

Imperial College  
**GREENLAND 2003**  
Expedition



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## INTRODUCTION

The aim of the Imperial College Greenland 2003 expedition was to gain experience of living and trekking on an ice cap with a view to crossing the Greenland ice cap in the future. Our destination was the west coast near Kangerlussuaq, where most crossings come off the ice cap. There, it was hoped, we would prepare ourselves by crossing the challenging expanse of pressure ridges and crevasses, experiencing some of the worst possible conditions while in the relative safety of being close to the edge of the ice cap.

This report gives an account of the expedition and details various other aspects including finance, health, equipment and food. It is hoped the report will be of use as a source of information for people planning visits to the same area in the future as well as a document where those interested can discover more about our expedition.

## TEAM MEMBERS

### *Daniel Carrivick*



Dan has been climbing peaks in the Alps for over seven years and has an impressive list of ascents to his name. He graduated from Imperial College last year having undertaken two mountaineering expeditions. In the summer of 2001 he was part of a team that returned from the Indian Himalayas with

two 6000m first ascents, and last year Dan travelled to the Bolivian Andes where several higher peaks were scaled along with some previously unclimbed mountains. The hunger for more expeditions saw Dan stay on at Imperial to do a PhD in structural geology. When not travelling to foreign lands, Dan can be found running around the mountains of England and Wales. With anything shorter than 26.2 miles "not worth running" Dan has clocked up an impressive tally of road and mountain marathons, including sub three-hour times and a couple of top ten positions. Wanting more of a challenge Dan has taken to multi-day adventure racing finishing in the top twenty in only his second ever event. Dan loves his food and especially all things sweet. He continues to devote time to Imperial's Outdoor Club, passing on his vast knowledge to new members and making scrumptious desserts that keep Tate and Lyle profits booming.

### *Adam Rumley*



Adam has travelled all over Europe in pursuit of the highest quality outdoor sports. He has climbed on ice and rock in the Swiss, Italian and French Alps. Adam enjoys the variety and challenges that the different disciplines provide. He has climbed regularly in the UK for six years and is a competent leader. Adams longest running passion is mountain biking, which he has been

doing for over 10 years. Recently he has taken on some of the countries toughest trails and survived to tell the tale. When not excessively active, Adam enjoys consuming lots of Dan's

puddings, the sugar content of which ensures he always has enough energy for the next day's activities.

### *Dominic Southgate*

Dom has been climbing indoors and out for 5 years and has climbed in many areas of the UK. As for the rest of the world he has, trekked the GR10 in the Pyrenees, climbed in France, Spain, Switzerland, Italy and Australia, and made ascents of several Alpine 4000m peaks. More recently Dom has become interested in ice climbing. He has spent the last couple of winters up in Scotland, experiencing some challenging conditions. His new interests include canoeing and mountain biking, which he tries to do at the weekends whenever possible. In the future Dom would like to do more ice climbing in other countries such as New Zealand, and one day climb in the Himalayas. His love of bouldering combined with his appearance means he is quite rightly nicknamed "monkey boy".



### *David Ward*

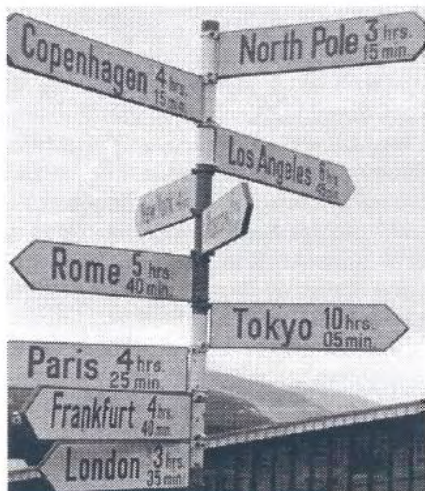
David has been taking part in outdoor activities for as long as he can remember. He has been climbing both indoors and out for over five years, including traditional single and multi-pitch routes throughout the



UK and abroad. Dave particularly enjoys sport climbing in the warmer climates around the Mediterranean and bouldering at Fontainebleau. Winter climbing is another of his passions, and every winter he can be found on ice and mixed routes throughout England and Scotland. He is an enthusiastic Alpine mountaineer and has reached some of the highest peaks in France, Switzerland and Italy. Dave is both a competent downhill and cross country skier having visited resorts in England, Canada and throughout Europe.

## BACKGROUND

Back in October 2002 we heard how a friend had spent a week skiing across the ice cap in Iceland, pulling behind him a children's plastic sledge. Hearing this we started forming our own ideas for an expedition along similar lines but on a grander scale. We began looking at locations where ski touring was possible and quickly came up with the idea of crossing the Greenland ice cap between the east and west coasts. After a bit of research, we found that there was an established route and although a number of Norwegians did it every year, it was not that common for people in this country.



*Choosing which direction to take*

More research was done, looking at access routes to and from the ice cap, how to get there, how long it might take and the sort of equipment that would be needed, along with many other logistical aspects. Two of the group attended the Explore 2002 seminar at the Royal Geographical Society (RGS), which greatly increased our knowledge of organising an expedition and gave us a chance to talk to experts who had already travelled in polar environments. It also made us think about a possible science objective for the trip and put us in touch with the Expedition Advisory Centre (EAC), based at the RGS, and Mark Evans, both of whom later proved to be invaluable sources of information.

We submitted our first proposal to the Imperial College Exploration Board. Our lack of research into certain areas and our poorly prepared

scientific aspect showed through and we were advised to rethink our plans. We agreed that if we wanted to do the crossing we would have to do a training expedition first as none of us had experience of polar environments.

The west coast of Greenland was chosen for the expedition location as this posed the most problems for a subsequent crossing. On the west side of the Greenland ice cap, pressure ridges extend up to 100 kilometres into the ice cap, making crossing them technically challenging. By experiencing this terrain during a training expedition we would be fully prepared for what we'd come across at the end of our intended east-west crossing. Kangerlussuaq was an obvious destination as it contained an international airport and most people crossing the ice cap came off to a place called Point 660, some 35km east of Kangerlussuaq.

While planning our itinerary we looked at how we could make the most of such a training expedition. We had heard that some people who skied across the inland ice had greatly speeded up their journey by using kites to pull them with their sled towed behind. We saw this as being a very good way of doing the crossing and decided that it would be another good objective to learn this skill while we were there. Permits were required for various things including travelling on the ice, carrying emergency beacons and to conduct scientific research. The necessary permits were obtained from the Danish Polar Centre.

After presenting our second proposal to Imperial College Exploration Board, our plans were accepted and we were able to begin organising flights and equipment; namely skis, kite and the pulk. Our food required a lot of planning, as we knew it would be expensive and almost impossible to buy all we needed in Kangerlussuaq. We had to find a way of getting the pulk there as well, so we decided that the most economical way would be to ship it out with the food, and this was done at the beginning of May from Immingham. Only a couple of ships travel to Kangerlussuaq a year so early preparation was essential to avoid missing the shipment. A few more last minute arrangements were made during June and July and by the beginning of August we were ready to depart.

## THE EXPEDITION

### *Leaving London*

#### THURSDAY 31st JULY

Behind schedule and running late, Adam and I threw the remaining equipment into some kit bags and hailed a taxi to take us, and all our kit, to Victoria. After picking up my ticket, a quick search found an equally overloaded Dave and the three of us took the 13:35 coach to Stansted.

We were on our way. The inevitable last minute rush was over. I sat back in my seat, turned on the air conditioning full blast and relaxed for the next hour and a half. On arrival at the airport we repacked our bags in the warm sun outside the terminal before joining the long queue for check-in. A mix up at the desk combined with poor mental arithmetic meant we didn't have to pay any excess baggage despite having over 120 kilos between three of us.

Our flight to Copenhagen was on time, touching down at 21:25. We made it to the left luggage counter just before it shut at 22:00 and dumped all our stuff before heading to the airport hotel for a meal and a drink in its rather posh, but very reasonable bar. It was then back to the airport to find the least uncomfortable seats on which we would attempt to get some kip.



*Re-packing bags at the airport*

#### FRIDAY 1<sup>st</sup> AUGUST

It was 06:00 when Adam and a sleepless looking Dave woke me. Having collected our luggage,

we checked it in and a little haggling ensued we only paid for twenty kilos of excess baggage.



*Traditional old-style Copenhagen street*

We were playing cards while waiting to board the plane at gate C10 when a member of the boarding staff approached us and asked if we'd be interested in flying out the following day because the flight was overbooked. With Dom unable to join us until Monday, we had no urgency to get to Greenland and when combined with the thought of a nice hotel bed and other perks we simply couldn't refuse.

A taxi took us to the Scandinavian Hotel in downtown Copenhagen where we checked in to the five star complex. The afternoon was spent walking around the city centre in the unseasonably warm sunshine, returning to the hotel the evening to take advantage of the free meal vouchers we'd been given.

### *Delays in Copenhagen*

#### SATURDAY 2<sup>nd</sup> AUGUST

It was another early start for us to make the most of the huge buffet breakfast before jumping in a taxi and heading back to the airport. We found ourselves sitting in the same seats at gate C10 when a different member of the airline staff told us they were looking for people to stay behind because the flight was overbooked. With a conflict of interests, Dave decided to take the flight while Adam and I volunteered to stay behind.

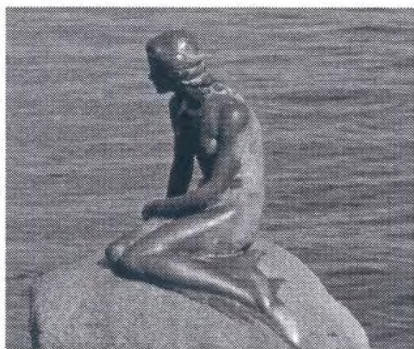
Three hours after leaving the SAS Radisson Scandinavian Hotel we were back in the reception checking in, but this time with a courtesy travel pack full of goodies. Rain and overcast skies ensured the rest of the day was spent resting and relaxing in and around the hotel.

## SUNDAY 3<sup>rd</sup> AUGUST

With no flights to Greenland we were forced to spend the day in Copenhagen. A lie in combined with an over indulgent breakfast meant the morning was nearly over by the time we finally ventured out into the city centre. We walked around the streets, window-shopping for a couple of hours before heading back to the hotel for lunch. I walked off the excessive accumulation of food around a neighbouring park and lake, while Adam took a siesta. Then although we weren't particularly hungry we thought it a shame not to make the most of the free food and so it was back to the restaurant for smoked salmon and caviar.

## MONDAY 4<sup>th</sup> AUGUST

We awoke early, ate too much from the buffet breakfast and took the taxi to the airport where we met a surprised Dom. With the flight once again overbooked and a growing backlog of passengers from the previous week, Dom was refused boarding. We decided one of us should fly out to meet and inform a waiting Dave. Adam volunteered and so it was I stayed another day in Copenhagen, this time with Dom.



*The Mermaid*

We were put up in the Palace Hotel, an equally high-class establishment, but being smaller and in the heart of the city it had a more traditional character. After a gourmet lunch we wandered around the sights in gorgeous sunshine. The regenerated docks were lovely with cobbled streets and quays full of old wooden sailing ships. These marvellously restored floating antiques led us up to Hans Christian Andersons' mermaid, the image of which will forever be associated with the city.



*Dan & Dom's flight just after landing*

## All in Kangerlussuaq

## TUESDAY 5<sup>th</sup> AUGUST

Air Greenland had put on an extra flight, at a slightly later time, to clear the backlog of passengers and so we didn't have to get up quite so early. At 10:15 I was back in the half empty seating area by gate C10 when we were called for boarding. The plane took off at 11:10 with just a third of its seats occupied.

Four and a half hours later at 11:40 local time we touched down in Kangerlussuaq and the plane pulled up in what appeared to be the middle of the town. We met Dave and Adam in a small building, which turned out to be the terminal building, complete with hotel, café, restaurant, Air Greenland office and tourist info. A few hundred metres from the terminal building and next to the airports perimeter fence was a half barren area of patchy grass and dispersed bushes that formed the towns' campsite. Dave and Adam had set up camp and spent the previous day tracking down our shipped goods that had been mistakenly picked up by someone else.

The afternoon saw a hive of activity with enquiries into jeep transport to the glacier and the unpacking of our shipment. Food was separated into ration bags and items of equipment were tried and tested.

## WEDNESDAY 6<sup>th</sup> AUGUST

Unable to get a jeep until Thursday, we spent the day doing small, but essential things around camp. I was up early and had everyone out of their tents in order to apply a seam sealant to the inners of both tents. This made them waterproof from the melting snow but did take twenty-four

hours to dry and so had to be done early. It was then out with the needle and thread to sew up a hole in my gaiter. Doing repairs was perhaps not the best way to prepare for an expedition. The sorting and packing of equipment was dispersed with rounds of Frisbee in the warm sunshine. A game of cards was also attempted but a deceptive breeze did its best to blow the cards away. With too much time on our hands the afternoon was consumed by sifting through our equipment to see where weight savings could be made. This was taken to the extremes when Dave removed two thirds of the handle from his fork and the ends of the prongs.

## ***First steps on the Ice Cap***

### **THURSDAY 7<sup>th</sup> AUGUST**

Dom had been up several times in the night bringing up everything he'd eaten the previous day. The cause was a source of much speculation but it could have been a range of things. Adam and I spent the morning cutting our skins and attaching them to our skis.



*First campsite on the ice, next to the ice road (right)*

The time disappeared somewhere and with several things to do and only a couple of hours to do them, we were forced to have a quick lunch of instant mash. Dave then went to fill up the fuel containers while Adam informed the police of where we were going. I sorted out what stuff was going and what was staying while Dom curled up on the picnic bench in an attempt to feel better. We decided to take the kit we didn't need with us to the glacier where we'd bury it as the left luggage at the airport worked out a bit expensive.

Come 15:00 we were throwing the last objects into our rucksacks and ten minutes later our jeep pulled up. Our bags were piled high in the back and jumped in. The jeep took us through the

town and as soon as we got out the other side we were onto the dirt. As we rounded the aptly named Sugar Loaf mountain, some 8km from



*Dave pulling the pulk, with Adam behind*

Kangerlussuaq, we caught our first glimpse of the distant ice cap. Over the next half hour we bounced up the sandy fjord getting ever closer to the immense walls of ice that towered over the confining walls of moraine. The driver stopped briefly to unlock the gate that prevented unauthorised vehicles from progressing further. We continued on past thunderous waterfalls and over rickety bridges spanning raging rivers, until the vegetation ran out. Perched high on a mound of ice and rubble the dirt road ended and the ice road began. The jeep was unloaded and bags ferried down to the ice where camp was set-up. I tried out my new skis on the ice road as we took an exploratory walk out onto the ice to see what the conditions were like. It was then back to the tents for a meal and a chat with the workers returning from a day of building the ice road.

### **FRIDAY 8<sup>th</sup> AUGUST**

By the time the road builders had returned for another days work, we had the tents down and were packed ready to go having assembled the pulk. The two kit bags containing items we didn't need were covered with a tarpaulin and buried with rocks out of sight from the road. My rucksack was attached to the pulk, which I pulled first, while the others carried their own rucksacks. The 120kg plus weight of the pulk was immediately apparent as I became stuck on the road verge unable to drag the pulk over the small mound. A helping push from Dave got the pulk onto the road and we made our way out onto the ice cap. Adam was the first to fall as his skis crossed and tangled, but before long the highly variable road surface had got the better of all of us. Staying together the others would give

the pulk a push every time a steep incline caused me to lose momentum and stop. The road gradient eased after the first kilometre and we made steady progress until a ford stopped our progress. A search for a better crossing place up and down stream proved futile and in the end Dave waded through the steadily flowing water, claiming somewhat dubiously to still have dry feet. Forgetting their boots were smaller, Adam and Dom followed, getting partially wet feet, while I stood on a floating iceberg and jumped across. The three of them then returned to pull the pulk across getting their feet soaked in the process. After boots had been removed and feet dried we continued, Dave taking over the pulling of the pulk. The pulks weight soon took its toll and Adam and I had a fulltime job in pushing from behind. By 3pm we could see the dumper flattening pressure ridges and filling in crevasses at the end of the ice road. I was pulling the pulk again when on a small descent, it accelerated uncontrollably pushing me off the road, arse first into an icy stream. Having sorted out the tangled mess we approached the end of the ice road and set up camp. The bullet-proof ice not only made digging level pitches a problem; it also took its first victim slicing Dom's hand when he slipped.



*Walking with loaded bags*

## **Ferry Loading Supplies**

### **SATURDAY 9<sup>th</sup> AUGUST**

Adam and I implemented an efficient routine to be packed, ready and waiting for Dom and Dave who were still taking down their tent. Adam attached himself to the pulk and using crampons he pulled the pulk to the end of the ice road. There it soon became apparent that one person would not be able to drag the pulk over the chopped up terrain. We set about ferry loading our things, walking a few hundred metres

forward with our rucksacks, before dumping them and returning for the pulk. All four of us



*Hauling the pulk*

would drag the pulk over the hummocky terrain, two at the front pulling and two brakemen at the back. This pattern continued for the rest of the day as we followed the old ice road that had fallen into disrepair. Progress was slowed by large gaps in the highly weathered old road and by a couple of rivers resulting in the need to detour. Dave slipped and cut his hand quite nastily when his crampons lost purchase on the ice. Soon after 4pm, feeling fairly tired, we found a flattish spot large enough for two tents on which we set up camp. Having eaten, and just before retreating to our tents, Dom informed us it was his birthday.

### **SUNDAY 10<sup>th</sup> AUGUST**

Our start was delayed temporarily while the rigid pulk arms were removed. They had taken a battering the previous day and so we decided to remove them before they suffered fatal damage. Once the pulk had been repacked to enable everything to fit in and the zip done up we set about the task of ferry loading picking up where we finished the previous day.

It wasn't long before a strap slipped off the back of the pulk and got entangled with my crampon. The strain broke the buckle and all of a sudden our new pulk was looking well worn. Things didn't get any better on the next pulk pull when the pulk slid down off a pressure ridge into my raised crampon which tore the canvas cover. Attempts to tape up the gash proved futile.

The route along the remnants of last years ice road was very broken causing us to only cover 1.3km by lunchtime. However that afternoon we made another 2.3km out on to the ice cap, thanks to fine weather and fewer gaps in the old road. The stints when we carried rucksacks and pulled the pulk were gradually lengthened so more of a



rhythm could be maintained. We stopped early as a huge crevasse field lay ahead and set up our tents on the last remaining patch of flat ice for as far as the eye could see.

## ***Crevasses and Pressure Ridges***

### **MONDAY 11<sup>th</sup> AUGUST**

The sun was again out in force by the time porridge had been cooked and eaten. All covered up and with plenty of sun cream on the small parts of the face still exposed we entered the crevasse field pulling the pulk first. It turned out to be a nightmare stint with huge gaps, steep drops and difficult route finding. Having returned to pick up our rucksacks we had to cross all the crevasses for the third time. Adam struggled with his skis which were attached to his rucksack in a way that hampered his progress and so we sat down to wait for him. Dave, afraid of getting piles from the numbing ice, went to stand up. In doing so he caught his crampon on his salopettes, tripped forward and stood on his ski pole bending it. Unhappy at the shape of his new pole, Dave tried to bend it back but only succeeded in snapping it in half. A twenty minute struggle ensued as Dave did battle with the pole to make it operational, if only a little bit shorter.



*Dave's bent walking pole, shortly before it snapped*

By lunchtime we had successfully crossed the kilometre wide crevasse field. Somewhat dismayed at our slow progress, together with a strengthening cold wind ensured we didn't stop long. The terrain was a lot better for the rest of the day and we set about making up lost distance. Dave managed to drop his lip salve and it fell into one of the many melt water holes that littered the surface of the ice cap. These holes could be anything up to half a metre deep and

were generally smaller than the width of your fist. Needless to say a large hole was excavated to eventually retrieve Dave's lip salve. We kept going until the flat-topped old road ran out, at which point we called it a day and erected the tents. Adam spent the evening tending to his feet, which were in a bad way.



*Slow progress across a crevasse field*

### **TUESDAY 12<sup>th</sup> AUGUST**

The cumulative effect of the previous few days' exertions resulted in us sleeping past our alarms. Once up and eaten, Adam had another foot session. He was still applying dressings to his blistered feet as I took the tent down around him. The late start motivated us to make up for lost time, but this momentarily dissipated when I misplaced my foot, and trod in an icy-cold melt water hole soaking my foot. When what looked like a small black rock on the horizon was seen, we made it our goal, ensuring the fast pace was maintained.

Having covered 2.4km in two and a half hours we rewarded ourselves with pepperami, nuts and jelly. The ice cap ahead looked much flatter now and the pressure ridges noticeably smaller.

Overcast skies brought rain soon after midday forcing us to put waterproofs on, and strong winds that caught our skis, which were attached to our rucksacks, knocking us sideways. The elevation difference between the old ice road and the pressure ridges reduced to virtually nothing making the old road hard to follow where it was heavily broken. As we got closer to the black dot so it looked like a green tent and then a metal cabin. It turned out to be a huge articulated cabin, fully furnished and on a sleigh. Ice movements had thrust the cabin up onto a pressure ridge causing it to lie at an angle in danger of toppling over. Moving past the cabin we found somewhere to camp but not before I

had trodden in another melt water hole, soaking my foot once more.

Our fatigue was beginning to show especially when Adam tripped on route to an icy pool to do the washing up almost ending up headfirst in the water. Earlier I struggled to remove the corned beef from the tin and sustained a deep cut to my right thumb in doing so, while Dave's ears began to blister where he had forgotten to put sun cream on them. We decided to have a rest the following morning to allow our bodies to recuperate.

### ***A Break in the routine***

## **WEDNESDAY 13<sup>th</sup> AUGUST**

Sleeping in until gone 10am, we took full advantage of our recovery morning, lying around eating high-energy foods until gone midday. An hour or so later we were up and ready to start our two-hour pulk pull. We had decided to leave our rucksacks and tents where they were and just pull the pulk as far as we could in a couple of hours before returning to the tents that evening.

The old ice road was again very broken and difficult to follow, although crevasses weren't so numerous. Time flew by and before we knew it an hour was up and we had covered 1.89km. Swapping positions, all four of us pulled the pulk for another forty-five minutes until the old road appeared to totally disintegrate. Unsure of the way ahead, we called it a day and left the pulk to return to the tents under ominous overcast skies.



*Battling against the terrain*

Back at the tents we had just refastened all the guy lines and filled up with water when the rain came. Glad to have got back before the heavens opened we played cards until our stomachs wanted feeding. Chilli con carne was on the menu followed by sweets and chocolate.

## **THURSDAY 14<sup>th</sup> AUGUST**

It had rained for most of the night and drizzle was still falling when we stuck our heads outside the tent in the morning. Uncertainty was rife when we didn't know whether to wait an hour to see if it cleared up or just get up and go regardless. This resulted in a half-hearted effort to get ready and hence took much longer than normal.



*Returning to pick up the pulk*

Wet, cold and heavily laden with sodden packs, we headed off after the pulk. Adam set a fast pace and later suffered both from overheating and with his feet. Once the pulk had been reached we continued with the ferry loading; carrying our rucksacks further on before dumping them to return to collect the pulk.

With the old road nowhere to be seen and visibility down to virtually nothing, navigation proved to be slightly challenging. Ten-foot bamboo canes lay by the side of the old road at every 150-200m intervals. We'd been following these canes assuming we were on the right route, but at a point they curved round to the left. As we followed them further and further, always bending round to the left, our suspicions grew. Then we started heading down slope and when I got my GPS out I discovered we had doubled back on ourselves.

Demoralised and wet we retraced our steps back to where we had dumped the pulk the previous day. Dave questioned our plans for the coming week, putting forward alternative objectives. This only served to cause fractions within the group, lowering moral yet further. After lunch we continued on a bearing out onto the ice cap and soon came across more bamboo canes. Although our trust in these markers had been severely set back I was confident that we were on the right track. By mid-afternoon there was no

sign of the weather improving and motivation was lacking so we called it a day.

## FRIDAY 15<sup>th</sup> AUGUST

A warm sun enticed us out of the tents in the morning, but a deceptively chilly wind awaited us. Battling with the wind we took down the tents and were ready to move on at a reasonable hour. Relatively flat drainage channels lay alongside the old undulating ice road ensuring we made good progress. By the time we were all hungry we had made just less than three kilometres, covering three times this distance as we returned for the pulk after each rucksack carrying stint.

That afternoon our progress slowed a little as larger portions of the road were missing, making route finding more challenging. A few large melt water lakes and some crevasses forced us to make big detours. The chilly wind blew all day into our faces and by 4pm we decided to call it a day. Ten yards from our chosen tent-pitching site Adam trod in a deep melt water hole soaking his foot. He was not a happy chap.

## SATURDAY 16<sup>th</sup> AUGUST

We were woken several times throughout the night by howling wind and driving rain. The wind was still trying to lift the tent off the ice in the morning and so we decided to call it a rest day.



*Dom crossing a crevasse*

Porridge was eaten at 11am, after which we played cards and I did a few crosswords. The afternoon was occupied with more cards and plenty of book reading. It was 5pm by the time I

eventually got out my sleeping bag to refasten the guy ropes on the tent, cutting my knuckles on the ice in the process.

That evening the wind eventually died down and the rain turned to snow. The neighbouring crevasses creaked and groaned rather too often for our liking.



*Dave and Adam crossing a stream*

## *The final push*

## SUNDAY 17<sup>th</sup> AUGUST

A bitterly cold morning awaited us as we emerged from our tents. The snow had frozen solid to the tents, and was difficult to get off. I sorted out a weeks worth of food as we had decided to dump the pulk and carry everything in an attempt to reach the snowline, effectively tripling the straight-line distance we could make each day.

Once packed we set off through the waiting crevasse field, which was littered with debris, including a couple of pulks, from previous expeditions. We picked up the trail of the old ice road on the other side and made good progress despite carrying packs weighing up to 65lb. By lunchtime we'd covered 7.5km.

The mornings fast pace took its toll in the afternoon and our pace slowed. Once we'd covered another 5km we called it a day, taking advantage of our early stop to rest for the next day's exertions.

## MONDAY 18<sup>th</sup> AUGUST

A new day and another cold morning, so cold we didn't get out of our sleeping bags until porridge

had been eaten. Moving fast to keep warm we packed our rucksacks and struggled to force our feet into our frozen solid boots.

It took a while after setting off for us to warm up, despite a clear blue-sky overhead. The terrain had looked significantly flatter ahead and so I started off the day skiing. However excruciating pain in the ball of my foot combined with more crevasses ahead meant I was fixing the skis onto my rucksack just an hour or so later. Having strapped my foot up, I was forced to loosen the bandage half an hour later when it started to inhibit my circulation.

With crampon, boot and gaiter back on, we continued and I hobbled on up to another container on a sleigh. The 10ft by 6ft metal cabin, which turned out to be Dog camp, was fully equipped with radio and communication equipment, beds, solar panels and heaters. Lunch was eaten behind the container, sheltering as best we could from a chilling wind.

A large river halted our progress mid afternoon. Having searched up and down stream for a suitable crossing point we found a place where we could just about jump across. Dave went first and we threw a rope across to him so we could send the rucksacks across on a zip wire. Adam and Dom followed the bags across on the rope before I took out the anchors and jumped across the river to join the others. All across safe and dry, we looked for somewhere flat to camp and pitched our tents, letting them dry in the late afternoon sun. That evening we stayed up to watch a chilly but very spectacular sunset.



*The sun setting spectacularly below low cloud*

## TUESDAY 19<sup>th</sup> AUGUST

Strong winds buffeted the tent in the morning. Dave and Dom were just starting to take down their tent when Adam and I were packed and ready to go. We were sheltering out of the wind

in an iced over stream ditch when the last of the guys was removed from Dave and Doms tent. The wind immediately got under the tent and blew it across the ice. It completed several triple somersaults before coming to rest in the stream gully where Dave was quick to rescue it. Forced



*Dave jumping across a stream*

to keep moving in order to stay warm, we battled headlong into the wind all morning. At midday we came to a junction where our road joined one from the south. Food packages abandoned by previous expeditions lay in the snow. Doing our bit for the environment we picked up as many of the omelette ration packs as we could carry and ate the biscuits there and then.

Continuing on after our little feast we followed what little was left of the old ice road, using the toppled bamboo canes as reassurance we were on the right route. The terrain was almost all flat now and before long we entered the land of large icy pools. Following the fluorescent-topped canes around the small lakes all seemed to be going well. But then we hit a large gap in the old road, filled with deep water. There was no way of crossing it and lakes on either side ensured a huge detour would be necessary to proceed. So with Doms' back hurting we called it a day and set up camp south of the road, near the lake.

Breaking a hole in the frozen lake we filled our water bottles. Adam dropped his bottle and it slid out onto the ice. Fortunately a nearby 12ft bamboo cane allowed us to retrieve the bottle while staying firmly on solid ground.

I was just about to get into the tent when I thought I heard the noise of an engine. I looked up and sure enough, their coming towards us, from the middle of the ice cap, was a piste basher. We watched as it approached the gap in the road and then backed off at the last minute. Instead the mighty machine waded through the two-foot deep lake, beaching next to our tents.

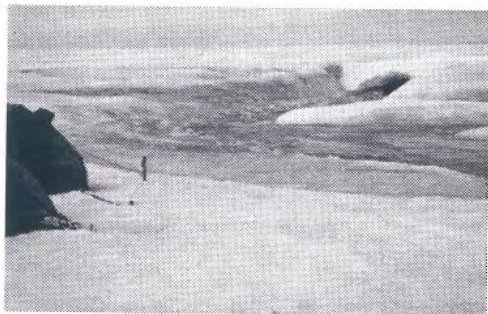
They stopped for a chat and we exchanged notes on where we'd come from and what the route ahead was like. After half an hour they continued on their way and we cooked tea.

It was gone 9pm when the piste basher returned, filling in the gap in the road. Had they filled it in for us? I wondered. It was very good of them if they had. While drifting off to sleep I suddenly thought if water was flowing through the gap in the road, then the piste basher had effectively built a dam. By morning we could be flooded out of our tents but it was too late – I had fallen asleep.

## *A wet surprise*

### WEDNESDAY 20<sup>th</sup> AUGUST

Many hours later when we finally awoke the inside of the tent was thankfully dry and there was no sign of water lapping around the fringes. The sound of a cold wind blowing furiously, pelting pea sized droplets of semi solid rain against the side of the tent made us huddle up inside our sleeping bags. Our intentions of venturing further along the road were put on hold until the weather improved and we drifted back to sleep. By late morning the day was looking like a write off, so we read books and attempted crosswords.



*Icy waters lap around our tent (left)*

Just after 2.30pm the rain ceased temporarily. I took the opportunity to venture outside into the bitter wind to relieve myself and was alarmed to see water almost at road level on the other side of the gap that the piste basher had filled in. My fears worsened as I went to take a closer look. The rain combined with snowmelt had caused the lake on the other side of the road to rise by over 2m, covering a huge area of the almost flat glacier. The dam was struggling to hold back the

water, which was cascading down through the ice wall eroding it bit by bit. With our tents many feet below the top of the dam, the danger seemed obvious. I warned the others but they weren't too bothered and when it came back onto rain I sought shelter in the tent.



*The waters start to recede leaving a snow bridge*

It had just gone 3:30pm when there was an almighty crash followed by an accelerating roar. I knew immediately what it was, and braced myself, anticipating the wave to hit the tent at any moment. Frozen still by the inevitability of our situation there was nothing one could do but expect the worst. I remained in the tent for what seemed like ages and when eventually I realised that if we were going to be washed away it would have happened, I stuck my head outside the tent. Fortunately only the lower part of the dam had given way, to form an ice arch, the top of which still dammed the water. Water was gushing under the arch at an alarming rate, taking ice with it. Unsure how long it would be until the arch gave way, we hurriedly salvaged our most prized possessions from our tents while keeping an eye on the water which was creeping ever higher towards them.

Over the next hour we watched as the upper reservoir drained under the arch and flooded the land around our tents moving blocks of ice many metres in size. At its height the water came within a vertical inch of flooding our tents. It was too close for comfort, but we had survived. The waters started to recede and we returned to our tents to cook a hearty meal.

### THURSDAY 21<sup>st</sup> AUGUST

It was snowing outside when we woke at just after 7am. We decided to wait for an hour to see if there was any improvement, especially in the visibility. By 8am the wind had died and the snow wasn't as heavy so we packed up and left.

Wearing goggles we followed the road trace back the way we'd come a couple of days previously for we were half way through our rations and hence had to return to the pulk where more food was waiting.

Dom was the first person to lose a leg in a puddle of slush, formed where the piste basher had filled in gaps in the old road and Adam soon followed. By mid-morning the snow had stopped and the sun was trying to come out. Dave was on a mission, leading a fast pace along the now easier to follow road. We later discovered why this may have been; he only had two sheets of toilet paper left and thus needed to get back to the pulk quickly to pick up some more, although Dave vigorously denied this.

Passing the point where the road split we took the new track up to Dog Camp, but before we reached it, there was the large river to cross. Not wanting to waste time with ropes we searched for an alternative way of crossing the obstacle. We could just about jump across but the problem was getting our rucksacks to the other side. Thinking about various options over lunch it was soon time to try some of them out.

Dom was the first to jump across making it, just about, onto the far ice bank. After consultation with Dom, Dave tried to throw Doms' rucksack across to him. There was no way anyone could throw such a heavy bag that distance, I thought, but they believed otherwise. And to give Dave credit he did throw the twenty-five plus kilo rucksack six feet across the river, but unfortunately it landed on the sloping bank and



*Dave throwing Dom his rucksack*

slid into the river before Dom could get it. The rucksack immediately started to get swept down stream in the fast flowing water. Adam and Dom ran after it on either side of the river and were just able to keep up. However there was no obvious way of reaching the rucksack as the river flowed through a ten-foot deep ice cutting. In the end it took a Herculean jump from Dom, off the top of a spur into the opposite river cliff

where he intercepted his rucksack with perfect timing and was able to hold onto it. Adam arrived moments later to pull Dom and rucksack out. They walked the fifty metres back upstream thankful that they had caught the bag before it reached one of the huge holes where the melt-water rivers disappeared to the bottom of the ice sheet.



*The improved method of getting bags across the river*

Back to square one I collected a few of the twelve-foot bamboo canes from back along the road and Dom came up with the ingenious idea of creating an A-frame on which the rucksacks could be swung across. While the system worked fine for the rucksacks, Dave proved to be a little too heavy for the bamboo canes. Adam, being lighter, tried his luck with the now shorter bamboo canes, but barely got off the ground before he fell into the river.

Once all across, Adam took a few minutes to dry out after which we continued up to Dog Camp a couple of kilometres away. There we stopped for a biscuit before crossing the large bowl shaped topography to pick up the old ice road on the far side. Dom took a couple of Ibuprofen for his back and I think the heavy rucksacks were affecting everyone's shoulders. Once we had crossed a series of smaller streams, large enough to cause painful detours in order to safely cross them we erected our tents at 5:30pm and put the stove on.

## ***Back to the pulk***

### **FRIDAY 22<sup>nd</sup> AUGUST**

We knew it had been a cold night, and in the morning the evidence was there to prove it. The inside of the tent was shrouded in ice crystals that were sent scattering with only the smallest of disturbances and Adams gloves had frozen solid. Dom struggled to get his frozen boots on,

but once we were all ready we set off at a reasonable pace, enforced somewhat by the desire to warm our hands and feet up. Dave set the pace again while Dom hobbled along, battling with pain in his foot despite being topped up with Ibuprofen. Dom was first to fall through a frozen over melt water hole, which did not help his foot problems. Dave helped Dom by taking the rope off him but he later went one better by finding a deeper hole and tore his salopettes in the process.

An early lunch was taken when Dave stopped abruptly in agony, from his ingrown toenail. While he tendered to his foot we basked in the sun. The cloud continued to break up and the afternoon was a scorcher. Our pace slowed as Dom took more frequent stops.

As we came around a bend and over a crest in the road we could see the digger less than a kilometre away. It was a pleasing sight but we still had one last crevasse field to cross. With something to aim for we ploughed straight for the digger, arriving just as it left to find our pulk at the end of the road. Camp was set up on top of the old road, well out the way of the new road.

As I took my crampons off I noted the front points were missing. They had snapped off. I retraced my footprints a little way back into the crevasse field and it soon became clear that they had been missing for some time.



*Setting up camp, in the wind*

That evening the digger returned and ploughed a route through the crevasse field while the piste basher followed with a cabin on a sleigh. After we'd eaten I heard footsteps approaching the tent. I looked outside and there were a couple of Norwegians who had almost completed the crossing. We talked to them about their crossing and compared equipment differences, which centred on our heavy skis. Wishing each other well, they moved on as they'd started to get cold and we returned to our tent to play cards.

## SATURDAY 23<sup>rd</sup> AUGUST

A rest day had been called for, predominantly to allow Dom to recover so we lay in all morning. I was woken momentarily by a jeep driving along the ice road, and later by Dave unzipping our tent to get the chocolate powder. Porridge was eaten at soon after 11am and then we read books for a couple of hours.

At 1pm another couple of Norwegians passed us



*Dave and Dom get the stove going*

and their first comments too were on the weight of our skis. They also thought we must have been Italians, when they came across our crampon marks further out on the ice cap. Once they'd moved on we finished eating our couscous and barely ten minutes later a group of five people, all with pulks could be seen coming across the road. They had attempted a peak on the east side of Greenland before doing the crossing and had only left Amassilak 26 days previously.

That afternoon we sent Adam down a crevasse with his skis and practised our crevasse rescue techniques. By the time we had set up the 5:1 pulley safely and hauled him out there was just enough time to do a spot of ice climbing, up out of the crevasses before packing up and returning to the tents where Dom had some hot chocolate waiting. Dinner soon followed. The evening was occupied by eating sweets in between rounds of cards.

## *Along the ice road*

## SUNDAY 24<sup>th</sup> AUGUST

With a maintained road to follow, Dom and I chose to ski while Adam and Dave preferred to walk. My rucksack was fastened to the top of the pulk, which I pulled along using slings and holding them in my hands. This was because the

road had not been flattened and was extremely undulating. On the down slopes the pulk would gather speed and so holding onto the slings allowed me to let go quickly if it started to veer out of control.

On one such slope the pulk careered down behind me, pushing my skis into a semi-frozen puddle. One ski tip pierced the inch thick ice, and slid underneath it. The pulk stopped on the back of the skis, trapping my foot in the icy water. Unable to push the pulk off my ski, break the ice or remove my foot from the ski I lay their feeling the water trickle into my boots until Adam caught up and assisted me. Dom and Adam then man handled the pulk across as I pulled only for Dom to fall through the ice. Adam and Dave also suffered wet feet in the slushy road as they didn't have skis to spread their weight over.

Heavily laden clouds lay ahead and before long it was pouring. Swapping waterproofs for my fleece we continued over a section with fewer potholes but severe undulations, steep enough for me to struggle to haul the pulk up. Another kilometre further on we were on to better roads, very smooth and almost flat, but this made the potholes less easy to spot. The rain had turned the smooth surface into a lethal ice rink making the pulk easy to pull but a nightmare to control. By midday I had cramp in both feet causing agonising pain but I managed to plough on to the cabin where we stopped for a quick soggy lunch. I swapped boots, by which time we were all cold and eager to get going.



*Dan hauling the pulk along the ice road*

Adam and Dave took over pulling the pulk, but after an hour Adams foot started to give him severe pain so I took over once more. Rain showers continued as we made our way along the slick road dodging potholes. The road cut straight across the crevasse field and what had taken a day on the way out took little more than an hour on the road. Looking side on down the

pressure ridges we, for the first time got a feeling for their size and were amazed at how we had dragged a pulk across them a couple of weeks earlier.



*Dom skis while Dave and Adam pull*

The tents were pitched by the side of the road in the pouring rain and strong winds and we dived inside, glad to be sheltered from the elements. Dom was most put out when he found his sleeping bag, that had stayed dry when his rucksack floated off down the river, was now wet because of the rain.

## MONDAY 25<sup>th</sup> AUGUST

The wind was still rocking the tent in the morning blowing a gust of rain every so often. Eating porridge we decided not to sit it out but rather to keep going and try and make the edge of the ice cap that afternoon. As we began to pack, the rain started again and doubts were cast as to whether we should go. But in the end no one wanted to unpack so we continued to get ready, putting on our waterproofs still dripping from the previous day's rain.

Our indecisiveness meant it was gone 11:30am by the time we finally left. I decided to ski while the others all wore crampons. The ice was even more lethal than yesterday as not only was their no grip, there was also a strong side wind trying its best to blow you off the road. Falling over was inevitable and barely five minutes had gone before I hit the ice. Adam and Dom started off pulling the pulk for the first hour, after which I took over.

Crossing the rivers was tricky, not least because they were in flood. I took my skis off to cross one river and successfully crossed it only to slip over on the bank of lethal ice. Adam ventured into a pool of ice slabs and slush, which swallowed his lower legs like quicksand. Trying to get out he stepped forward only to sink





**Dom, Dave and Adam picking out the flattest path (from left to right)**



**Struggling to get the heavily laden pulk over a ridge**



**Adam pulling the pulk along the remnants of last seasons ice road**



**Dave leading the way across the never ending pressure ridges**



**Flatter terrain beyond the pressure ridges**



**Snow fell in the night and froze to everything**



**Camping on what was left of the old ice road**



**Using a zip wire to pull our bags across the river**

further. This happened several times until he eventually found solid ice.

After lunch, Dave took over pulling the pulk from Adam and it wasn't long before we had climbed over a crest and could see Pt 660. With our objective in sight it was heads down to the finish. Descending down the ice road we passed a digger laying pipes under the road and a road leveller. As we got to within a couple of kilometres of Pt 660 the road turned slushy and gave a little more grip. Dave and Adam pulled the pulk down the final descent to the glacier edge, with Dom staggering on by the side. The ice ran out at 3:30pm. Dumping our loads and ice cap equipment Adam and I went and retrieved the bags we'd left under a buried tarpaulin. Everything was soaking but at least the bags were still there.

Adam and I had decided to walk back to Kangerlussuaq, while Dave and Dom would hitch back with the workmen, taking back all the equipment. We sorted out extra food and fuel before packing up and leaving Dom and Dave to pitch their tent in which they'd wait for the first available lift. Crossing moraines we soon entered the lush heather covered peat land. It was all very picturesque, set against the backdrop of sheer ice cliffs and thunderous melt water cascades. The temperature increased as we descended and got further from the ice cap. Dave stopped for a quick chat as he passed us at 7:10pm in one of the workman's jeep. As the vehicle pulled off down the road so we caught a glimpse of Dom squashed in the back with rucksacks, skis and the pulk all on top of him.



*Pulling the pulk across another gushing stream*

With no obvious streams for water we continued until we came to a relatively silt-free lake and set up camp by its side. It was an idyllic campsite and in the dusk of the evening we cooked a hearty dinner on the lakes sandy shore. There we ate our three course meal; herb and mushroom

soup, rice with sausage casserole flavoured sauce and many jelly babies for dessert.

## ***The walk to Kangerlussuaq***

### **TUESDAY 26<sup>th</sup> AUGUST**

The warm sun forced us out of the tents in the morning, and after a hearty bowl of porridge we got going along the road. We soon came across the designated area for camping marked on our map, only 500m further on down the road. The ground was slightly flatter and the water less silty but apart from that we didn't miss much by camping where we had.



*The end is in sight*

After passing the barrier across the road we walked over a small col, dropping down into the sandy ford where a large river meandered freely from the Russell glacier. Shortly after the tourist "prison" bus passed us we came across the wreckage of an old military aircraft.

Topped up with chocolate, we were soon on our way again walking to the end of the flat sandy plain where the road climbed up and around the back of a prominent hill called Sugar Loaf. There we stopping briefly by a lake for some water before continuing around Sugar Loaf and through a nature reserve. As we passed a thunderous set of rapids so we crossed into inhabited land and soon passed remote houses, communication masts and other signs of civilisation. The buildings of Kangerlussuaq looked surprisingly close, but the GPS told us they were still another 5km away.

An hour later, at 5:20pm, we walked back into the campsite wearing shorts and T-shirt to be greeted by Dave and Dom hidden amongst their Down jackets. Adam went to phone home to find out his exam results while I put up the tent. Dave and Dom already had tea on the go, and before long we were eating another good meal.

## WEDNESDAY 27<sup>th</sup> AUGUST

The tent soon became too hot in the morning sun and I was forced out into the cool morning breeze. After making a cup of tea I cooked up fried bread, eggs and beans which went down a treat. The morning was spent reading and relaxing while our kit was spread out around the campsite to dry. Dave and Adam found that we couldn't change our flights but we could transfer our luggage thus easing our transfer between flights in Copenhagen. Meanwhile Dom sat around the tents carving a figure out of a lump of wood.

By 2pm the airport was quiet as all the daily flights had come and gone. I took the opportunity to have a shave and wash in the airport toilets, which made me feel much better. The rest of the afternoon was occupied by playing cards and reading books.

## THURSDAY 28<sup>th</sup> AUGUST

The day was spent in and around the campsite. I started patched up the holes in the outer of one of tents with Seam grip, where crampons and ski poles had got the better of it. Then once the 11:15am flight had departed I bought some postcards from the souvenir shop in the airport. Returning to the campsite via the shop I picked up some goodies for lunch.

In the afternoon we wrote postcards, played



*Adam walking back along the dirt road*

Frisbee and had many rounds of cards. There were several more visits to the airport to post the postcards and to the shop to purchase bits and bobs. That evening I got ready to go off walking for a few days in the tundra. Adam decided to join me despite his feet wanting more rest. Dom and Dave chose to stay in Kangerlussuaq, to go on day walks and visit the sports centre.

## *Close encounters with Musk Oxen*

## FRIDAY 29<sup>th</sup> AUGUST

Having eaten a massive bubble and squeak breakfast, which combined the leftovers for the previous evening with fried bread and an omelette, Adam and I leisurely packed our rucksacks sorting out what we'd need for the next few days.



*Walking back into Kangerlussuaq*

We finally left the campsite at 11am, still feeling bloated from our large breakfast. Our pace was almost as leisurely as our packing as we walked through the town and around the end of the runway. The Jack Perry memorial bridge on the far side of the town was an ideal spot for our first stop where we stared down at the awesome power of the swollen river, as the boiling mass of silt laden water cascaded into the fjord through a deep channel it had carved out of the bedrock. The road took us up to Lake Ferguson where we walked around its northern edge.

The sun shone uninterrupted on the crystal clear rippling waters as we hacked our way through the overgrown track. Lunch was eaten three quarters of the way along the five-kilometre lake from where we traversed up the valley side to get our first distant sighting of musk oxen. A bit further on we came closer to another pair of the huge mammals, and after acknowledging our presence they left us to pass unimpeded. Climbing up to the col high above Lake Ferguson we saw a caribou before entering into a plateau of hummocks and small lakes. Crossing the plateau we found a place to camp next to a small lake with a spectacular view of the distant ice cap. We watched two oxen fighting a few hundred metres from us as we pitched the tent. Thankfully they left us alone and we set about

rectifying the problem of carrying too much food. It was a good meal!

## SATURDAY 30<sup>th</sup> AUGUST

After a bowl of porridge we were on the move again. Aware of a herd of musk oxen sitting down in the next depression we quietly packed up and slipped down towards a large lake, out of sight. On our descent we noticed more oxen across the valley and deer galloped away from us as we approached.

Nearing the lake we admired as three herds of caribou were walking up the ridgeline silhouetted against the morning sky. Musk oxen were at the foot of the ridge several hundred metres away. Thinking nothing of it we continued heading away from the ridge. The next thing Adam noted the oxen had broken into a gallop and was bounding towards us. The animal was quite a way off so although we were alarmed we didn't feel in immediate danger. Caught in the middle of a broad expanse of valley slope we could do nothing but continue away from the animal. Remembering the advice we'd read on the back of the map we walked slowly, our hearts racing slightly, towards the lake and our intended route. On reaching the lake we were pleased to see the animal had resigned to walking, but also noticed two equally huge oxen following it. Walking around the lake we lost sight of the beasts. They had continued to follow us, plodding at a sedate pace before stopping to graze.



*Camping by the lake*

Every five minutes I would keep looking behind us, to see if we were being followed but there was nothing. Twenty minutes had passed when I heard a deep gruff. I turned to see a musk oxen bounding along the path at full speed towards us. The animal was less than a hundred metres away and closing fast. With only seconds before the

oxen would be upon us there was no time for fear. The lake was 10m below us and clearly we had to get off the path so we climbed up the steep bank as fast as we dared without startling the animal. A brief glance back noted the animal had stopped on the track and was eyeing us up. We kept moving away hoping it had left our trail.



*Adam samples the water, with the icecap in the distance*

I looked back several times and saw nothing, but then just as we got to the top of the next rise, there the animal was, bigger and closer than ever. Beginning to fear that there was no escape I began to think of desperate options. All the time we moved, slowly and steadily, just as we had been told to do. Coming across a small gap in the rock I thought of crawling in and sitting it out, but Adam wanted to keep going so we did. Moments later the animal turned and started to move away from us, it had had enough.

With nerves on a knife-edge we were mortified to find a whole herd of musk oxen where we wanted to go. Taking a large detour we dropped back down to the lake. I came over one rise, startling a resting musk oxen. It stood up, looking me in the face before running away with its partner. I don't know who was more frightened – the animal or I.

Deciding enough was enough I got out the stove, ready to be used as a flame-thrower should we have been attacked. Our too close for comfort encounters played havoc in our minds and before long we were taking huge detours around rocks, thinking they were musk oxen.

Passing herd after herd we found a sheltered spot behind a hill and set up camp. The small lake wasn't great for a water supply but it seemed better than descending four hundred vertical metres to the nearest river.

That afternoon we played cards, listening tentatively for any movement outside but there was none. Eating late into the night we went to

sleep full and happy to be in the relative safety of the tent.

## SUNDAY 31st AUGUST

I didn't have the best night's sleep, what with Adam's snoring and the sound of oxen running past our tent. Were they real ones, or was I imagining it, I thought. I had no intention of finding out.

Once a few early morning showers had passed we struck camp and walked back the way we'd come; up over the col. There we filled up our water bottles from a small lake before continuing around a herd of musk oxen and along the side of a much larger lake. Throughout the morning we walked, constantly aware of any musk oxen. Every time we climbed a small rise and were unable see what was over the top of it, our hearts would start racing at the thought of coming face to face with musk oxen. Fortunately none of the animals were quite as inquisitive as they had been the previous day, leaving us to walk uninterrupted around them.

Eating lunch near where we camped on Friday evening we dropped down towards Lake Ferguson giving a wide berth to large group of musk oxen. Lovely pine scents often wafted through the air as our feet disturbed the undergrowth. Adam's ankle started to give him problems, so we took it easy across the uneven terrain.

Near the lakeshore we sat and watched three musk oxen on the far side of the valley as they first found somewhere to cross a muddy stream and then scaled what appeared to be a sheer rock



*View from the top of the pass*

face. Once the show was over, we set up camp on the terrace overlooking the lake. As I went to turn the tent around a gust caught the tent and blew it sideways snapping one of the poles

around a join. After playing cards and eating we were forced to retreat early into our tent as a herd of oxen approached.

## MONDAY 1<sup>st</sup> SEPTEMBER

I awoke to find the tent in the middle of a herd of musk oxen. I didn't dare look outside as I could tell the animals were close from the chewing of grass and churning of their stomachs. Adam woke a bit later and we lay there, motionless and in silence until they had slowly passed. Fortunately my book was to hand so I passed the time by reading it.



*Getting ready to leave*

Musk oxen, move really slowly most of the time, especially when they eat, so it was an hour and a half before the whole group had moved away. They sat down some seventy metres from the tent, which was a bit too close for comfort, but we got fed up of waiting and took the tent down anyway. They watched as we disappeared out of sight by dropping to the lakeside, and thankfully decided not to give chase. Walking the 5km back along the southern side of Lake Ferguson, in the glorious morning sun, we soon came to the first of the shoreline cabins, from where we followed the road around the tip of the lake and back down into Kangerlussuaq.

Dom and Dave were in the middle of making lunch when Adam and I arrived back at the campsite at 1:20pm. We caught up on each other's news in between mouthfuls of all the leftover food. A local trekking agency had packed up for the year and left Dom and Dave all the food they had spare, so their was plenty for all.

Souvenir shopping, writing postcards and reading the last pages of books all took place that afternoon. Cards followed an enormous meal in the evening until the cold forced us to the warmer surroundings of our sleeping bags.



## *The journey home*

### **TUESDAY 2<sup>nd</sup> SEPTEMBER**

Drizzle greeted us in the morning and so we lay in until the worst had passed. I went for a walk down towards the fjord in the morning to watch the planes drop out of the low cloud as they came in to land. Getting soaked from wading through thick vegetation I returned to the airport to dry out before heading back to the tent where Adam had mash on the go.



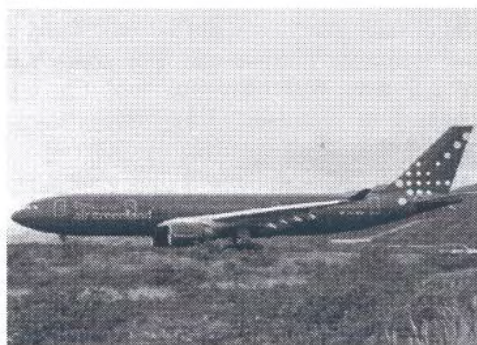
*Adam looking the part*

We found a washroom in the hotel attached to the terminal building and made good use of its shower facilities. At 3pm we took a gamble and started to sort out our kit but we only got as far as packing one ski bag before it came on to rain. After the shower had passed we packed the rest of the kit, cooked a big meal and burnt the spare fuel on a bonfire. While packing, Dave noticed his crampons were also broken, where the anti balling plates screwed on to the crampon at the back. After dinner, the big clear up continued with pans being thoroughly scrubbed, stoves dismantled, fuel bottles rinsed and rubbish thrown out. The remaining ski bag was then packed and the pulk wrapped ready to go.

### **WEDNESDAY 3<sup>rd</sup> SEPTEMBER**

When the alarm went off at 7am there was still drizzle falling on the tent. Adam and I packed up our rucksacks inside the tent while Dom and Dave took theirs down. Our tent soon followed and we ferried all our kit to the airport terminal.

We checked in at 8:45am and got our luggage transferred to Stansted. They didn't charge us excess baggage despite being well over the limit, so to celebrate we went to the airport café for a breakfast.



*Our plane home*

Taking off on time at 11:30am, we climbed out of Kangerlussuaq towards the ice cap. Soon all was lost beneath a blanket of cloud and we were left to enjoy the in flight hospitality and entertainment. Some five hours later at 7:30pm local time, we landed at Copenhagen and dashed between the airport terminals to make our connecting flight after being held up by a locked exit door to the gate. On attempting to check in, it was discovered that our luggage wouldn't be transferred despite our baggage receipts saying the opposite. So we had to go back, find our luggage and then check it in, all within fifteen minutes before the gate closed. Thanks to the efficient airport staff we made it, only just and after paying the excess baggage charges we went through and boarded the plane. At 9:20pm we left Danish soil and followed the Northern European coast back towards England. A couple of hours later at 9:50pm UK time we landed at Stansted airport. Once the entire luggage had been collected we exited the hall to meet waiting friends and families, all going our own separate ways.



*Dom enjoying his airplane food*

# SCIENTIFIC RESEARCH

## BACKGROUND

Geochemical analysis of melt water stream sediments has been used by scientists looking for anomalous mineral concentrations and ore deposits while environmentalists have located anthropogenically contaminated land. Work has been carried out in the easily accessible alpine melt-water rivers. A few people have sampled from Himalayan rivers to determine the rates of silicate and carbonate weathering (Blum et al, 1998) and a few rivers in Greenland have been targeted for specific elements. Jakobsen (1989) carried out geochemical stream sediment surveys to locate zinc and barium mineralized veins while Steenfelt et al (1992) undertook geochemical mapping in the Nagssugtoqidian mobile belt. Bindler et al (2001) study mercury anomalies on a coast to ice transect near Kangerlussuaq. However up until now no one has looked at the base line concentrations in these sediments and perhaps even more surprising is no one has compared data from an ice cap with that from a glacier.

## AIM

To compare and contrast the element composition of glacial and ice cap snows and melt waters.

## OBJECTIVES

- To collect ice and melt water samples from Greenland's ice cap.
- To take similar samples from Alpine glaciers in the Swiss and French Alps.
- To test all samples for a suit of elements using a Inductively coupled plasma mass spectrometer (ICP-MS)

## SAMPLING

Samples were taken from in situ melt water pools on the Greenland icecap every 5-7km travelled inland from the edge of the ice cap. In the Alps, snows had to be melted for samples to be obtained. To minimise possible contamination samples were taken approximately 15cm below the glacier surface. Disposable gloves were worn and the samples were never handled. The acid-cleansed sample bottle was thrust into the snow



Dom samples the water for himself

and moved around until full of compressed snow. The lid was then fastened and the snow left to melt. Samples were taken from the Saas glacier in Switzerland and the Glacier Blanc in the Ecrin Nation Park in France.

## CHEMICAL ANALYSIS

Analysis of the samples using the ICP-MS has not been possible yet as the machine is currently undergoing essential maintenance. A separate scientific report will be made available once the samples have been analysed and the results compiled.

## REFERENCES

- BINDLER, R. & RENBERG, I. (2001) Mercury accumulation rates and spatial patterns in lake sediments from West Greenland: a coast to ice transect. *Environmental Science & Technology*. (Accepted for publication)
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- JAKOBSEN, U. 1989. Geochemical stream sediment and overburden surveys of a zinc and barium-mineralized area, Freuchen Land, central North Greenland. *Journal of Geochemical Exploration*. 31, 117-134.
- STEENFELT, A., KALSBECK, F. & JEPSEN, H. (1992) Geochemical mapping and geological reconnaissance in the Nagssugtoqidian mobile belt, West Greenland. *Gronlands Geologiske Undersogelse*. 159: 31-37.

## FINANCIAL REPORT

The expedition was only made possible by the generous donations awarded to us by various governing bodies, for which we are eternally grateful. The table below details the expeditions income and expenditure, listed in order of size. Funds to reduce the deficit between income and expenditure are currently being sought.

I N C O M E		
Imperial College Exploration Board		£3,216.13
<i>Expedition Grant</i>	£2,000.00	
<i>Insurance Grant for BMC Insurance</i>	£822.50	
<i>Equipment Grant for EPIRB</i>	£393.63	
Personal Contributions		£2,000.00
University of London Convocation Trust - Dunsheath Expedition Award		£1,875.00
Gilchrist Educational Trust		£500.00
Royal College of Science Association		£500.00
Edinburgh Trust No. 1		£300.00
Gino Watkins Memorial Fund		£300.00
Old Centralians Trust		£250.00
<b>Total Income</b>		<b>£8,941.13</b>

E X P E N D I T U R E		
Equipment		£4,355.18
<i>Ski Equipment (boots, poles, ski's, skins and bindings etc)</i>	£2,296.78	
<i>Down Clothing and Sleeping bags (3 people)</i>	£1,203.36	
<i>Pulk (including harnesses and attachments)</i>	£635.09	
<i>Kite</i>	£219.95	
Flights		£2,745.85
<i>Flights Copenhagen - Kangerlussuaq</i>	£2,227.20	
<i>Flights London - Copenhagen</i>	£266.43	
<i>Excess Baggage Payments</i>	£252.22	
Insurance		£822.50
Shipping		£701.07
<i>120kg (2m cubed) from Immington to Kangerlussuaq</i>	£637.50	
<i>Transport to Immington</i>	£63.57	
Expedition Wallet		£506.78
<i>Jeep from Kangerlussuaq to Pt 660, one way</i>	£158.35	
<i>Airport Expenses (left luggage, flight change, breakfast etc)</i>	£111.91	
<i>Misc (inc. phone calls, stamps, postcards, foreign exchange etc)</i>	£103.41	
<i>Food (Perishables)</i>	£99.56	
<i>Activities</i>	£33.55	
Communications		£446.51
<i>EPIRB - emergency rescue beacon</i>	£393.63	
<i>Radio Permit</i>	£52.88	
Imported Food		£254.13
First Aid		£224.72
<i>RGS Expedition First Aid Course</i>	£164.50	
<i>First Aid Supplies</i>	£60.22	
Report		£116.35
<i>Printing</i>	£62.83	
<i>Films and Photo Development</i>	£28.93	
<i>Miscellaneous Stationary</i>	£24.59	
<b>Total Expenditure</b>		<b>£10,173.09</b>

## EQUIPMENT REPORT

### *Personal Clothing*

The most versatile piece of clothing every member took was a 'Buff', which is basically a tubular piece of stretchy fabric. It doesn't sound much, but this very light and small piece of fabric was used as a hat, balaclava, neck gaiter, ear warmer, sweat band, and worked vary well at covering up your face from the sun.

Only one person opted for the more traditional 'layering system' on their top half on a day-to-day basis, whilst the other three wore a Buffalo/Montane single layer smock. The smock was used in conjunction with a normal base layer. When the sun did make an appearance the single layer smocks were a bit too warm, and so just a thermal was worn. Waterproofs were only worn when the rain was relentless as they promoted sweating. The smock system worked best, as a normal waterproof couldn't transfer body moisture through it fast enough whilst working hard in the rain. One person also used a buffalo hood. This saved having to take a fleece hat and also meant that a balaclava was never needed. It also had the advantage that it was always there, connected to the smock so no time was wasted in stopping to put it on/off. On the bottom half every member wore Ron hill's and was supplemented by waterproof salopettes as and when it was deemed cold or wet enough.

We all had down jackets, which proved essential in the evenings. Three of us had Rab whilst the other had a Marmot jacket. Both are very good manufactures of down clothing and there were no problems to report. Two members used fleece trousers in the evenings and one took Buffalo salopettes. Although not one hundred percent essential it was nice to change into these in the evening instead of having to get straight into your sleeping bag though wearing tight Ron hill's. It was also comforting to know that extra warmth was there should we have needed it.

One could talk forever about which glove combination is best; I think it boils down to ones own preference. Having taken a few pairs too many, I was able to experiment. I personally found it best to have one very thin pair of liner gloves which would dry very quickly and

therefore I didn't care about getting them wet whilst putting up a tent. When a thick pair of fleece gloves got wet they took a good few days to dry and when a waterproof mitt was used you have the usual problem of never being able to undo straps/knots despite whatever the manufacturers say. Once I started moving the thin gloves would dry out within 30mins and then I could put on a warmer pair if needed or a waterproof shell if it was wet.



*Lofting the down and airing the bag*

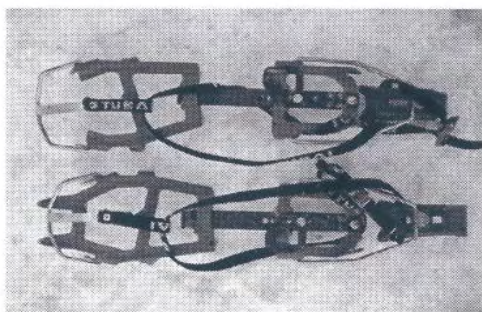
Everyone decided to use a liner sock underneath a thicker mountain sock, we all used Bridgedale liners but only half the group had any major problems with blisters so this is thought to be due ultimately to boot choice.

### *Personal Equipment*

We all had different boots from three different manufacturers. The best seemed to be the La Sportiva, Nepal Top Extremes, which gave the wearer no blisters and were comfortable to walk in all day, as with all the leather boots we took though one did get cold feet when not moving. La Sportiva, Trango Extremes, were not ideal for walking in all day, primarily as they are designed for ice climbing rather than general mountaineering. Solomon Super Mountain 9's, which should have been fine, gave the user huge blisters day after day, it was decided that the fitting was probably not perfect. Asolo plastics were also used, by far the warmest boot, but the inner broke whilst out there, in the boots defence this was the result of many years sustained

abusive use. Gaiters were used in conjunction with our boots most days, the best of which were the new Extremities model, and the poorest were the over priced Mountain Hardwear 'conduit' gaiters. Crampons were used when crossing the severely crevassed and steep sided pressure ridge regions. Catastrophic failure of technical crampons were experienced when the front points snapped of a pair of Stubai crampons and the anti-balling plate attachments broke the back points of a pair of Black Diamond crampons. The no frills Grivel G10 New Classic's suffered no such problem.

No one was overly impressed with the Black Diamond Expedition ski poles we took as they were easily bent, and vibrated on impact. Every pair sustained some deformation or breakage. The fitted basket kept getting stuck in the melt water holes on the ice, stopping you in your tracks. This was irritating and resulted in some of the deformation incurred.



*Dan's crampons minus the front points*

Everyone had down sleeping bags, three of us opted for the 'Summit 800' produced by Rab, whilst one person had the 'Big Bang' made by Mountain Hardwear. Both had similar temperature ratings as well as water-resistant shells. Slightly warmer bags would have been nice but not essential, especially when conscious of weight. The shells were tested past their waterproof limits on most nights due to the huge amount of condensation in the tent, consequently their insulation suffered. Synthetic bags could be a good alternative if a bag of comparable volume and weight were found. Two of the group had Karrimat Extreme mats, which were anything but extreme, the users got cold and wet. One Thermarest was taken which worked admirably, but the usual worry of the valve breaking or sustaining a rip, which can't be repaired, is always there. The best option seemed to be a Ridgerest with a Z-rest on top.

## **Group Equipment**

The Mountain Hardwear Trango 2 Ultra tents stood up to the weather absolutely fine, but we did have some problems with them. The fly and inner material ripped extremely easily, but too its defence rips didn't enlarge despite being subject to ferocious winds. The metal ends of the poles are not attached to the elastic inside and so when one fell out there was little way of keeping it in place. Strong winds gradually deformed the shaped poles around the joins, forcing them apart, which only weakened them further until the inevitable happened, and one snapped. The large front porch space was extremely useful, both for storage, cooking in, and storing water.

Three ice screws, two warthogs, two ice axes (one adze, one hammer), a snow stake and a shovel, were taken per tent to be used as tent anchors. The warthogs weren't much good and we would recommend screws in preference to them. Both the Black Diamond and BCA shovel coped extremely well with the hard ice, but the bigger blade on the Black Diamond shovel was useful. The axes worked well to tie down guy lines as one could achieve a solid anchor with them. The screws and warthogs however melted out of the ice and the strain of the guy line and had to be replaced every twelve hours. Buried crampons were also used as effective anchors as and when necessary.

Primus Himalaya Multi Fuel stoves were used, one per tent and they coped with the temperature excellently. The white fuel we used was a little dirty and hence blockages had to be cleaned out a few times a week. One 1.5ltr Trangia pan with lid was shared between two expedition members for cooking and eating from. This worked fine.

We transported all group equipment, fuel, and food in a Snowsled Polar pulk. The model we used was a Greenland 1.6 with metal tracers and harness for the pulk. The tracers and harness weren't used much as most of the time we were pulling the pulk whilst walking. We found the best way to pull the pulk was by attaching an 8ft sling to each corner and then everyone walks with one. The sled sustained a reasonable amount of damage considering it had a rather hard time with the pressure ridges. This included some holes in the front corners and the front lip had definitely been weakened from hitting too many obstacles.

## Equipment List

Below is a list of equipment we took to Greenland along with some comments about their usefulness based on our experiences.

### PERSONAL

**Approach Shoes** – not required on ice cap but useful for walking around the tundra

**Avalanche Transceivers** – not used or needed

**Balaclava** – not used but would be a fool to go without one

**Batteries** (torch / gps/ camera) – took loads but used few because torch was rarely required

**Belay device** – useful for crevasse rescue

**Bivibag** – not used but good survival piece of equipment and made good groundsheet in tent

**Books** – one needed for those rainy days

**Buff** – very useful. Two worked well together – one for the head and one for the neck

**Camera** – digital cameras recommended to get best shots, don't have to worry about films

**Cigarette Lighters** – essential

**Compass** – essential, used only once, take one where magnetic deviation can be set

**Crampons** – we used them a lot, but could cope without them on a crossing if using the ice road

**Documents & Passport** - essential

**Down jacket** – essential, used every evening when we'd stopped moving

**Ear plugs** – useful for light sleepers or if sharing a tent with a heavy snorer

**Eating utensil** (spoon) – can eat anything with a spoon, light & small medicine spoons are ideal

**Emergency rations** – useful to keep some high-energy foods on you for emergencies

**Film** – prefer foil packed films as they're protected. Don't forget to take cases for exposed film

**First Aid Kit** – to contain a bare minimum of dressings, plasters, triangular and crepe bandage

**Flask** (thermos) – really useful for hot drinks throughout the day, made the night before

**Fleece** – windproof layer recommended, worn often when walking

**Fleece pants** – worn fairly frequently in the evenings to keep warm

**Gaiters** – essential when crossing those melt water streams

**Gloves (fleece)** - windproof ones recommended

**Gloves (thermal inner)** – very useful, often worn on their own

**Gloves / Mitts (w/proof)** – not used much but essential

**Goggles** (glacier) – worn once, but essential in blizzard conditions

**Harness** – not worn while moving but useful for crevasse rescue

**Hat / Mountain Cap** – we made do with buffs, but this is a suitable alternative

**Head torch** (+bulbs) – not needed as much as we thought due to few hours of darkness

**Helmet** – not used at all

**Ice axe** (and spares) – useful for crevasse rescue, cutting steps and anchoring tents

**Ice hammer** – hammer useful for hitting the odd snow stake in to anchor the tents

**Jacket** (waterproof) - essential, worn several times when it rained

**Karabiners screw gate** – useful for crevasse rescue and general purpose

**Lip salve** – essential, one tube per person was plenty

**Money** – not much to spend money on, £500 for the four of us was just about enough

**Mountaineering Boots** (stiff) – glad we took them, not required for the crossing though

**Pen and Paper** – for diary notes and any other bits and bobs

**Penknife / Leatherman** – having both in the group proved most useful

**Prussik loops** - required for crevasse rescue

**Roll mat** – two recommended, one thin basic one and one shaped e.g. Ridgerest / Z-rest

**Rucksack** (60-80L) – required because only took one pulk

**Rucksack liner** – essential to keep rain out

**Salopettes** – useful to wear so one can sit on the ice while resting

**Shirt** (long sleeved) – not used on ice cap, just in and around town

**Shorts** – worn once or twice off the ice cap where daytime temperatures reached 20°C

**Ski's, boots, poles and skins** – essential once across the pressure ridges and useful on ice road

**Sleeping bag** – good warm bag at least rated to -20°C is essential

**Sleeping bag liner** – recommended especially for down bags which are difficult to clean

**Slings 8ft** – useful for pulling the pulk with and for crevasse rescue

**Socks (thick)** – two pairs are essential, one for wearing outside and one to keep dry for inside

**Socks (thin wicking)** – found useful to use liners under thick socks

**Stuff sack** – required for both down jacket and down bag

**Sun hat** – not used as a buff proved adequate

**Sun tan cream / lotion** – we covered up as much as possible to minimise sun cream usage

**Sunglasses** – essential on the ice to prevent snow blindness

**Survival Bag** – not really needed in addition to a bivi bag

**Thermal pants / Ron hills** – essential base layer

**Thermal top** – essential base layer, long sleeve recommended

**Trekking trousers** – not worn on the ice cap but useful travelling clothes



*Adam and Dave dressed for the occasion*

**T-shirts** – not required on the ice cap but one was worn around Kangerlussuaq

**Underclothes** – a couple of pairs sufficed most people's needs

**Wash kit** – just toothpaste and a small toothbrush was all we used on the ice cap

**Watch** – essential, recommend one with an in built altimeter per group

**Water bottle** – a 10ltr water pouch was useful for collecting melt water from streams, we wouldn't recommend bottles

with tubes or small necks as these freeze over easily becoming easily blocked

**Waterproofing** – not required while we were in Greenland, best to reproof before you go

**Whistle** – not used but recommended survival equipment

## GROUP

**Altimeter** – watch recommended as more accurate than a GPS

**Bamboo canes** and ribbon – not required as plenty by the side of the road

**Binoculars** – not required

**Black bags** – useful to keep things dry and put rubbish in

**Cooking utensils** – just need something to stir the food, wooden is preferable as lighter than metal, but a spoon will suffice.

**Cord** 5m by 3mm – for spare guy lines and shoe laces

**EPIRB** – required by the Danish Polar Centre, took one between the four of us

**First aid kit** and antibiotics - essential

**Frisbee** – useful while in Kangerlussuaq

**Gaffer Tape** roll (20m) – can be wrapped around ski poles for easy access and storage

**GPS** – essential for easy navigation

**Ice screws** – very useful for anchoring tents on the ice

**Kite**, lines and handles – not used, would recommend for the experienced only as conditions are rarely suitable

**Tarpaulin** (large) – useful as a groundsheet and to store bags under

**Maps** – can be bought at the airport

**Mascot** – personal preference

**Pack of cards** – wouldn't go on an expedition without them

**Petrol containers** – took fifteen litres and used less than half, as we didn't have to melt snow

**Pulk** (inc. metal traces and harnesses) – essential once across the pressure ridges

**Ropes 8.5mm by 50m** – not used while moving but essential for rescues, you could perhaps get away with two shorter lengths

**Saw** (snow) – not used, as we never reached suitable snow

**Sewing kit** – essential for repairs

**Snow shovels** – essential for levelling sites where tents were pitched

**Snow stakes** – useful to anchor tents, but snow pegs would be lighter

**Stove** - Primus Himalaya Multifuel – taking two meant we could all cook together and if one broke we would still be able to cook on the remaining one.

**Tents** – took two identical tents so in strong winds we could double pole one tent if necessary. Seam grip was essential for repairing tears to the fly sustained in the strong winds when erecting and dismantling them.

**Thermometer** – not essential but provided interesting information

**Tibloc** – useful for crevasse rescue instead of prussacs

**Torch** (spare) – not really necessary in summer

**Trangia pot & lid** – one per pair worked well, used to eat of

## MEDICAL REPORT

During the expedition there were no serious medical requirements. A few minor incidents did however require minor treatment. The details of these now follows.

Unfortunately Dom had stomach problems on arriving in Greenland, possibly caused by some seafood served in a buffet in Copenhagen. Paracetamol was taken and his stomach settled down after a few days.

We anticipated serious foot problems and everyone expected to get minor trench foot, but as a result of wearing almost exclusively mountaineering boots and not the plastic ski boots, this problem didn't occur. Dan had athlete's foot throughout the expedition, however this was an existing problem exacerbated by the conditions. It was treated with talcum powder. Everyone had blisters at some point and these varied in severity from Dan's, which were very minor, to Dom's and Adam's who both suffered badly. Everyone taped their heels, with varying degrees of success (nothing seemed to stick to Adam's heels). Adam and Dom used melolin and gauze dressing in an effort to minimise abrasion. Both Adam and Dom took ibuprofen when the pain became unbearable, Dom using it for three days and Adam for two.



*Dave tends to his painful foot*

Dom, Dave and Adam all cut their hands slipping over on sharp ice. These minor cuts were dealt with by either taping over the affected area or leaving the cuts exposed. It was noticed that the cuts seemed to take longer to heal than usual. This was attributed to the environment.

Dan sliced his thumb open whilst opening a tin of corned beef. This was a reasonably deep cut and was treated with a plaster and tape. It caused limited use of the thumb for a few days but healed fully during the trip.

Another problem we had predicted was sunburn. With regular application of high factor sun cream this was all but avoided, however everyone except Dan had very minor sunburn at some point. Within the first week, Dave and Adam suffered blistering on their ears after forgetting to apply sun cream to this part of the face. E45 cream was used to sooth the affected area and all blistering cleared up within ten days.

Dave had a problem with one of his big toes toward the end of the trip. This was due to an ingrown toenail, an old problem that he had thought might flare up again. This caused considerable pain and made walking uncomfortable and unfortunately there was very little we could do to relieve the pain, other than taking a few ibuprofen tablets.



*Dom drying his feet*

Dan had acute pain in the arch of his foot for two days in the middle of the trip for no apparent reason. This was strapped up but made little difference at the time. The pain was intermittent and didn't hinder Dan too much.

Adam twisted his ankle on the last day on the ice, which caused some pain when walking. This was treated with ibuprofen, rest and elevation when possible however with painkillers there was no problem in continuing.

Throughout the rest of the trip, Dom had a bit of back pain thought to have resulted from carrying his heavy rucksack. He took paracetamol for this.

Below is a list of the first aid items we took on the expedition along with comments regarding their use and quantity.

#### ANTI-BIOTICS

**Amoxicillin 20x250mg capsules** – 2 courses taken, very versatile  
**Ciprofloxacin 10x250mg tablets** – 1 course taken  
**Flucloxacillin 28x250 mg capsules** – 1 course taken

#### CREAMS AND OINTMENTS

**Burneze spray 1x60ml** – taken for stove burns, not used.  
**Caneston Cream 1x15mg** – anti-fungal cream, not used, didn't spend much time in plastic boots.  
**E45 cream 1x50g** – used on sun blisters, better moisturisers may be available but this cream was effective at relieving the irritation  
**Savlon cream 1x60g** – effective on ice grazes and more serious blisters

#### DRESSINGS AND INSTRUMENTS

**Plasters, adhesive x50 assorted** – quantity was fine, variety was useful.  
**Micropore 10mmx5m x2** – virtually useless, far too thin to stick for any length of time  
**Micropore 25mmx5m x3** – much better than 10 mm, only take this in future  
**Scissors (medical) x1** – worked fine  
**Steri-strips large x3** – not used  
**Steri-strips medium x10** – not used  
**Thermometer, forehead x1** – not used, medically proven to be as accurate as a rectal thermometer  
**Antiseptic cleansing wipes x30** – supplement to personal supplies, used about half  
**Non-Adhesive melolin dressings x5** – useful, but preferred adhesive dressings  
**Adhesive melolin dressings x5** – extremely good for blisters when used with tape, more required, suggest x15

#### PAINKILLERS

**Aspirin 24x300mg caplets** – not used  
**Co-Proxamol 20 tablets** – very strong painkillers, not used  
**Ibuprofen 32x500mg tablets** – used for back pain and blisters, quantity fine  
**Paracetamol 56x500mg tablets** – used for headaches, maybe took too many

#### OTHER MEDICATION

**Dioralyte sachets x20** – very expensive and probably not worth the money. Make up rehydration drink with salt and sugar according to WHO quantities instead  
**Duclolax 20x5mg** – not used but worth taking

#### PERSONAL FIRST AID KIT (x4)

**Antiseptic cleansing wipes x6** – with group extras, quantity was sufficient  
**Blister Plasters, assorted x5** – usual performance, difficult to warm before application hence only lasted a day on the foot.  
**Crepe bandage 50mmx4.5m x1** - not used  
**Crepe bandage 75mmx4.5m x1** - not used  
**Dressing, sterile, No 8 x1** – not used  
**Dressing, sterile, No 9 x1** – not used  
**Gloves, sterile x1** – not used  
**Plasters, adhesive, waterproof, assorted x25** – Variety and number sufficient  
**Safety Pins x6** – not used



**Survival blanket x1** – not used, some people took survival bags which were useful for keeping things dry outside the tent.

**Triangular bandage** – not used

**Zinc Oxide tape 25or15mmx5m x1** – the thicker the better, 25mm minimum recommended. Didn't take but would recommend thicker still e.g. 50mm.

## FOOD REPORT

The food was organised into day and week bags to ensure our supplies lasted throughout the 28-day expedition. These are detailed below. Any leftover food went into a separate bag that allowed us to supplement the day bags as and when we felt necessary.

**DAY BAGS** – Each day bag contained three bars per person to eat throughout the day along with the necessary ingredients for the main meal. A day bag could contain any one of four different menus to add some variety to our diet. The contents of these different day bags are listed below. Seven of each were taken.

**One** - Pasta with Cheese Sauce followed by Butterscotch or Chocolate Angel Delight

*4x36g Cereal bars  
4x56g Chocolate caramel bars  
4x56g Chocolate caramel biscuit bars  
1x64g 1 pint Powdered soup  
1x500g Pasta  
2x55g 1/2 pint Cheese sauce mix  
1x60g 1 pint Angel delight*

**Two** - Spaghetti Bolognese flavoured Mash with Corned Beef followed by Strawberry or Chocolate Blancmange

*6x36g Cereal bars  
4x56g Chocolate caramel bars  
2x56g Chocolate caramel biscuit bars  
1x64g 1 pint Powdered soup  
1x50g 3/4pint Spaghetti Bolognese Sauce Mix  
2x125g Instant mash  
1x340g Corned beef  
1x35g 1 pint Blancmange*

**Three** - Chicken Chasseur flavoured Couscous with Tuna followed by Chocolate or Vanilla flavoured Custard

*6x36g Cereal bars  
2x100g Nutty Chocolate  
4x56g Chocolate caramel biscuit bars  
1x64g 1 pint Powdered soup  
1x50g 3/4pint Chicken Chasseur Sauce Mix  
1x330g Couscous  
2x87g Tuna  
1x1 pint Custard*

**Four** - Sausage Casserole or Chilli flavoured Rice with Pepperami followed by Raspberry or Blackcurrant flavoured Instant Jelly

*4x36g Cereal bars  
2x56g Chocolate caramel bars  
2x56g Chocolate caramel biscuit bars  
2x100g Plain Chocolate  
1x64g 1 pint Powdered soup  
1x50g 3/4pint Sausage casserole or chilli con carne sauce mix  
1x500g Rice  
4x25g Pepperami  
1x25g Double sachet of instant jelly*



*Sorting our the food*

**WEEK BAGS** – A lot of food in the week bag supplemented the day bags providing us with food in the morning and at midday. The week bags also contained staple basic ingredients like sugar, flour and milk powder along with other items that were added to the evening meals to give extra flavour. The contents of the four-week bags were identical, and are listed below.

*1x350g Flour  
1x500g Milk powder (made 9 pints)  
1x250g Chocolate powder  
1x900g Oat Cereal  
3x200g Sweets  
1x250g Sugar  
3x200g Biscuits  
28x1 Tea bag  
1x56g Tin of sardines  
4x250g Mixed dried fruit  
1x200g Tube of tomato puree  
4x200g Peanuts  
8x135g Whole jelly  
1x150g Cheese Biscuits*

The following items were put in a separate bag and made available on a daily basis for the entire expedition.

*1x450g Baby wipes  
1x133g 100 Vitamin tablets  
2x1 Scourer  
1x54g Soap  
1x24g Oxo cubes  
1x100g Salt*

In addition each person was allocated the following, to last the entire expedition.

*2x80 sheets Toilet paper*  
*2x1 Lighter*  
*1x1 Small box of matches*

Below is a list of the food items we took to Greenland along with some comments about how they fared based on our experiences.

**Baby Wipes** – not essential, one team member survived without them

**Biscuits** – can never take enough of these

**Blancmange** – take lots of sugar for this and extra milk powder

**Cereal Bars** – one per person per day was not enough, take more

**Cheese Biscuits** – extremely good supplement with the evening's soup

**Cheese Sauce** – a nice change to the sauce mixes, thickened with flour

**Chocolate** – a nice change to chocolate caramel bars

**Chocolate Caramel Bars** – both plain and biscuit bars recommended for variety

**Chocolate Powder** – too heavy to drink frequently, but proved to be a nice once-a-week luxury

**Corned Beef** – difficult to extract in extreme cold and fairly heavy

**Couscous** – instant so saves on fuel and time, good staple alternative to rice

**Custard Instant** – often diluted to make it go further and then drunk

**Flour** – very little used until we made chapattis at the end of the expedition

**Instant Whip** – difficult to get to set, but a great drink

**Jelly instant** – set easily in the cold, unfortunately we very low calorie versions!

**Jelly whole** – a great snack that was nibbled on throughout the day

**Lighters** – essential for lighting stoves

**Mash – instant** – saved time and fuel, went a long way, can be used to thicken soups

**Matches** – useful to have as well as lighters

**Milk Powder** – 9 pints a week was just enough, but would take more next time for porridge

**Mixed Fruit** – great for adding to desserts, porridge or eating throughout the day

**Oat Cereal** – only had enough for every other day, would take double next time

**Oxo Cubes** – good for adding to mash to create an extra flavour

**Pasta** – would happily have eaten more but only had 500g per four person meal and our Trangia pots couldn't hold any more

**Peanuts** – proved very popular, and a great alternative energy source to sweet food stuffs

**Pepperami** – eaten with meals and as a snack

**Rice** – took quick cook, 5 minute basmati rice which worked fine

**Salt** – essential to replace salts lost throughout the day

**Sardines** – a little weekly luxury, probably wouldn't take again as a bit messy

**Sauce Mixes** – an excellent way of flavouring the staple foods

**Scourer** – two taken, got a bit scraggy towards the end, recommend one per week

**Soap** – rarely used but good to have

**Soup Powder** – often made up with more water than recommended to aid our rehydration

**Sugar** – not enough taken, the porridge required a lot and we forgot people drink it in their tea

**Sweets** – good to have and suck while walking

**Tea Bags** – one per person per day proved ample, we weren't big tea drinkers

**Toilet Tissue** – most team members only used one box of 80 sheets

**Tomato Puree** – great for mixing with the cheese sauce, and adding to the mash

**Tuna** – worked well with the couscous

**Vitamin Tablets** – not essential, one team member survived without them



*Snack time*

## USEFUL INFORMATION

Below are a few points that people visiting the area or similar future expeditions may find useful in when planning their trip.

### THE CROSSING

- All the people we met who had almost completed the crossing said our ski-mountaineering skis were too heavy
- They all wore lightweight, thin Norwegian skis made by Asses. The skins were narrow and only extended a third of the way along the centre of the skis.
- Leather boots were worn, specially designed for the skis with a metal toe attachment bar at the front.
- Yeti gaiters enabled them to wade through almost any water they came too
- They had not used crampons, axes or ropes at all during the crossing
- Some used lightweight plastic sledges that had proved to be just as good as their fibre glass counterparts that are up to ten times more expensive.
- Most had two sleeping mats, one normal foam mat and one z-rest

- Metal runners were not required, and many had got on alright with rope attachments
- Some parties had obtained air photos, possibly from the Danish Polar Centre, of parts of the ice cap in poor snow years so they could plan a route through heavily crevassed areas.
- Boats to the ice cap on the east side of Greenland can be organised by Roberto Peroni from The Red House in Tasiilaq.



*Ice movements threaten to topple workers cabin*

## **TO / FROM THE ICE CAP**

- A locked barrier prevents unauthorised vehicles from getting within 8km of pt660
- Kangerlussuaq Tourism have a key and will drive you there for £160 one way
- Jeeps are booked with Kangerlussuaq tourism at the airport
- Straight line distance from Pt 660 to Kangerlussuaq is 35km
- A Skanaska workman happily gave us a lift back to Kangerlussuaq.

## **KANGERLUSSUAQ**

- Kangerlussuaq is a town through which people pass
- Few people stay very long in Kangerlussuaq
- The town has very little culture or history
- The international airport is the only thing running the town, and hence all activities centre on this.

## **Shopping**

- The town has a supermarket "Buttiken" just across the road from the airport
- The shop stocks just about anything you could ever want but at a price
- Typical prices include 50p for a tin of baked beans, £2.40 for 15 eggs and £1.70 for a loaf of bread.

- The shop sold white fuel for stoves

## **Camping**

- There is a small open space 300m from the airport terminal which is designated as a camping spot
- We were not charged for camping there
- We were allowed access to the showers in the hotel, attached to the airport terminal building
- Fuel was obtained from the local pump for cooking on. We were only charged a couple of pounds for fifteen litres.

## **ICE ROAD**

- Built and maintained by Skanaska
- Contracted from 1<sup>st</sup> April to 1<sup>st</sup> June and from 1<sup>st</sup> Aug to 1<sup>st</sup> Oct every year to build and maintain ice road
- Approx. 100-150km in length from the edge of the ice cap at point 660
- Metal cabins are positioned approximately every 20km along the road
- These form temporary accommodation for the people working on the road
- The cabins are fully equipped with communication equipment, beds, stove and a heater amongst other things

## **SHIPPING**

- Only a couple of ships from the UK go to Kangerlussuaq each year, so if shipping things out make sure you organise this early enough e.g. 6 months prior to departure.
- Ships to the east coast of Greenland are a lot more frequent and hence expedition food and equipment doesn't have to be shipped out so far in advance.
- Our food and equipment was shipped out from Immingham in the second week of May.



*Building the ice road*

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## USEFUL TEXTS

**Lonely Planet – Iceland, Greenland and the Faroe Islands** – An essential source for planning a trip, full of contacts, information and ideas, useful to take with you too, available from all good bookshops

**Hiking Map West Greenland, Kangerlussuaq**, 1:100,000 interval 25m – the range of maps cover the area from the coast to the ice cap, available from Tourism Kangerlussuaq based at Kangerlussuaq airport

**Nordre Stromfjord, Ost, 67 V2**, 1:250,000, printed by the Geodaetisk Institut. Copenhagen, 1978. A contoured map with limited detail due to its scale, a good starting point though, available from Stanfords map and guidebook shop, London

**Sondre Stromfjord, Ost, 66 V2**, 1:250,000, printed by the Kort-og Matrikelstyresen, 1995. A contoured map with limited detail due to its scale, a good starting point though, available from Stanfords map and guidebook shop, London