racks with us on most climbs as we normally couldn't judge the severity of the climbing until we were actually on it. After one of our ropes was severed by a stone fall on one route, we used the two halves as walking ropes for our pairs, and took one other rope in case there were any difficult sections which required pitching.

3.11 Accommodation

While travelling through Reykjavik we stayed in the Salvation Army Youth Hostel, which we found to be friendly, comfortable, central, but most importantly the cheapest accommodation available. However, due to a administrative error, the staff booked us in for the previous night. This meant that we ended up getting individual rooms for the price of a shared room, but this was only because the hostel was not completely full. At this point we also decided to check that our reservations were correct for the way back.

The distance from the Hostel to the domestic airport is only a couple of miles, but at Icelandic rates this cost around $20 for the taxi. So on the return we just walked the distance. The international airport, Keflavik, is served by a regular bus service which will take you to the Hostel directly.

In Kulusuk, we stayed in the house of Georg Utuaq, from whom we had chartered boats. This was very comfortable, and infinitely preferable to wild camping considering this is what we would be doing for the rest of the expedition. The airport in Kulusuk is a couple of miles outside the town, but right next to the hotel, so on the way in we had booked the local taxi. This turned out to be a pick-up, which carried us and all of our gear on the bumpy ride into town. On the return journey we decided to walk to the airport and it took about forty minutes with all our gear.

3.12 Equipment

As well as standard camping and climbing gear we also had to take some extra kit which would not otherwise be needed for a standard alpine climbing trip.

Since we did not know what the snow conditions would be like we took snow shoes, as well as extra flotation tails to expand the footprint if in soft powder, as we weren't taking skis. We were also taking a fairly large selection of electronic equipment on the trip, such as cameras, camcorder, walkie talkies, GPSs

Figure 6: Accomodation in Kulusuk

and satellite phone. In order to charge these we brought along two folding, crystalline silicon photovoltaic solar panels and a 'home brew' connector to couple the two cells into one device on overcast days. The connector proved very useful and allowed us to charge our batteries in conditions that would otherwise have provided insufficient sunlight.

The satellite phone was hired from a company called G-Comm. The phone operated on the Iridium satellite system as this is the only network to support coverage for the poles. The phone was hired at a monthly rate and we were also pre-charged for a minimum number of calls. We also paid a large deposit for the phone, which had our call charges deducted from it before being refunded to us on return of the phone.

Another piece of safety kit we took was an EPIRB (radio distress beacon). This was carried by someone in their pack at all times as a precaution. It was hired from GES for minimal cost and could have proved to be life-saving if it had been needed.

3.13 Full kit list

Below is a comprehensive list of the equipment we took with us on the expedition.

Task	Items	Quantity
Cooking	Pans 1.5 + 2 litre	2
	Washing up bowl	1
	Washing up liquid	1
	Washing up towel	1
	Sponge	2
	Bowls / plates	4
	Sporks	4
	Pan Grippers	1
	Stoves	2
	Stove repair kits	2
	Mugs	4
	Fuel bottles (stove attachment) 600ml	2
	Plastic fuel cans @ 5 litre	5
	Fuel	25 litres
	Nalgenes (food storage)	2 x 1 litre
	Food	630,000 kcal
	Coffee filter	1
	Lighting stuff (matches/lighter) Magnesium flint	Several
	Personal water bottles	8
	Knives	3
	Heat exchanger	1
	Trillium stove base	1

Table 3: Kit list, cooking

Sleeping	Tents	2
	Sleeping bags	4
	Bivvy bags	4
	Plastic bags (tent anchors)	40
	Thermarests	4
	Roll mats	4
	Silk sleeping bag liners	4
	Eye masks	4
	Snow shovel	1
	Tent repair kits	2

Table 4: Kit list, sleeping

Climbing	Ropes - half ropes	2
	Sledges / pulks	4
	Climbing Racks	2
	Whistle	4
	Rock shoes	4
	Harnesses	4
	Helmets	4
	Finger tape	4 rolls
	Chalk bags+chalk	4 bags 4 balls
	Axes	8
	Crampons	5
	File (for axes/crampons)	1
	Snow shoes	4
	Ski Poles	4 pairs
	4" Snow shoe flotation tails	4

Table 5: Kit list, climbing

Sun protection	Sun block factor 40	1 litre
	Sun glasses	4
	After sun / moisturiser 500ml E45	1

Table 6: Kit list, sun protection

Washing	Personal wash kit	4
	Towel	4
	Toilet rolls	20 sheets/day/person
	Washing bowl	1

Table 7: Kit list, washing

Medical	Med kit	1
	Blister kit	4

Table 8: Kit list, medical

Electronics & Misc	Digital compact	1
	Digital SLR Camera	1
	Stills camera battery charger	1
	Hard disk memory	1
	Memory cards	4
	Camcorder	1
	Camcorder batteries	2
	Camcorder tapes	6
	Camcorder mic	1
	Camcorder charger	1
	Solar panels	2
	Walkie talkies (inc batteries)	4
	AA / AAA battery charger	1
	GPS	2
	Sat phone	1
	Compression straps	4 per person
	Sat phone charger	1
	EPIRB	1
	Tripod	1
	Head torches	4
	Compasses	2
	Maps	4 copies
	Binoculars	1
	Dry bags	many
	Diaries/ notebook/ 4 books/ 1 pack cards/ chess etc	
	3mm cord for spare shoe laces/guys	10m

Table 9: Kit list, electronics and misc.

Clothing per person	Base layers	2
	Walking trousers	2
	Waterproof trousers	1
	Buffalo/equiv	1
	Outer waterproof shell	1
	Gloves (pairs)	3
	Hat	1
	Socks (pairs)	2
	Liner socks (pairs)	3
	Gaitors	1
	Boots (pairs)	1
	Underwear	2
	Warm item for base camp	1
	Buff/neck gaitor/balaclava	1
	90+ litre sack	1
	Alpine sack	1
	Bivvy boots/ankle warmers (pairs)	1
	Flipflops/sandals (pairs)	1

Table 10: Kit list, clothing per person

Rack	Set of nuts	1 + spares 1-5
	Hexes	7
	Cams	6
	Quick Draws	12
	Lock gates	7
	Slings	6
	Ice Screws	3
	Pitons	2
	Belay devices	2
	Micro nuts	1 set
	Tricams	$\frac{1}{2}$ set
	Nut keys	1
	Wire gates	6
	Ab tat Roll	40m
	Prussiks	4

Table 11: Kit list, climbing rack

3.14 Medical kit

The expedition carried a large medical kit, containing an imaginative selection of drugs and treatments, and two smaller identical first aid kits which were carried by each climbing pair.

3.14.1 Climbing first aid kits

Triangular bandage x 2

Small standard dressing

Large standard dressing x 2 (NATO type)

Finger tape (zinc oxide)

Glucose tablets

Glow-stick

Length of elastoplast

Roll of self adhesive crepe bandage tape (for immobilising and splinting limbs)

The base camp medical kit contained the drugs, creams/ointments and some spare quantities of those items which were in the climbing kits.

3.14.2 Drugs

The group took a fairly comprehensive selection of drugs, dressings and remedies. A short list, with dosing and explanations, follows:

Antibiotics

Ciprofloxacin 500mg twice daily for five to seven days. This drug was carried for the treatment of diarrhoea, chest infections and urinary tract infections. One of our number had an allergy to penicillin; unlike augmentin, ciprofloxacin contains no penicillin.

Clerythromycin 500mg twice daily for five to seven days. This drug is a broad spectrum antibiotic which we carried for treatment of wound infections, chest infections, diarrhoea, tendon infections and animal bites.

Augmentin 500mg three times daily for five to seven days. This drug was carried for the treatment of infected wounds, and also for short term treatment of appendicitis. Augmentin is a broad spectrum antibiotic.

The group took six courses in total, which may have been slightly excessive.

Analgesics

Tramadol 100mg up to four times daily. This is a strong opiate pain killer.

Co-codamol Two 30/500mg tablets to be taken up to three times daily. This is also a moderately strong pain killer.

Diclofenac Two 50mg tablets up to three times daily. This is a non-steroidal anti-inflammatory which is used to treat muscle and joint pain.

Ibuprufen 400mg up to four times daily. This is a less strong anti-inflammatory which was carried for more routine use.

The group carried around 100 doses of ibuprofen, three weeks worth of co-codamol and diclofenac and about one week's course of tramadol. We thought it best to be prepared for any eventuality.

Other medicines

Burn cream

Savlon

Anti-fungal cream

Fucidic acid ointment

Two different types of anti-histamine

Laxatives

Intestinal sedatives

Indigestion pills

In addition to the group kit, each member of the team was responsible for his own personal medications, including blister plasters. It was found that Compede plasters were very effective, however they should be kept quite dry. The compede dressings will stay in place longer when the edges are protected with a strip of finger tape, this will also prevent them from bonding with the wearer's socks.

3.14.3 Training

The group carried and frequently perused a superb first aid handbook for mountaineers. In addition, the group underwent a one day training session with a seasoned mountain rescue paramedic, the idea of which was to prepare the climbers for any eventuality.

It's true that preparation can minimise risk and maximise survival probabilities in many situations such as hypothermia, burns or even infections, but when somebody is very seriously injured in the mountains, there is not a whole lot a first aider can do about it. The first aid book stated that "whilst an ice screw could be a life saving trepanning tool in the hands of a skilled neurosurgeon", such procedures should not be attempted by amateurs (although it is the view of this group that anyone who has trepanned a skull using an ice screw IS a skilled neurosurgeon).

3.15 Polar bear protection

While we were in Kulusuk on the way out, the locals discovered a polar bear out on the floes and shot it. We were advised that our expedition area was much further South of typical polar bear habitat and that they spend most of their time out on the floes hunting and very rarely venture inland.

As our expedition area was inland, the likelihood of meeting a polar bear was slim. If we did meet one then it would probably be very lost and hungry, and only an accurate shot with a rifle would kill it. If we had taken a shotgun it would have merely been to scare it, as the chances of killing it with a shotgun are slim. So we opted to take a flare gun to scare polar bears instead, and it also doubled as a distress beacon. We were advised that if we did feel threatened by a bear, we could call the Tasiilaq police who could shoot it from a helicopter, although we'd obviously never wish this to happen.

3.16 Emergency contingency

In the event of an injury, we'd have the option of treating the casualty using our first aid training and extensive first aid kit. For more serious problems we could phone for helicopter rescue, by the police in Tasiilaq, using our satellite phone. If this was not possible then we could set off our EPIRB radio beacon to summon help as a last resort.

A full risk assessment was carried out as part of our planning, this is available on our website.

3.17 First aid training

We looked into going on a mountain first aid course, but due to our limited budget decided we could not afford it. So instead Steve was taught mountain first aid by his father, who has advanced training as part of a mountain rescue team. This, along with our general first aid knowledge and a mountain first aid book, was our first aid training.

Due to the remoteness of the region we were going to be travelling in we decided we needed to bring a good selection of prescription anti-biotics and pain-killers. These were prescribed for us for the expedition by a doctor (Mark's brother) and paid for by the expedition. Everyone was instructed on the recommended uses and doses of these medicines by Mark's brother, and this information was copied into the front of everyone's diaries should it be needed.

3.18 Training

As part of our preparation for the expedition we all undertook some training. We all had fairly good levels of basic fitness through playing various sports while at university, however we also felt that we should try and do some more specific training geared towards the expedition.

To this end, we decided to meet once a week at the indoor climbing wall at the Cambridge sports centre (Kelsey Kerridge) and have a progress meeting before doing some climbing. To prepare for pulling sledges we got four old tyres from the local garage and bolted them together so that we had two pairs of tyres. We then had sessions dragging them round the local park, to try and simulate dragging sledges.

To check that we would work well as a team we had a few trips to the Peaks to go climbing and also spent a weekend away in the Cairngorms in February camping in Coire an t'Sneachta. Sadly there was too much powder and we were unable to do any Scottish routes, however it did give us practise camping in the snow and an insight into how difficult it could be to travel without any snow shoes or skis in deep powder.

3.19 Permits and paperwork

An expedition permit is required for most Greenland expeditions and this can be obtained through the Danish Polar Centre[6]. The DPC website contains useful information on permit requirements for expeditions depending on the destination in Greenland and the purpose of the expedition (e.g. mountaineering, scientific research etc.). Application deadlines can also be found on the DPC website. At the time of writing this report most expedition permits must be obtained at least 3 months prior to the start of the expedition (6 months for biomedical projects).

[6] Danish Polar Centre http://www.dpc.dk

The process of obtaining an expedition permit may be more complicated if you are heading to the national park in North-East Greenland.

The Danish Polar Centre requires that most expeditions have extensive search and rescue (SAR) and air-evacuation insurance. The level of cover required will usually necessitate special arrangements with your insurance company; BMC insurance can arrange the necessary cover for an additional premium.

The Danish Polar Centre introduced some new regulations in 2006 stating that expedition permits and full SAR/evacuation insurance are no longer required for teams operating within 150km of Tasiilaq. Since our destination was within this zone we benefited from these new regulations (we actually modified our plans slightly to take advantage of them; see section 2.2). Ultimately we saved about $250 - $300 per person in insurance premiums (see section 3.20).

Expedition parties must also apply to the DPC for licences for radios and firearms at least 3 weeks prior to the start of the expedition (at the time of writing this report). If you intend to take an EPIRB distress beacon (and you are strongly recommended to do so) you must also register this with the DPC. Greenland Expedition Specialists arranged this on our behalf.

3.20 Insurance

Since our climbing area was within 150km of Tasiilaq we didn't require an expedition permit or full SAR/evacuation insurance (see section 3.19 for details).

We contacted Ray Perry of the BMC for our insurance quote (fairly detailed plans had to be submitted for this). He informed us that the BMC's standard Alpine and Ski policy was sufficient for our expedition, which ended up costing only $151.35 per person. This was an absolute bargain given that we were expecting to have to pay $400-$500 per person, as is more typical for expeditions of a similar duration.

If your expedition requires full SAR/evacuation cover, which it probably will if you require an expedition permit, you will have to arrange this specially with your insurer (the BMC can do this). You might expect to pay around $400-$500 per person for a six week expedition.

3.21 Food

On any expedition, food is one of the most important considerations; It affects performance due to its nutritional impact and the weight of carriage, but most importantly food has a large bearing on morale.

From reading various books including Mountaincraft and Leadership (Langmuir 2000), the average adult male requires 2500 calories/day; a mountaineer requires 4500 - 5000. Although this was our aim, we found it very difficult in practice to reach this target and maintain a sensible calorie to weight balance.

In light of the high cost of freighting we only took a small amount of food from the UK, which was freighted over by GES. This consisted of a selection of ready-made meals. The bulk of the food was bought in the local store[7] in Kulusk. Below is a rough indication of the variety of food we had and some comments about our choices.

Having bought our food, we repacked it into daily ration bags. This meant very little effort was needed to sort out the food each day. It also ensured we did not overeat at the beginning of the expedition and were able to monitor our food supplies. We effectively took about a week's extra food with us in case of emergencies. This proved, however, to be essential when we began to loose food to the foxes.

We rated the food out of ten in terms of calories, tastiness, ease of use etc.

Breakfast	Rating	Comment
Porridge	9	Highly recommended, filling, slow energy release, quick to cook. For a bit of variety see "additions section". (In a particularly low moment we tried adding butter and cornflakes making it inedible.)
Cereal	5	We brought a couple of boxes of cereal for variety, but ended up eating them as a snack at lunch or adding them to hot chocolate or budding.

Table 12: Expedition breakfast food list

[7] Pilersuisoq Supermarket http://www.pilersuisoq.gl

Lunch	Rating	Comment
Ships biscuits	9	Absolutely brilliant. Almost indestructible. Travelled well, dried well when wet and provided a filling lunch. A favourite of all.
Ryvita	3	About a third of our biscuits were Rivita. This was a mistake! It was a bad day when it was a "Ryvita day". These were not filling at all and were completely inedible when wet; imagine soggy stale weetabix, impossible to even dry out and salvage.
Cheese	9	Very good. Kept well and could be melted into evening meals if left over.
Salami	9	We all looked forward to salami, Could have done with more, but weight meant this was not possible
Figs	8	Very expensive (we spent $40 on figs getting 4 each every second day). However, very tasty and kept us regular.
Biscuit bag	5	A bag/day consisting of 6 squares of chocolate, $1\frac{1}{2}$ fig rolls and some biscuit crumbs each. We could have taken much more chocolate and fig rolls. The biscuits were not worth taking, but were a good sweetener when added to hot chocolate as we cut the sugar a bit fine. For future expeditions I would recommend taking chocolate bars/packets of sweets (e.g skittles). As they can be eaten throughout the day and will provide more calories.
Raisins	8	About half a cup each every second day. Mostly we saved them for the rice pudding.
Peanuts sweet nuts	7	Good source of protein, but taste terrible if get wet.
Mackerel Guff	7	This fish paste was a surprisingly tasty change. We only brought a few tubes, but was good given the dubious sounding name.

Table 13: Expedition lunch food list

Evening Meal	Rating	Comment
Main Course		
Selection of dried packet meals	7	These were shipped in for us by GES. They were tasty but bear in mind that the portion sizes do not account for the empty stomachs of hungry mountaineers.
Rice and a selection of packet sauces	9	Boil in the bag rice. Very good, very filling, lots of butter was added to the sauces to increase the calorie count.
Spaghetti and selection of packet sauces.	9	Was perhaps the favourite meal of the expedition. Very filling, easy to cook and once again anything could be added to give a bit of variety and extra calories.
Polenta	4	Lacked any real substance, would not take on another expedition.
Soup	7	We brought two kinds. One was a thick, creamy soup, a good snack, The other kind was effectively a few strips of pasta floating in water. Not worth taking. We brought stock cubes which slightly enhanced the flavour.
Instant mashed potato	8	Only occasionally used as a main meal. Mainly used when left unsatisfied by a main meal, mash filled an empty stomach well. Light to carry, would not be without it on any expedition. Lots of different things can be added to give a bit of variety to a bland food. Needs to be cooked on a stove with variable heat.

Table 14: Expedition dinner food list

Puddings	Rating	Comment
Pudding rice (& powdered milk)	10	When coupled with spaghetti as a main course, this was the ultimate evening meal. It took a while to cook, but was well worth it. Especially good with a variety of additives (raisins, drinking chocolate).
Budding	8	We had no idea what this was when we bought it, just that it had a high calorie count. It turned out it was supposed to be cold custard. The first time we made it we followed the instructions (see photo below), which was a mistake
Pancake mix	7	Due to our lack of frying pan we had a few experimental cooking sessions until we got anything edible. Resembling fried breadcrumbs more than pancakes these turned out to be a hit when sugar and syrup was added. Constant minding and lots of patience needed with the cooking.

Table 15: Expedition pudding food list

Figure 7: Lachlan making Budding at Base Camp 1

Additions	Comment
Milk powder	High in protein, essential for a creamy rice pudding. Only drawback was that the cans were rather bulky.
Salt	Essential for replacing the salts lost when sweating, but take less than you think you will need, a small amount of salt goes a long way.
Pepper	
Sugar	Take more than you think you will need.
Syrup	When added to porridge a good way of getting an energy boost in the morning.
Mixed dried vegetables	A nice addition to make smash more interesting
Stock cubes	
Tabasco	Essential!
Garlic powder	
Butter	Good for trying to get in some extra calories.
Curry powder	
Mixed herbs	
Kendal Mint Cake	We only took one bar each and used it as our emergency rations. Would take more in the future.

Table 16: Expedition food additions list

Drinks	Comment
Hot chocolate	
Tea	Lady Grey was a favourite
Coffee	As we were all "coffee-holics" we brought with us an MSR coffee filter. Coffee proved to be our little bit of luxury.
Alcohol	A small amount used to mark special points throughout the expedition.

Table 17: Expedition drinks list

On previous expeditions Lachlan had used Mountain House dehydrated meals. He found that although they were a very good tasty meal, they had the disadvantage of leaving the eater with a messy wet plastic bag which has to be carried around. The question which has to be asked is whether you would prefer to have to wash bowls each night or carry around wet waste. The advantage of all our meals was that they enabled all of our waste to be "dry waste".

For transporting food, we bought a series of Nalgene bottles of differing sizes. These were very effective. We also used a lot of small plastic bags. Although secure, these were hard to open with cold/wet hands. It might be advisable to look into taking double topped zip-lock bags.

3.22 Water

When in the field we managed to find running water fairly close to most of our camps, this quite often being the reason for camping at that location. Otherwise we melted snow on the stove. When planning we had allowed enough fuel to be able to melt snow as our only water source for the duration of the expedition (see next section for more details).

3.23 Fuel

When preparing for the trip we used various sources to try and calculate how much water we would need and therefore how much fuel we would require to melt snow. We were using an MSR XKG stove and so worked from the figures and suggestions on the MSR website for the amount of fuel we would need to melt snow.

This meant that we ended up taking 25 litres of white gas with us. This turned out to be complete over-kill, as we found running water sources at many of our camps. We ended up only using 13.5 litres of fuel and taking the rest back to Kulusuk with us.

3.24 Waste

One of the more entertaining train journeys we went on was when travelling from Cambridge to London for the MEF/BMC interview. We caught many puzzled glances as the four of us discussed our potential waste management techniques and drew up an intricate spider diagram to present to the interviewers. We had a comprehensive understanding of all the human and other waste options available to us, having read the Lanchester expedition report. Many of the solutions we dismissed due to the negative impact we perceived them having on health and hygiene.

3.24.1 Human Waste

The way in which we planned our expedition meant that we did not intend to stay in any one camp for more than a week. This considerably reduced the impact our human waste had on the environment. How we created our latrine area varied depending on the terrain we were in. When load-ferrying we were mostly on dry glacier, so our latrine was a suitable crevasse in the glacier. On arriving at each camp we quickly identified a latrine area downstream, scouted out a safe route to it, and proceeded to dig a latrine protected from the elements by snow walls on three sides.

Figure 8: Lachlan modelling the toilet pit with privacy wall

3.24.2 All Other Waste

All other waste was put into black bin bags and carried back out with us disposed of in Kulusuk. As mentioned earlier the food section (see section 3.21) our choice of dry food such as pasta, meant rather than carrying out soiled plastic, such as would be the case with boil-in-the bag meals, we just ended up having to wash our pans a little more often. Although we accept the argument that this would produce a large amount of grey water, the impact this had on the environment was reduced as birds and foxes soon cleaned up after us. There was not enough waste food, nor were we in one area long enough, for them to become dependent on us.