IMPERIAL COLLEGE LONDON

EAST GREENLAND 2009

EXPEDITION REPORT

Approved by the Imperial College Exploration Board

Kindly supported by Imperial College London, the British Mountaineering Council, the Alpine Club, the Gino Watkins Memorial Fund, the Arctic Club, and the Andrew Croft Memorial Fund.

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A TALENT FOR ADVENTURE

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SUMMARY

The Imperial College East Greenland Expedition 2009 comprised of four students: Jonathan Phillips, Chris Larvin, Rob Porter and was lead by Dominic Southgate. The initial plan for an Arctic mountaineering expedition was conceived in October 2008 and after 10 months of planning, the team finally departed from the UK at the beginning of August. The first proposal had focused on the Sortebrae region as the intended destination but budget constraints resulted in a switch from charter plane to boat and therefore also a change in objective. The final destination was the North-West of Renland, a peninsula in the middle of Scoresby Sund which was, to the best of our knowledge, previously unexplored.

On August 3rd the team departed from Gatwick airport for Iceland, where we allowed 2 nights in Reykjavik before flying on to Greenland. The second leg of the journey then involved another connection at Kulusuk (Greenland) before finally arriving at the destination airport of Constable Point. Much of the equipment and all of the expedition food was freighted out in advance but unfortunately did not arrive in Constable Point as intended and in fact it transpired that the cargo had not even left Copenhagen. The carrier was at fault so they agreed to fly it out but that still meant waiting one week for it due to the frequency of Constable Point flights. The first few nights therefore had to be spent in one of the hangars at the airport before we relocated to the town of Ittoqqortoormiit by boat.

The team was very lucky to be given some food which enabled us to spend a few days hiking in Liverpool Land after renting two tents. We headed across from Ittoqqortoormiit towards Lillefjord and made an ascent of a nearby peak. On return to Ittoqqortoormiit our freight had finally arrived and the following day we headed out on the 250km boat journey up the fjord to North West Renland. Once we had reached the correct valley we picked a suitable part of the coast to unload all of our equipment and a brief exploration of the area revealed a good site for base camp. A further day was spent exploring the two main glaciers and possible objectives in the area.

Many difficulties had to be overcome in route finding, especially finding paths over the glaciers and crossing melt-water rivers. In total though, three mountains were successfully summitted with between 1600m and 2000m of ascent on a variety of different terrain including scree, rock, snow and ice. Two further routes were completed but stopped short of a full summit due to snow conditions and avalanche risk. A number of glaciers were explored, including the largest from the coast up to the ice-cap.

A final night was spent in another part of Renland with a Dutch group of climbers before both headed back to Constable Point on the same boat. A final highlight of the trip was then seeing a polar bear whilst camping at the airport, albeit at a safe distance through binoculars. In addition to the peaks climbed, many photographs were taken as reconnaissance for future expeditions and some good objectives were noted. The geology of the region was analysed by one member of the group and a study of the region's flora was conducted and specimens collected for identification back in the UK. A fantastic experience was had by all members of the team and the group is extremely grateful to all the individuals and organisations who helped fund the expedition, gave us advice during the planning stages and assisted us whilst on the expedition.

INTRODUCTION

The idea for an expedition to Greenland stemmed from a conversation between Chris and Lorraine Craig, who is the chair of the Imperial College Exploration Board. Lorraine has a great interest in all things Arctic (which is both motivating and extremely useful) and it was not long before the team were investigating possible areas to explore in East Greenland. However, the important step of selecting the area that we wished to visit was not a simple task but more of an iterative process.

The group began by looking at the Stauning Alps but these appeared to have been fairly well documented and the only real option would have been to attempt harder routes in previously-visited areas. As a group we were more interested in Alpine-style ascents on snow and ice, rather than technical rock, which better suited everyone's experience. The next region we looked into was the Sortebrae, East of the Watkins mountains, which had far more snow cover but was also more remote. Quotes were obtained for chartering a Twin Otter ski plane to access the region by landing on the ice-cap but they were prohibitively expensive.

Our attention then turned to Renland, a peninsula at the top end of Scoresby Sund which looked like it could be accessible by helicopter or boat. Whilst there had been a few expeditions in recent years to explore the Edward Bailey Glacier in the South-East of Renland, there appeared to be a glacier network in the North-West which (from the information we could find) did not appear to have been visited before. Aerial photographs and satellite imagery of the region showed that there were a reasonable number of peaks around 2000m and some photographs of the North coast taken from Nordvestfjord suggested that they might make good objectives. Unfortunately a helicopter charter could not quite carry the payload that we required in a single journey and two journeys would have been outside the means of our budget. The only remaining option was then a boat charter from Ittoqqortoormiit up the fjord to land on the coast.

Once settled on Renland as a destination, planning then began in earnest; arranging logistics, obtaining permits and sorting equipment. From the outset, the expedition had been planned as lightweight, mobile and unsupported. The expedition was to be self-sufficient with every effort made to reduce its environmental footprint and all waste (except human waste) was to be carried out of the area.

AIMS & OBJECTIVES

The expedition successfully achieved its primary aim and subsidiary objectives.

AIM

- To make first ascents of unclimbed peaks in the North-West of Renland in East Greenland.

GENERAL OBJECTIVES

- Take one member on their first expedition.
- Take three members on their first Arctic expedition.
- Return home safely having enjoyed the challenges and unique environment of the Arctic.
- Identify other potential objectives in the area for future expeditions.
- Inspire other members of Imperial College, as well as the wider climbing community to explore the Arctic.
- Extend the climbing and expedition experience of all members.

EXPEDITION TEAM

The team all knew each other from being members of the Imperial College Outdoor Club and had regularly climbed together in the UK and beyond. Whilst Rob and Dom had previously been members of the Imperial College Shimshal expedition in 2007, this was the first Imperial College expedition for Jonny and Chris. *(Left to right below; Dom, Jonny, Chris and Rob).*

DOMINIC SOUTHGATE - LEADER

26, PhD Student, Bioengineering Dept.

Dom has been climbing and mountaineering for 8 years and has been involved with the Imperial College Union Outdoor Club for most of this time, including the role of chairman in 2002-2003. He was a member of the 2003 Imperial College expedition to West Greenland performing reconnaissance for a crossing of the ice-cap. He was also a member of the 2007 Imperial College expedition to Pakistan, which made an ascent of Yazghil Sar, near Shimshal. He has been trekking all over the world, including USA, Australia, New Zealand and South Africa, has a number of seasons in the Alps, as well as Scottish Winter, and has recently become an Aspirant member of the Alpine Club.

JONATHAN PHILLIPS

22, PhD Student, Materials Dept.

Jonny has been walking and climbing for many years, with a background in traditional climbing up to E1. In 2003 he was a member of an expedition to the Northern Territory of Australia. From 2008-2009 he was chairman of the Outdoor Club, and in the subsequent year was the chairman of the Imperial College Exploration Society. In recent years trips to the Alps with the Outdoor Club have allowed to him partake in alpine mountaineering. He is currently an aspirant member of the Alpine Club and hopes to attain full membership in the near future.

CHRISTOPHER LARVIN

23, Undergraduate Student, Geology Dept.

Chris has been enjoying the outdoors since an early age and began rock climbing in 2003. Upon joining Imperial College he became involved in the Outdoor Club and was Secretary of the club in 2006. With a fondness for colder climes, he has completed three seasons of Scottish winter climbing and Alpine ice climbing as well as a small amount of alpine mountaineering in the French Alps. As well as mountaineering Chris enjoys road cycling and road running, completing a marathon in 2007.

ROBERT PORTER

22, Undergraduate Student, Mathematics Dept.

Rob has been climbing since 2006, when he joined the Outdoor Club. From there he started rock climbing in the UK and has particularly enjoyed mixed and ice climbing in Scotland and the French Alps. Rob was a member of the 2007 Imperial College Shimshal Expedition to Pakistan making an ascent of Yazghil Sar. After 6 weeks climbing in Chamonix in the summer of 2008 Rob successfully applied to become an aspirant member of the Alpine Club.

EXPEDITION TIMELINE

The planning of the expedition took 10 months, starting in October 2008 and culminating in a very busy month before departure. The team faced many setbacks, mostly due to the cost of transport and the limitations this placed on the destination and compromises had to be made. The change in area resulted in many more hours of planning as more research was needed into previous expeditions, logistics and possible objectives. Fortunately the majority of deadlines were met, enough funding was secured and the necessary permits were obtained in time for our departure out to Reykjavik.

OCTOBER

Chris, Rob and Jonny decide that they would like to do a mountaineering expedition to Greenland and suggest it to Dom who then also joins the team. Research into past expeditions and possible areas begins. The group meets with Lorraine Craig, chair of the IC Exploration Board, who suggests useful contacts for expeditions to Greenland.

NOVEMBER

The group considers a number of areas on the East coast but settles on the Sortebrae region due to the number of unclimbed peaks and type of terrain, however, it requires a Twin Otter ski-plane to land on the ice-cap. Quotation requests are sent out for the plane charter; the initial budget is based on previous expeditions' costs.

DECEMBER

The first proposal is submitted to IC Exploration Board and provisional approval is granted to the expedition. An application is submitted to the Alpine Club Climbing Fund.

JANUARY

Chris, Rob and Jonny spend a week climbing in the Cairngorms as part of the IC Outdoor Club winter tour. Chris and Rob also take part in the IC Exploration Society winter tour, ice climbing in the Ecrins. Dom spends two weeks in Canada practicing skiing and snowshoeing. Gino Watkins Memorial Fund and Arctic Club Award applications submitted.

FEBRUARY

Transport quote is received for the Twin Otter but is prohibitively expensive and flight sharing does not appear to be an option. Other destinations and modes of transport are investigated. Radio permit applied for from TeleGreenland for the EPIRB. Expedition gets full approval at the second IC Exploration Board meeting. BMC expedition grant and Andrew Croft Memorial Fund applications submitted.

MARCH

Firearm permit applied for from the Chief Constable of Greenland for the rifles. Expedition permit applied for from the Danish authorities. Equipment companies contacted for sponsorship and/or discounts.

APRIL

Renland is chosen as a more suitable destination and the cost of helicopter and boat charters to the region are investigated. The team is contacted by Geoffrey Halliday about collecting botanical specimens during the expedition.

MAY

Helicopter charter also proves too expensive and so boat becomes the only option. This is arranged through Martin Munck of Nanu Travel based in Ittoqqortoomiit. It also pushes the expedition departure date back from mid-June to the end of July when the sea ice has cleared from Scoresby Sund.

JUNE

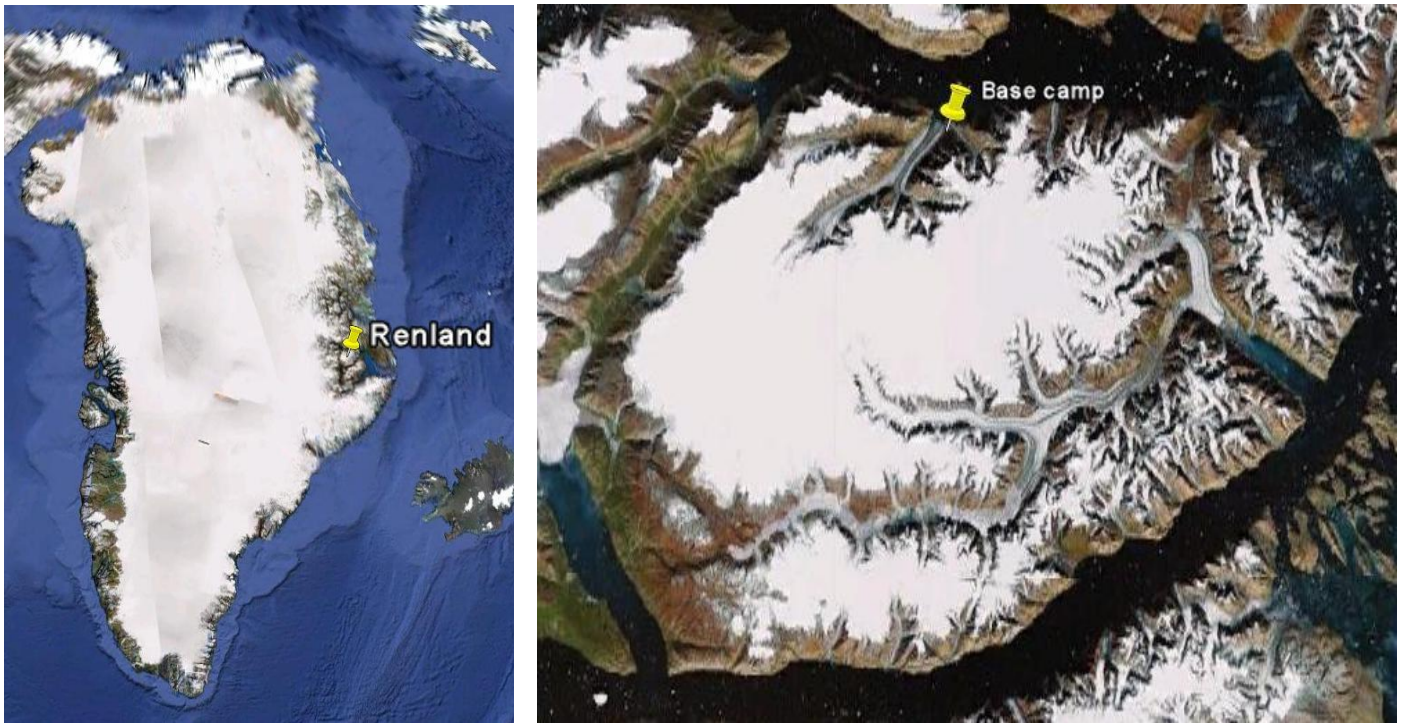
Flights are booked for UK/Iceland and Iceland/Greenland. Equipment is purchased including snowshoes, stoves and down items for those who didn't already own them. Medical advice sought from Dr Mark Daniels at the Imperial College Health Centre, first aid kit assembled and prescription medication obtained.

JULY

Half of the mountaineering equipment and all of the food is packed into barrels and kitbags and picked up by a courier arranged through the freight company. Expedition insurance is arranged and necessary documents forwarded to the Danish authorities. Satellite phones are obtained/new SIM card acquired.

AUGUST

On Mon 3rd August the team meet at Victoria mainline station and head to Gatwick airport to fly to Reykjavik.



Renland location in Greenland (left) and base camp site in Renland (right).

PLANNING & PREPARATION

DESCRIPTION OF AREA

Renland is a peninsula on the East Coast of Greenland, located approximately 71° North and 26° West. It lies at the end of Scoresby Sund, the longest fjord in the world, which splits either side of Renland and becomes Nordvestfjord to the North and Ofjord to the South. The nearest permanent settlement as the crow flies is the airfield at Constable Point. However, by the most feasible form of transport - boat - it is Ittoqqortoormiit; 250km away at the Southern tip of Liverpool Land.

Much of the interior of Renland is covered by ice-cap at a height of around 2000m. From this, there are glacier systems that flow towards the coast creating steep sided valleys that end abruptly at the fjords. During the winter months the sea ice forms along the coast of Greenland and includes Scoresby Sund, which freezes over completely. The sea ice then only begins to leave the fjord during July and is generally only navigable from the last week in July to mid/late September.

When our means of transport was changed from helicopter to boat, we therefore also had to put the dates back to August so that the sea ice would have cleared by the time we needed to access the Renland coast. Even so, there are still many icebergs remaining in the fjord at this time of year and much care is needed when travelling up Nordvestfjord in small boats.

MAPS & AERIAL PHOTOGRAPHS

Mapping of the Renland area at 1:250,000 is available from Stanfords (Covent Garden, London), the sheet of interest is number 22: "Kangertertivarmiit - Kangertivat - Nordvestr Fjord – Stauning Alper". This map is also available to purchase in Ittoqqortoormiit from Nanu Travel, as well as the sheet covering Liverpool Land (number 20) which came in useful when we made our ascent of Trefoden. Aerial photographs at 1:150,000 can be obtained free of charge from the Greenland Aerial Photo Database (http://kmswww3.kms.dk/gronland/gronland_english.htm). Google Earth was also a much-used and convenient resource for researching the area.

The team decided to overlay a contour map on top of an aerial image for the area we were visiting, which can be seen in Appendix A. The group took a number of copies which were laminated in advance and this proved very useful.

The Polar View project from the Technical University of Denmark provides real-time images of the sea ice in the Scoresby Sund area and was very useful in the weeks immediately preceding the expedition (http://www.seaice.dk/test.N/).

PREVIOUS EXPEDITIONS TO RENLAND

The part of Renland that we intended to visit was the North-West and had not previously been explored. However, research was conducted into expeditions that had been to other parts of Renland (mostly the Edward Bailey Glacier to the South-East) for background on the climate, equipment, logistics and many other aspects. The most useful ones were as follows:

WEST LANCASHIRE COUNTY SCOUTS 2007

Expedition website: http://greenland.westlancashirescouts.org.uk/

OXFORD GREENLAND EXPEDITION 2008

Expedition website: http://www.oxfordgreenlandexpedition.co.uk/

QUEEN'S UNIVERSITY BELFAST 2008

Expedition website: http://www.qubgreenland.com/

LOGISTICS & ADMINISTRATION

FLIGHTS

The team flew from London Gatwick to Keflavik, Iceland with Iceland Express. A bus transfer with Flybus took us to Reykjavik so that we could then fly out to Constable Point via Kulusuk with Air Iceland. The return leg from Greenland was direct to Reykjavik. The group did not experience any delays or issues with any of the flights.

A hand-held luggage scale was taken so that maximum use was made of each person's checked baggage allowance and to minimise hand luggage, which was near the Air Iceland limit (the aircraft flying into Constable Point have very little hand luggage storage).

Kulusuk airfield.

FREIGHT

Due to the large amount of equipment and food needed for the expedition we decided to freight most of the mountaineering equipment and food in advance. We initiated this process in late March and the most prompt and helpful reply came from Fastlane International, so we chose to use their services.

The destination for the equipment was Constable Point Airfield, where we would be arriving in Greenland. It was also decided that we would request for it to be there a week before we were to arrive, in case of a delay. As it happened the freight was to be sent on the Royal Arctic Lines ship from Denmark, and there were only two ships scheduled over the summer. Although we were not told directly, we assumed the cargo would be put on the first of these two ships, which was to arrive in Greenland a few days before us. The freight was packed into 6 small barrels and 3 large duffle bags and was picked up by a TNT courier on the 7th July.

On the 30th July, prior to our departure, we phoned the Airport Manager at Constable Point to confirm that he had received the cargo but were told it had not arrived. We contacted Fastlane to ask where our equipment was and were told it had been arranged through TNT, who had, in turn, contracted it to a 3rd party. Fastlane then said they would "escalate" the situation with TNT to try to find out more. After being sent a couple of obscure emails from them in response to our queries, it became clear

that they had no idea where our equipment was or who was in the process of finding it. On 3rd August we had no option but to leave for Iceland and attempt to locate it in the following days. After 4th August Fastlane did not send us any further information and all communication was done through TNT directly.

It transpired that our equipment had been taken by road to Denmark and despite being at the dock on the 17th July in time for loading; it was not put onto the first Royal Arctic Lines ship by the 3rd party. A number of phone calls were made to TNT and eventually they agreed to forward it by air freight to Constable Point (at no extra cost), which arrived a week into our trip. Had we not managed to get through to somebody helpful at TNT our gear would not have arrived until early September when the second Royal Arctic Lines ship was due to reach Constable Point. We contacted Fastlane on our return but did not receive any explanation or apology as to why they failed to ensure that our freight was put on the correct ship.

The freight on the return leg was organised directly through Royal Arctic Lines with the help of the Airport Manager at Constable Point. This was far less hassle, less expensive and we received our equipment approximately one month after returning from Greenland without any problems. For future expeditions we would recommend organising freight through TNT or Royal Arctic Lines directly. Another option would possibly be to talk to Air Iceland, as we met some canoeists in Greenland who had been able to negotiate extra luggage allowance for their flights in advance.

PERMISSIONS & PERMITS

An expedition permit was required by the group because the intended location was within the boundary of the North-East Greenland National Park (albeit by only a few kilometres). The permit had to be obtained from the Danish Agency for Science, Technology and Innovation (DASTI, formerly known as the Danish Polar Centre), for which the deadline was three months prior to departure. As part of the requirements for the permit, the team was required to carry a rifle (for protection against large mammals) and an EPIRB emergency radio beacon (in case evacuation was required). Both of these items required their own permits - from the Chief Constable of Greenland for the rifles, and from TeleGreenland for the EPIRB. As part of the hand-over of administration from Denmark to Greenland it is likely that in the future the process will be handled directly by the Greenlandic authorities.

INSURANCE

PERSONAL INSURANCE

All members of the expedition were covered by Imperial College's insurance policy and a specific expedition level policy was obtained from the BMC. A specific requirement of the DASTI was for insurance cover and statement thereof to the amount of 1,000,000DKK to cover search and rescue costs. This was to be provided to their offices no less than 3 months prior to the start of the expedition. Our statement was unfortunately delayed but did eventually reach them with enough time to obtain the expedition permit before departure.

FREIGHT INSURANCE

The freight was insured during transport from the UK to Greenland through a policy arranged with the agent handling the freight in the UK, FastLane International. This cost was ~£20 and only covered us for loss or damage; it therefore did not cover us for the delays encountered at the beginning of the trip. The expedition insurance did not cover any of the additional expenses incurred due to the late arrival of the freight either.

COMMUNICATIONS

During our time in Constable Point we used the mobile phones we had brought from the UK to contact the freight agents and to discover where our freight was located. Good signal was obtained on the Vodaphone and O_2 networks but not, however, on Orange. In Renland, communication with the outside world and between pairs was limited to satellite phone only. Each team had a satellite phone, one provided by Imperial College Exploration Board, the other hired from Adam Phones. The Imperial College phone was used for updating a Twitter site (via Twittermail), which allowed us to keep in contact with families and friends back home.

In the event it was not possible to communicate between teams except in person as the hired phone could not receive messages or calls from the Imperial College phone, despite being on the same network. It was hoped that two way radios were going to be

used during the expedition but in the end these could not be afforded in the budget. Another Dutch team we met said they had used two way radios successfully up to a range of 12km. They also said they had had problems with their satellite phone, so in hindsight radios would have been useful given the failure of the satellite phones. The Imperial College phone was charged with an excellent Motorola solar panel designed for that model of satellite phone (9505). Unfortunately it was not possible to charge the other satellite phone (9505A) as it was incompatible with the solar panel and was only supplied with a mains charger.

As previously mentioned, an EPIRB loaned by the Imperial College Exploration Board was stored in base camp for the duration of the expedition. This was only to be activated in the event of a serious emergency when all other methods of communication had failed.

PHOTOGRAPHY

Three members of the expedition took cameras. Jonny used a Fujifilm Finepix S1500, which during the course of the expedition was used to record some 2000 images and 20 videos of the region. This model ran off 4 AA batteries and the 12x optical zoom was extremely useful for capturing shots of distant wildlife, as well as documenting possible routes for perusal later at base camp. Chris bought a Casio Exilim EX-Z29 in the airport on the outward journey and found it disappointing; it had issues starting up below -5°C and a poor lens. Additionally, it was incompatible with the solar panel and as a result the lithium ion battery ran out at the end of the third week. Dom had a Samsung S850 which generally performed well though did require regular changing of AA batteries. Overall, the models which could be powered by AA batteries proved more useful as in the end the solar charger did not work as well as had been hoped.

Nordvestfjord (looking West from camp on our final route).

EXPEDITION JOURNAL

DAY 1 — MONDAY, 3RD AUGUST

The team caught the train from Victoria Station to Gatwick Airport and then flew to Keflavik, Iceland followed by bus transfer to Reykjavik. Checked in at Hotel Floki, where we were to meet Poul Lauridsen, the locum doctor for the next 6 weeks in Ittoqqortoormiit.

DAY 2 — TUESDAY, 4TH AUGUST

Day was spent in Reykjavik exploring the city. Phone calls were made to the airport manager at Constable Point and subsequently Air Iceland cargo department in Kulusuk, by whom we were informed that it was likely that our freight was there, to be shipped on our plane the following day.

DAY 3 — WEDNESDAY, 5TH AUGUST

Departed Reykjavik International airport to Constable Point Airfield via Kulusuk. On arrival at Kulusuk the employee in charge of cargo could not locate our freight. Fastlane International could not be contacted as their offices had closed for the day. The phone number for TNT was obtained from the UK, from whom we determined that our freight had travelled via Belgium and Copenhagen, to a third party agent. The team continued on to Constable Point to find that it was not there either. Night was spent in aircraft hanger by kind permission of the airport manager, Thy.

DAY 4 — THURSDAY, 6TH AUGUST

Day spent at Constable Point. Learnt that our freight was in Copenhagen still having not been put on the correct boat and was being handled by Blue Water shipping company. Phone calls were also made to the expedition insurance company, who informed us we were not covered for any expenses incurred. Night spent in aircraft hanger again.

DAY 5 — FRIDAY, 7TH AUGUST

Further conversations with TNT revealed that the freight would arrive on the 17th at the earliest, though Thy might be able to speed things up from Iceland. Phone calls were made to Martin to arrange boat pick up on the 9th, to go walking in Liverpool Land until freight arrived. Given a week's worth of spare food by two Norwegian girls, Pernille and Ann from Oslo University.

Constable Point storage hangar (left) and loading the boats for transfer to Ittoqqortoormiit (right).

DAY 6 — SATURDAY, 8TH AUGUST

Collected the rifles, ammunition and flares, headed up into Jameson Land and walked towards a peak known as 'The Fort'. Practiced firing the rifles in case of polar bear attack. Returned via the river valley, contouring over loose and steep slopes.

DAY 7 — SUNDAY, 9TH AUGUST

Packed up gear and waited for boats which came at 16:30. Loaded kit bags and local post mostly into the closed-backed boat (M/S Nanu) which Jonny and Chris travelled in. Dom and Rob travelled in open-top boat and got considerably wet. Journey took almost 2 hours to Ittoqqortoormiit because of temporary engine failure on the Nanu. Met Martin briefly and then looked for Poul Lauridsen who gave us a tour of the hospital and let us stay at his house for the night.

DAY 8 — MONDAY, 10TH AUGUST

Borrowed two tents from Nanu Travel and set off out of Ittoqqortoormiit into Liverpool Land in the evening after dinner. Headed out towards Lillefjord along the winter dog-sledding track but visibility was poor due to low cloud. Route avoided snow patches due to lack of crampons and scrambling was required instead. Camped on a flat area just off a snow field half way to Lillefjord.

DAY 9 — TUESDAY, 11TH AUGUST

Left the tents in-situ and headed off to attempt a local peak, Trefoden (1110m), the second highest in Liverpool Land. Virtually all of the ascent was on scree but route finding was fairly easy and the summit afforded good views of the fjord and the mountains to the North.

Ittoqqortoormiit (left) and Trefoden (right).

DAY 10 — WEDNESDAY, 12TH AUGUST

Walked back into Ittoqqortoormiit over some snow fields and glaciers now that we knew our way and visibility was much better. News from Thy was that our freight would arrive at 17:00 on the first helicopter and we would be leaving for Renland by boat at 10:00 the next day.

DAY 11 — THURSDAY, 13TH AUGUST

Purchased fuel for stoves and headed to boats for packing and refueling which took until 12:00. Headed out in the M/S Nanu to Syd Kap, then put on windsuits for open boats out to Renland. Averaged 50kph for 250km and arrived in the early evening where we unloaded onto a rocky shore near the target area. Dom and Rob recced a base camp location but spent night at coast.

DAY 12 — FRIDAY, 14TH AUGUST

Spent the day moving all the barrels and kitbags from the coast to BC (four journeys each), which was hard work over the Eastern glacier and lateral moraine banks. Base camp was established on gently-sloping vegetated ground in an enclosed basin with a river along one side.


Landing site on Renland coast (left) and Eastern glacier exploration (right).

DAY 13 — SATURDAY, 15TH AUGUST

Group split into two teams to investigate the two nearest glaciers for possible routes and objectives. Dom and Jonny went up the Western (main) glacier to the fork, whilst Rob and Chris investigated the Eastern glacier. The latter didn't look promising but there were possible objectives off the Western glacier.

DAY 14 — SUNDAY, 16TH AUGUST

Dom and Jonny headed out to cross the main glacier to attempt Peak 1 (Pistol Ridge), however ultimately returned to base camp after many hours trying to find a way off the glacier on the far side, which ended abruptly above a melt water river. Rob and Chris ventured up the nearest ridge to base camp (to the South) and completed a route on mixed ground in a 16 hour push, returning at around 07:00.


Chris on his and Rob's first route (left) and Dom at the foot of the glacier side wall after the abseil (right).

DAY 15 — MONDAY, 17TH AUGUST

Dom and Jonny headed out again to investigate the lower part of the glacier for a suitable crossing point and eventually settled on abseiling off the side of the glacier on Abalakov threads. After wading through the river they gained the start of the route and climbed to the halfway point bivvy (900m). Photographs were taken looking to the end of the fjord which was now visible and a large avalanche recorded on the opposite side of the valley as part of the ice-cap layer broke off the top of the mountain.

DAY 16 — TUESDAY, 18TH AUGUST

Dom and Jonny climbed the second half of their route up to the summit of the peak (1636m) and attempted to traverse the ridge. However, a large cleft in the ridge which had been hidden in the contours of the map prevented this and so descent was made down a steep gully to the bottom of the side valley for another bivvy. Rob and Chris explored the coast and found a better pick-up point.

DAY 17 — WEDNESDAY, 19TH AUGUST

Dom and Jonny returned to base camp via a river crossing and suitable part of the glacier which had been visible from the top of their route. Chris and Rob headed off to explore the length of the main glacier up to the ice cap and bivvy on the snow.

DAY 18 — THURSDAY, 20TH AUGUST

Chris and Rob gained a high point on the ice cap (2110m) before starting their way back and stopping to bivvy again.

DAY 19 — FRIDAY, 21ST AUGUST

Chris and Rob abandoned their bivvy on the ice-cap in preference of returning straight to base camp, arriving early morning. Dom and Jonny put off heading back to the Western valley (of their last bivvy site) due to dropping pressure and ominous cloud build up which made the weather look like it might get a lot worse.

DAY 20 — SATURDAY, 22ND AUGUST

Weather improved again so Dom and Jonny relocated their tent from base camp to the head of the Western valley to attempt a peak to the South. First sighting of live musk ox in the region.

Jonny and Dom at the summit of Peak 2 (left) and Rob on the ice-cap during his and Chris's second excursion (right).

DAY 21 — SUNDAY, 23RD AUGUST

Dom and Jonny headed out from the new camp and completed a route up a series of glaciers to the intended summit (1950m), taking in a subsidiary peak en-route. Discovered two types of tracks between the peaks that looked like they may have been polar bear and possibly Arctic hare.

DAY 22 — MONDAY, 24TH AUGUST

Dom and Jonny returned from the Western valley to base camp. Rob and Chris left for the same valley that day to attempt a peak to the North but the teams did not see each other and must have passed on the glacier.

DAY 23 — TUESDAY, 25TH AUGUST

Chris and Rob ascended from their advance camp at the head of the valley to their objective (1810m) which was the highest point at the Western end of the ridge to the North (the Eastern end of the ridge was the summit that Dom and Jonny had first climbed).

DAY 24 — WEDNESDAY, 26TH AUGUST

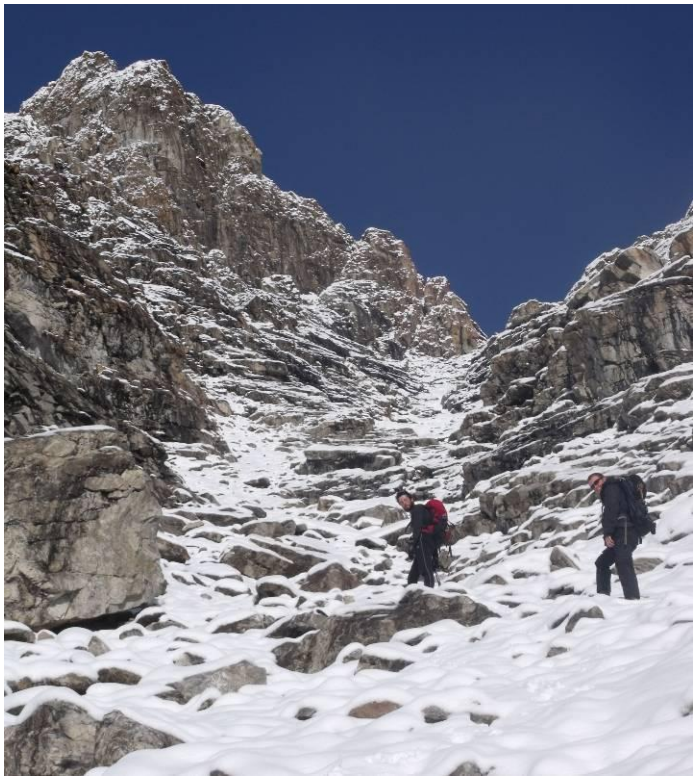
Weather deteriorated and Rob and Chris returned to base camp in heavy rain.

DAY 25 — THURSDAY, 27TH AUGUST

The poor weather continued with low cloud and rain at base camp but snow higher up resulting in the snow-line dropping several hundred metres. Dom and Jonny headed up the course of the river that ran past base camp to begin the botanical study.

DAY 26 — FRIDAY, 28TH AUGUST

The cloud lifted so Dom, Jonny and Rob left base camp and headed up to attempt the ridge on the far side of the Eastern glacier. An advance camp was established in the moraine valley at the foot of the slopes leading up to the ridge.



Rob traversing above a deep gully (left) and with Dom high on our final route (right).

DAY 27 — SATURDAY, 29TH AUGUST

The low cloud returned in the night but cleared late morning so we headed up the South-West facing slopes, crossing a number of steep gullies. However, the group ultimately had to turn back at 1555m due to unconsolidated snow lying on steep slabs. A geological study was conducted by Chris around base camp.

DAY 28 — SUNDAY, 30TH AUGUST

Dom, Jonny and Rob descended from advance camp and completed the botanical study during the descent at a particularly good site on the South-facing slope. Boats were spotted by the group in the fjord at 14:30; a day earlier than had been arranged. Descent was completed rapidly and base camp hastily packed up. The boats were boarded and the group headed to another part of Renland known as Skillebugt, to rendezvous with a group of Dutch climbers and to shorten the following day's journey.

Breaking camp at Skillebugt (left) and fresh bear tracks at Constable Point (right).

DAY 29 — MONDAY, 31ST AUGUST

Both groups packed up and boarded the boats for the return journey to Constable Point on mostly calm seas. Tents were pitched at the airport behind the guesthouse and the evening spent chatting to the members of the Dutch expedition.

DAY 30 — TUESDAY, 1ST SEPTEMBER

Woke early to see a polar bear in the vicinity of the airport, began sorting equipment for freighting back to the UK and otherwise relaxed.

DAY 31 — WEDNESDAY, 2ND SEPTEMBER

Finished packing the gear for freighting and attached it to a pallet for loading onto the Royal Arctic Lines ship which was due to arrive in a couple of days. Flew to Reykjavik and stayed at Hotel Floki once again.

DAY 32 — THURSDAY, 3RD SEPTEMBER

Spent the day seeing some of the cultural sights in Reykjavik, such as the contemporary art museums, a sculpture garden and the cathedral.

DAY 33 — FRIDAY, 4TH SEPTEMBER

Early start (03:15) in time to get the first Flybus from Reykjavik to Keflavik. Journey back to the UK made on time and without any problems.

CLIMBING REPORT

An overview of the peaks and routes climbed can be found in Appendix B. Unfortunately there were no quality photographs showing the whole of Route 2 or Peak 2 and 3, and so these have only been shown on the overview.

Prior to the expedition the main glacier was identified as a potential target from maps and aerial photos of the area and a photo from a boat. The glacier did not appear to be too steep and it looked as though it would allow us access to the ice cap via rock and ice routes. The photos we had seen of the area suggested a similar style of climbing to what we were all comfortable with in Scottish winter or alpine summer. The equipment would be the same as we had used previously on trips to these areas, thus further cutting on costs by not needing much new kit.

General Terrain

Most of the glaciers were dry and the snow was all compact and consolidated when we arrived. This made glacier travel fairly straightforward and we never needed to rope up. At glacier junctions the ice became very crevassed but, although the progress was slow at times, we never had too much trouble reaching our desired destinations along the glaciers. For one route it was necessary to abseil off the side of the glacier to get off it.


Jonny crossing a broken section of the main glacier (left) and Peak 1 (right; near) & Peak 2 (right; far).

The aerial photos were of little use for choosing routes. We spent a couple of days exploring up two of the glaciers and another valley. Mostly we would walk along the bottom and look for routes that might “go”. As it was difficult to see the whole of the route this added to the exploratory nature and often made us err on the side of caution.

The rock was generally fairly loose and most of the time we did not trust it very much. Several of our routes involved large amounts of scree. Rock protection was taken but not used for the routes we climbed.

After the snow dump towards the end of our expedition (end of August) there was a lot of soft snow covering the routes. This did not have a chance to consolidate before we left as the temperatures were not low enough once the sun was shining again. This made climbing very difficult and we had to abort the final route we attempted on soft snow over loose rocks and slabs.

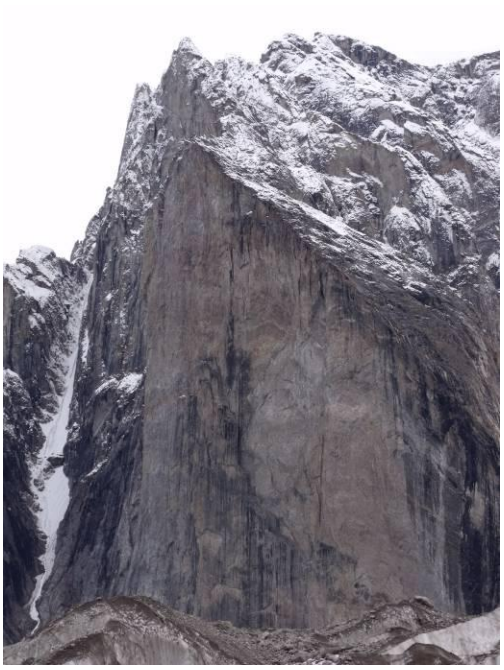
A significant problem we found was the lack of easy descent routes. In effect, anything we climbed up would have to be down-climbed or abseiled. Most of the routes we looked out were not topping out on the ice cap. For those that were there was no easy way down off the ice cap other than a long walk up to the end of the main glacier. This added to the “serious” feel of the area.

Future Potential

There is some potential for parties wishing to attempt harder alpine or bigwall routes. In August, when we were in the area, there was not a huge amount in the way of snow couloirs. The shallower angled rock was also very loose for the most part and

we did not manage to find any satisfying lines. Earlier in the year the snow conditions might be better, but entry much earlier in the year would be impossible by boat.

For many of the steeper glaciers avalanches were common, particularly after the snowfall where we would see several large seracs break off each day. We made a point of staying well away from these.



Good snow conditions might open up a number of worthwhile alpine routes (left). Other potential includes bigwall (right).

WEATHER

During our time at Constable Point at the start of the expedition we experienced several days of persistent rain, however, this did eventually clear to enable us to briefly explore Jameson Land, and ultimately Liverpool Land. Upon arriving in Renland the weather was stable and good. Typically the temperatures remained above freezing, even at the higher camps, except overnight on a few occasions. During the last week in Renland we experienced several days of rain, which resulted in fresh snow on the higher slopes of the mountains down to ~1300m.

NAVIGATION

Primary navigation was conducted by orientating oneself to the environment, and was typically quite easy given the nature of the terrain. To pinpoint the location of summits and camps etc, GPS units were carried. Dom and Jonny used an iFinder Go2 device, whilst Chris and Rob employed a Garmin Geko. These devices ran on AA batteries and could typically provide a location within 25 seconds, though altitude readings generally took longer and were less accurate.

SUGGESTED FEATURE NAMES

Peak 1: Muzzle Peak (East end of Pistol Ridge)

Peak 2: Dojo

Peak 3: Breech Point (West end of Pistol Ridge)

Route 1: Roch Point (local summit) North Ridge

Route 2: Tower Ridge South West Face (attempted)

Main Glacier: Imperial Glacier

EQUIPMENT & CAMPCRAFT

For the base camp a Terra Nova Super Quasar and a Mountain Hardwear Annapurna were used. The Quasar was a very comfortable size for two people and the two porches made it easy to store necessary equipment and cook in bad weather. We found all four of us could sit together in only mild discomfort in this tent on the rainy days. The Annapurna was a smaller tent with only one entrance. We found the door a little too low and tapered at the top meaning it was never quite comfortable getting in or out. In both tents we hung up "washing lines" of elastic cord to hang clothes on thus creating extra space. The back porch of the Annapurna was very small and not very useful as it was difficult to get gear in and out of it. We also used a cheap tent for storing equipment while we were at base camp, which meant we could have more space in our tents.

All members of the team wore leather B3 rated boots. Three members went for La Sportiva (Nepal Extreme and Trango) and the other went for Salomons. These were always warm enough for the conditions, even on the ice cap, and although all members experienced some blistering and bruising to varying degrees we encountered no real problems. This was partly because we encountered no deep snow, so the boots were never immersed in snow and therefore remained fairly dry. We had taken snowshoes (MSR Lightning Ascent and MSR Denali) but these were never used due to the compact snow conditions.

Clothing systems used generally relied heavily on the use of Montane smocks. Three members used the Extreme smock and one used an older lighter version. We had anticipated using similar systems to Scottish winter, but the weather was generally warmer and less unpleasant in Greenland. Often while walking in to the climbs only very lightweight clothing, like wicking shirts, was needed. For the high climbing the Montane Extreme smock was warm enough on its own. The waterproofs were not used for the mountaineering as the Montane smocks were weatherproof enough even on the bad days. Waterproof bottoms were not used and we did not have problems using normal hiking or mountaineering trousers, three members choosing Craghopper Kiwis. One member used Ronhill running tights and carried over-trousers incase it got cold. Smartwool mountaineering socks were comfortable and warm. All members took down jackets but these were only used as a "benefit layer" for extra comfort around base camp. It was never cold enough to need to climb in down.

Each member of the group had a different sleeping bag system; two members opted for a single down bag – a PHD Hispar 600 and a Rab Quantum 600 endurance bags were used. One member opted for a lightweight down bag (ME Helium 650) for bivis and a synthetic for basecamp (REI Zephyr) which could be combined, though it was never necessary. The final member opted for a heavier down bag for basecamp (Mountainlife Everest) and a lighter one for excursions (Alpkit Pipedream 600). Each of these systems coped with the temperatures we encountered with no problems, even camping higher up and were really just a matter of personal preference.

Three members used Grivel G12/G14 crampons and pairs of Petzl Quark axes; one member used Charlet Moser M10 crampons and a pair of HB Tornado axes. The technical axes were only necessary for one pitch of climbing but often one was used as a mountaineering axe. We had all used this equipment before and it was chosen as this was what we were used to. It all performed well for us. Choices of gloves varied but normal ice/ski gloves were good enough. Dachsteins were very warm and comfortable. We all took spare pairs so we could change when our gloves or mitts got wet. Some members brought multiple pairs of cheap liner gloves as we have found before that our thin gloves have tended to tear fairly easily.

For entertainment we took one radio to try to pick up BBC world service and other news channels. We managed to get this to pick up several shows, including BBC world service at certain times. We also managed to tune in to a couple of Canadian broadcasts and got some news from these. The main radio station we could pick up was China Radio International, which was in English but focused mainly on China and rarely gave any European news.

FOOD AND COOKING

Primus Omnifuel stoves were used for cooking. We chose these due to the fact that we knew we would not be able to obtain gas canisters in Greenland and we wanted stoves that could burn anything. We think the fuel we were using was poor quality unleaded but we were never quite convinced. One of these stoves worked very efficiently, with only the minor problem of soot all over the pans. The other had some problems due to the fact that we were using the wrong nozzle size. This seemed to make strange things happen when we were camping high and the temperatures got cold. We managed to melt through a fuel filter in

the tube and the windshield. This was probably not the fault of the stove though. Apart from this we did not need to perform much maintenance and the stoves continued working efficiently.

We carried a water filter but this was never used as we collected running water from a stream at base camp and generally we found running water on the glacier and near all our camps. The only camp without running water was the high camp near the icecap where we melted snow. Water collection at base camp was facilitated by having a 10L water container. This was purchased in ASDA and although it was cheap it was very effective. It was easy enough to fill the water up once or occasionally twice a day.

The group dining on some of the freeze-dried meals donated by the Norwegians (left) and the aerial system for the radio (right).

As mentioned above, our food failed to arrive in Greenland in time for the start of the expedition and so we were very kindly gifted some food by members of an alternate expedition. This meant that ultimately when we arrived at our destination we had, approximately, a one week excess of food. The meal plans made in the UK prior to departure were loosely kept to; however given the excess of food it was possible to select meals from a broader selection. In advance of departure we bought most of our expedition food from ASDA in one 'big shop', and ordered the remainder from specialist retailers in the UK. We had chosen to have a set of lighter meals for when out climbing, centred on freeze-dried dinner packs, and heavier foods whilst in base camp.

Please see Appendix D for details of what food was taken.

MEDICAL REPORT

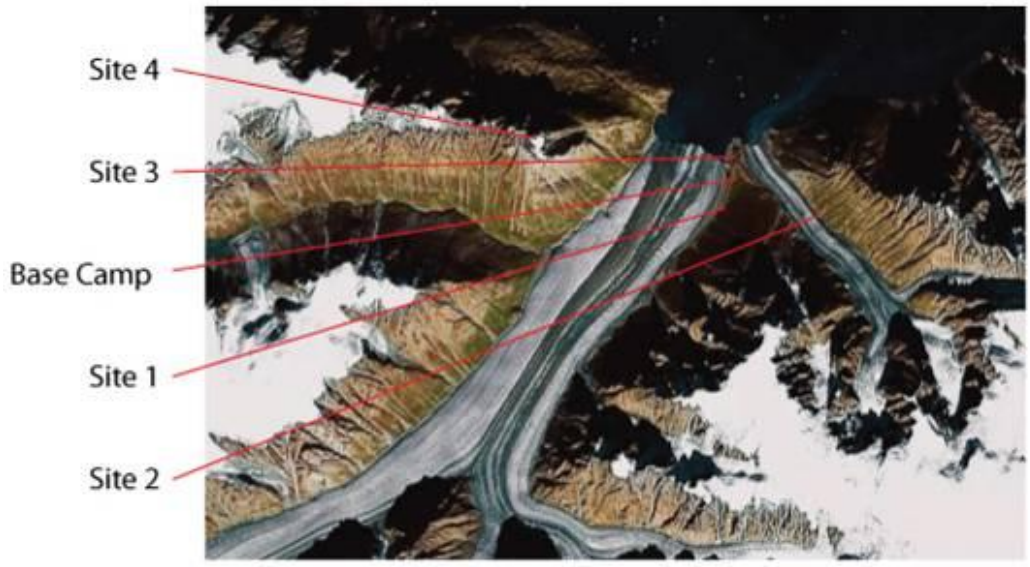
Medical advice for the expedition was kindly given by Dr Mark Daniels of the Imperial College Health Centre, who also provided prescriptions for the medication required in case of emergency in such a remote region. In addition, Dr Christopher Imray agreed to be our medical contact in the UK that we could speak to via satellite phone for expert medical advice in such a situation. A base camp first aid kit was assembled containing items that would allow a casualty with reasonably serious trauma to be looked after for a few days whilst evacuation was arranged, including antibiotics and strong painkillers (full contents given in Appendix E). In addition, each member of the group had their own personal first aid kit containing items for treating small wounds and minor ailments.

In the event, the base camp first aid kit was not used and no major injuries or illnesses were experienced by the team. Minor wounds were sustained, including cuts and abrasions, blisters and the occasional twisted ankle or knee whilst moving over scree, but no more than would normally be expected when venturing outdoors.

SCIENTIFIC REPORTS

BOTANICAL STUDY

During periods of bad weather and on certain routes we recorded the flora we observed in each location. The location of each site is presented on the map below. Two specific sites (1 and 2) were examined thoroughly for flowering plants, the others were recorded in passing. The species observed at each location and the general characteristics of each site are detailed below. In total 22 species of flowering plant were observed in the region, photographs were taken of each and several species are presented in Figures 1-3. The identification of specimens was conducted by Geoffrey Halliday, from photos provided by the expedition upon our return.



SITE 1 – LATERAL MORAINE VALLEY

Local environment: Moraine valley next to the main glacier with stream running through the middle.

Date visited: 27/08/09 Location co-ordinates: 71°27'00.5" N, 26°41'45.9" W

Elevation: 67m Aspect: NW facing

Flora observed: *Chamerion latifolium, Cerastium arcticum, Salix arctica, Campanula gieseckiana, Polygonum viviparum, Dryas*[*], *Lycopodium selago, Vaccinium uliginosum, Tofieldia pusilla, Cassiope tetragona, Silene acaulis, Pyrola grandiflora, Oxyria digyna, Saxifraga oppositifolia*

SITE 2 – SOUTH-WEST FACING SLOPE

Local environment: Steep vegetated slope above lateral moraine next to the glacier

Date visited: 28/08/09 Location co-ordinates: 71°27'11.3" N, 26°37'57.5" W

Elevation: 300m Aspect: SW facing

Flora observed: *Chamerion latifolium, Campanula gieseckiana, Cerastium arcticum, Pyrola, Salix, Cerastium, Potentilla crantzii, Arnica angustifola, Draba aurea, Oxyria, Erigeron humilis, Trisetum spicatum, Sedum rosea.*



(left to right) *Dryas*[*], *Polygonum viviparum* and, *Silene acaulis*.




(left to right) *Pyrola grandiflora*, *Arnica angustifola*, *Draba aurea and Papaver radicatum*.

SITE 3 – COASTAL

Local environment: Mostly moraine and loose scree close to the edge of the fjord.

Date visited: 27/08/09 Location co-ordinates: 71°27'43.96" N, 26°40'56.29" W

Elevation: 0m Aspect: N facing

Flora observed: *Dryas*[*], *Salix arctica*

SITE 4 – RIDGE TOP

Local environment: Rock and loose scree with snow patches

Date visited: 18/08/09 Location co-ordinates: 71°27'42.37" N, 26°48'13.77" W

Elevation: 1630m Aspect: Level ground

Flora observed: *Papaver radicatum*

In the general area around base camp several plants were observed, these included: *Empetrum hermaphroditum, Vaccinium, Cassiope, Dryas*[*], *Silene acaulis.*

The two records of note are *DRABA AUREA*, which is rather uncommon in Scoresby Sund and restricted to the interior, and *PAPAVER RADICATUM*, which, at 1650m, is only 50m short of the highest record in the whole central fjord area.

[*]Most of the *Dryas* in the central fjord area is intermediate between *octopetala* and *integrifolia*.

GEOLOGY

A study of the geology of the basin was conducted throughout the expedition, with a day spent studying hand specimens. The basin is dominated by gneisseswhich are believed to have pelitic to psammitic protoliths. Approaching the ice cap to the south, there was a distinct change, with extensive thicknesses of migmatised granites and decimetre basic intrusions. They are believed to be Mesoproterozoic (1.6 to 1.0 Ma) and belong to the crystalline complexes of the north-south trending Calendonian Fold Belt which dominates the east coast of Greenland, within a thin skinned tectonic regime. This fold belt was produced during the Calendonian Orogeny with the collision of Laurentia and Baltica around 420 Ma. The geology of the area has a complicated tectonic history, with evidence of folding, thrusting, extension, metamorphic and magmatic activity. The tectono-thermal sequence of southern Renland is described within Leslie and Nutman (2000).

The necessary permit to return with geological samples was not obtained in time and as such further petrological and mineralogical analysis could not be conducted.

See: Leslie, A. G. & Nutman, A. P., 2000. Episodic tectono-thermal activity in the southern part of the East Greenland Caledonides. *Geology of Greenland Survey Bulletin* 186, pp. 42–49.

WILDLIFE

In the three regions we visited - Jameson Land, Liverpool Land and Renland - we encountered much of the fauna present in Greenland. At Constable Point airport and in the village of Ittoqqortoormiit we met many huskies and during our 12 hours on the boats we observed a seal swimming in the Fjord. Many small birds were seen around base camp and on the moraines, which included the Greenland Arctic Redpoll, Greenland Wheatear, and Raven. There were frequently skeins of geese flying overhead or feeding near base camp, though exact identification of the species was not possible. In each region visited we also observed Musk Ox, and Arctic Hare. Finally at the airport prior to our departure we saw a polar bear, albeit from a safe distance.


Greenland Arctic Redpoll (left) and Greenland Wheatear (right).



(left to right) Arctic Hare, Huskies and Musk Ox.

ENVIRONMENTAL REPORT

All of the expedition food was purchased in the UK and shipped out to Greenland in advance, which was supposed to have been by sea freight but unfortunately had to be flown in the end. When preparing the food for shipping, all excess packaging was removed and recycled where possible to minimise not only weight but also the amount of rubbish that would need to be disposed of when leaving the mountains.

The team tried to minimise its carbon footprint from transport but unfortunately the only practical way to reach Greenland within the time constraints was to fly via Iceland. However, flights to the destination area in Renland were substituted for boat charter which we hope reduced our carbon emissions, especially as we shared the return journey with another group. It is also hoped that the expedition had a positive impact on the local community by chartering the boat transport directly through a company in Ittoqqortoormiit, rather than with a business located outside of Greenland.

All rubbish was burned where possible (including toilet paper) and that which was not (e.g. tins and all ash) was returned on the boat to Constable Point for disposal. The two large white barrels used for freight were used again on the return journey for shipping equipment back to the UK. The four small blue barrels were taken to Constable Point and donated to the airport manager for use as he saw fit. No rubbish or unwanted items were left at base camp on departure. The quantity of petrol taken by the expedition was sufficient to last 3 weeks if we had been melting snow for water. In the end, there was always running water available and so about 8 litres of fuel was left over. Some of this was used for disposing of the rubbish at the end of the trip and the remainder was also returned to Constable Point for use by a future party.

A small number of plant specimens were taken and pressed as part of the botanical study but care was taken not to decimate populations or destroy surrounding vegetation. A number of musk oxen were also encountered but were kept at a reasonable distance so as not to disturb them.

FINANCE

This section provides a summary of the finances for the expedition.

INCOME

The expedition was supported by grants from the following bodies:

Imperial College Exploration Board:	£4000
Andrew Croft Memorial Fund:	£1000
Alpine Club Climbing Fund:	£800
Gino Watkins Memorial Fund:	£1500
Arctic Club Award:	£500
British Mountaineering Council:	£400
Total:	£8200

EXPENDITURE

The following is a summary of the expedition expenditure:

Nanu Travel Services (boat charter):	£3808
Flights:	£2504
Equipment:	£1303
Freight:	£565
Iceland Accomodation/Subsistence:	£656
Food:	£632
Satellite Phone:	£350
First Aid Provisions:	£125
Miscellaneous:	£592 (inc. fuel, permits, international phone calls and other transport)
Total:	£10535

PERSONAL CONTRIBUTIONS

Personal contributions were calculated on an individual basis, depending on equipment purchased, but were not less than £500 each and totalled the difference between income and expenditure as follows:

Total expenditure – Total income =	£2335

CONTACTS

- The Outdoor Shop, Stony Stratford: http://www.theoutdoorshop.com
- Be-Well Expedition Foods: http://www.be-well.co.uk/
- Iceland Express: http://www.icelandexpress.com/
- Air Iceland: http://www.airiceland.is/
- Airport Manager, Constable Point: (Thy) Tel.: +299 99 38 50
- Nanu Travel: (Martin Munck) Tel.: +299 99 12 80, Fax: +299 99 10 70, Email: nanu@greennet.gl

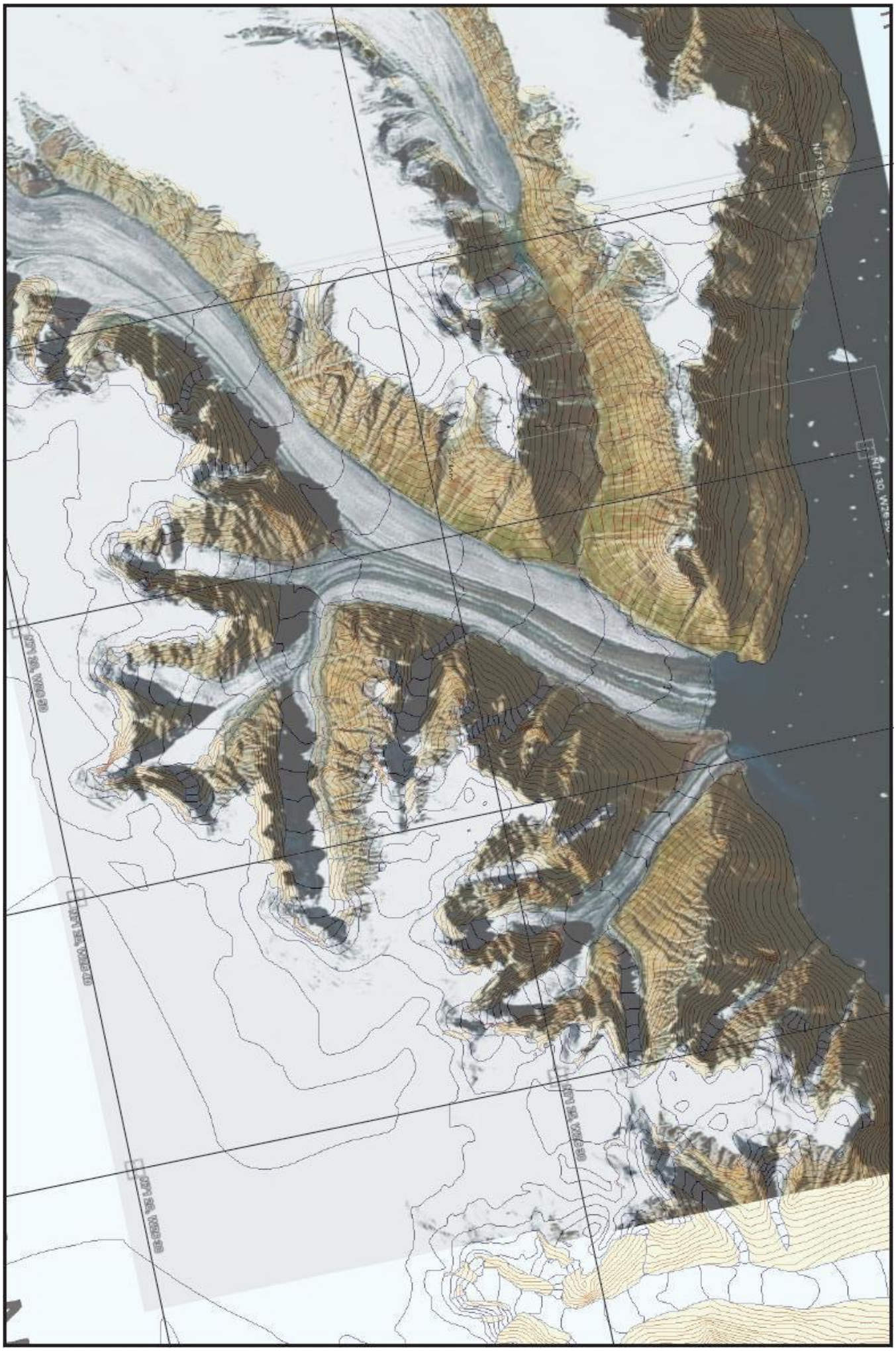
  http://www.nanutravel.dk/
- Danish Polar Centre (now integrated into the Danish Agency for Science Technology and Innovation):

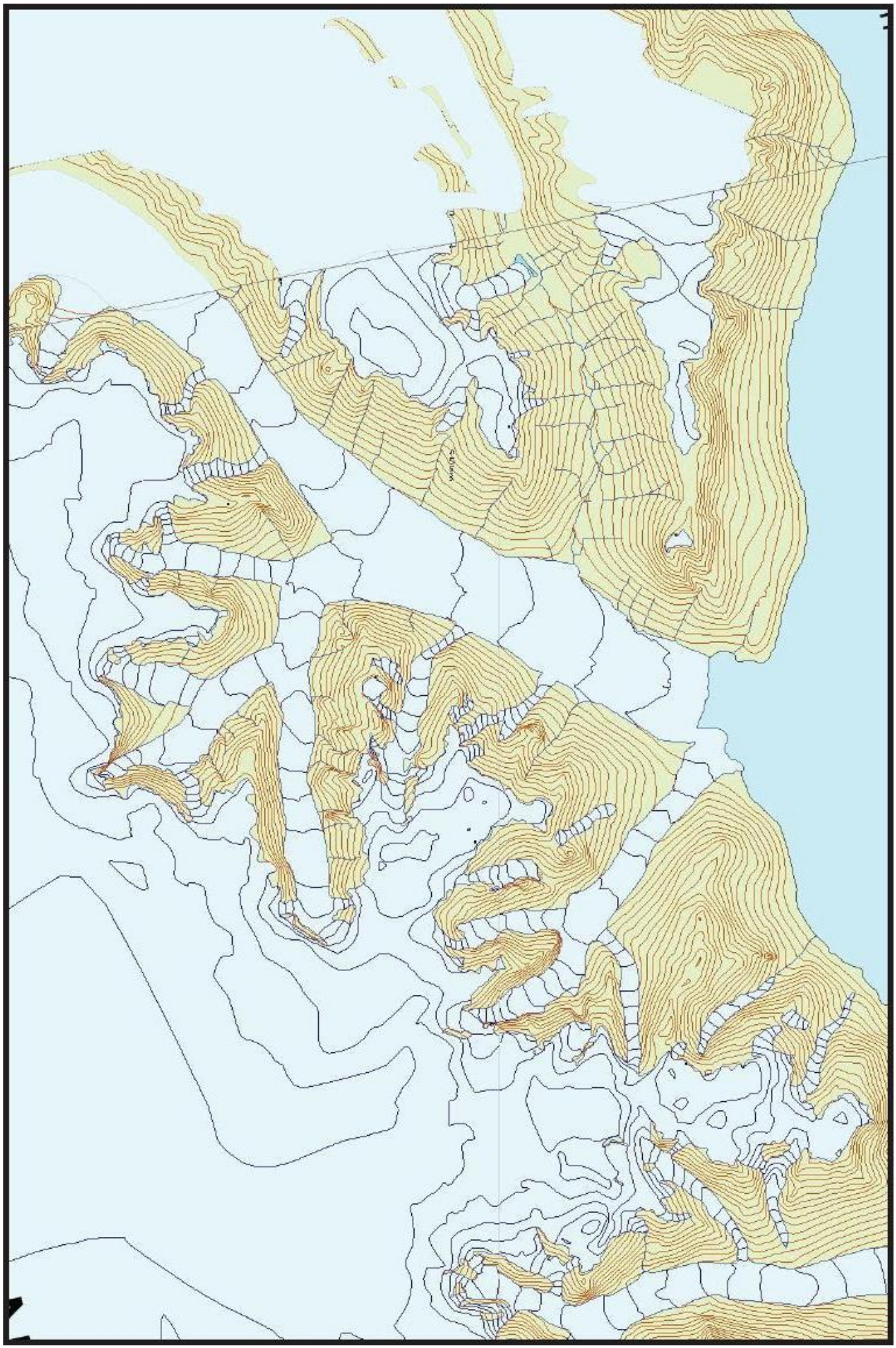
  http://www.dpc.dk/sw494.asp

ACKNOWLEDGEMENTS

- The support of Imperial College Exploration Board, especially the assistance of Dr Lorraine Craig is gratefully acknowledged. www.imperial.ac.uk/expeditions
- Andrew Croft Memorial Fund
- Alpine Club Climbing Fund
- Gino Watkins Memorial Fund
- Arctic Club Award
- British Mountaineering Council
- Dr Mark Daniels, Imperial College Health Centre
- Dr Chris Imray
- Derek Fordham, Alpine and Arctic Clubs
- Geoffrey Halliday (botany)
- Ann Christin Ferrari Holme and Pernille Hamerness, Oslo University, Norway
- Poul Lauridsen, (locum doctor at the time of our stay in Ittoqqortoormiit)

APPENDIX A – MAPS AND AERIAL PHOTOGRAPHS

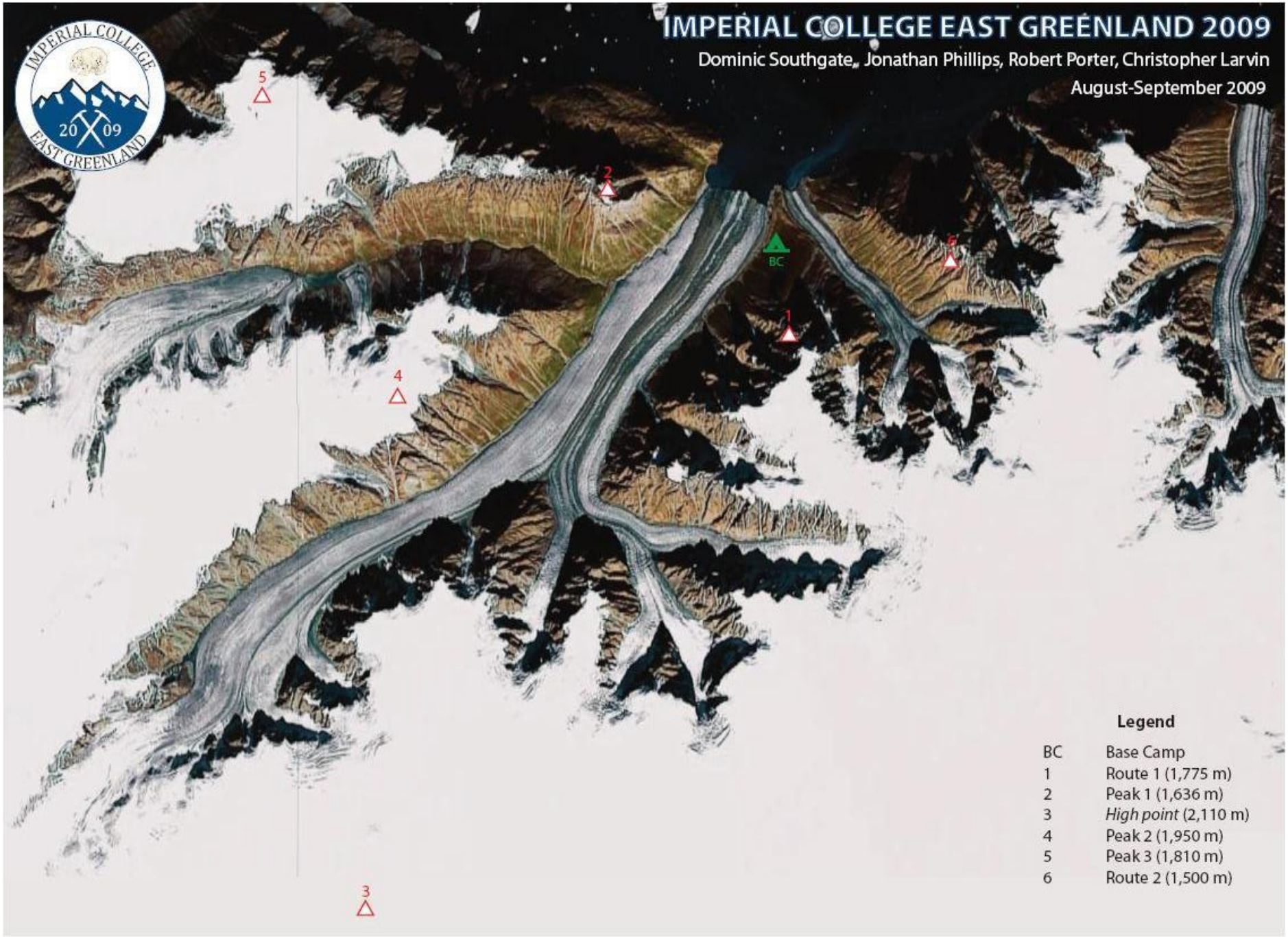




APPENDIX B – ROUTES

Note: numbers in brackets refer to the points on the overview map, member names are given as initials.

Date	Lat/Long	Altitude	Notes	Members
14/08/09	N71° 27’ 15” W26° 39’ 26”	50 m	Base Camp (BC)	
16/08/09	N71° 25’ 49” W26° 40’ 01”	1,775 m	Roch Point (1)	RP, CL
18/08/09	N71° 27’ 44” W26° 48’ 05”	1,636 m	Muzzle Peak (2)	DS, JP
20/08/09	N71° 18’ 47” W26° 56’ 54”	2,110 m	Ice cap high point (3)	RP, CL
23/08/09	N71° 24’ 59” W26° 56’ 41”	1,950 m	Dojo (4)	DS, JP
25/08/09	N71° 28’ 35” W27° 02’ 7”	1,810 m	Breech Point (5)	RP, CL
29/08/09	N71° 26’ 29” W26° 31’ 42”	1,500 m	Tower Ridge, South-West face high point (6)	RP, JP, DS


IMPERIAL COLLEGE EAST GREENLAND 2009
Dominic Southgate, Jonathan Phillips, Robert Porter, Christopher Larvin
August-September 2009
IMPERIAL COLLEGE
20 09
EAST GREENLAND
BC
1
2
3
4
5
6
Legend
BC Base Camp
1 Route 1 (1,775 m)
2 Peak 1 (1,636 m)
3 *High point* (2,110 m)
4 Peak 2 (1,950 m)
5 Peak 3 (1,810 m)
6 Route 2 (1,500 m)

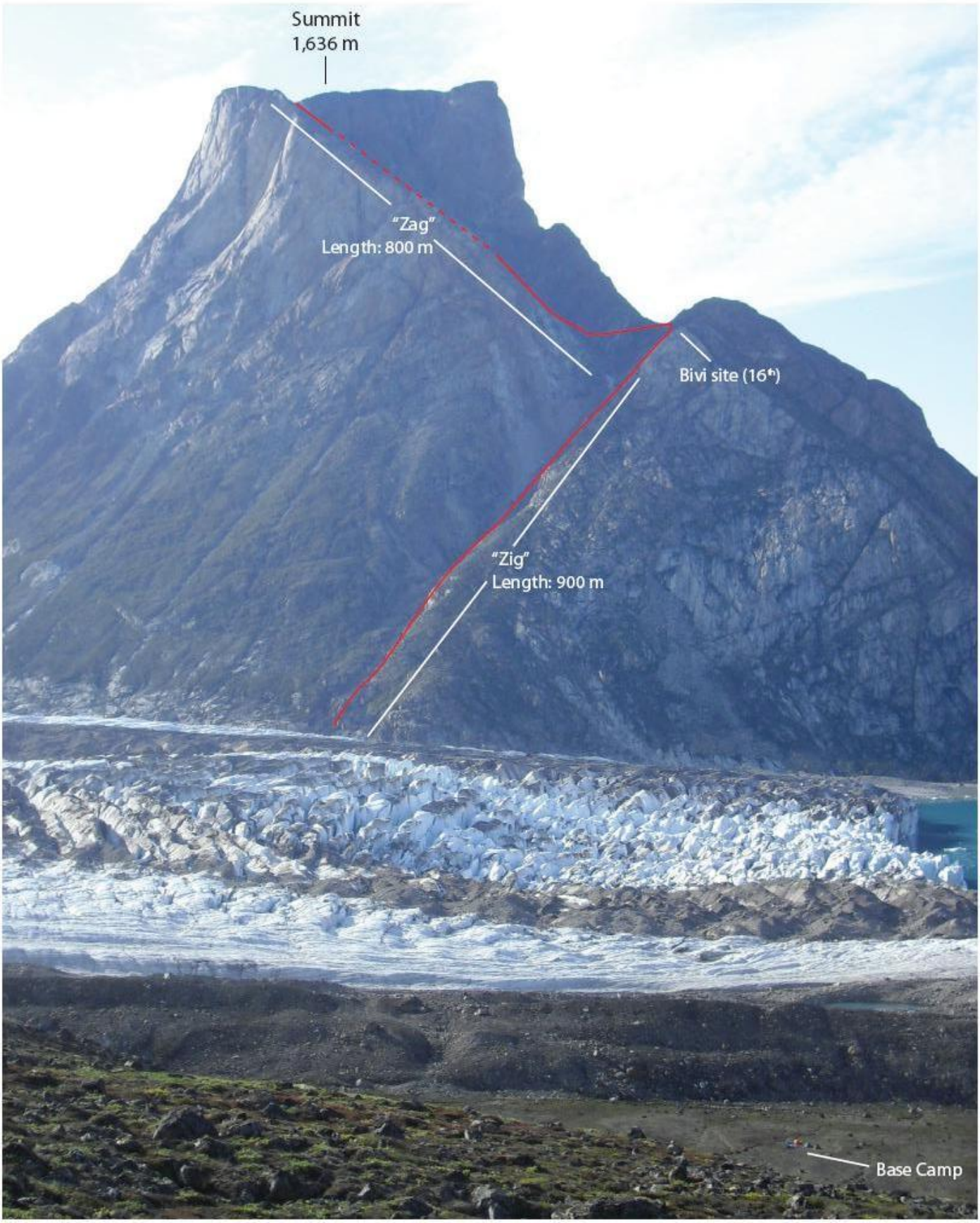
ROUTE 1

FA: Robert Porter & Christopher Larvin; 16th August 2009

Length: 2,000+ metres

PEAK 1

FA: Dominic Southgate & Jonathan Phillips; 16-17th August 2009
Length: 1,700 metres



APPENDIX C – KIT LIST

Total group kit:

Activity	Items	Quantity
Cooking	MSR Blacklite Pans (set of 2)	2
(total)	Sporks	4
	Primus Omnifuel Stoves and pump	3
	Stove Repair Kit	1
	Wind shield	2
	Fuel Bottle (1 litre)	2
	Fuel Can (5 litre)	4
	Mugs	4
	Fuel Funnel	1
	Nalgene Bottles (1 litre)	8
	Lighting Flints	2
	Lighters, matches	4
	Knives (also for climbing)	4
	Scourers/washing liquid	2
	Water filter	1
Sleeping	Terra Nova Quasar tents	2
(total)	Sleeping Bags - Rob	1
	Sleeping Bags - Jonny	2
	Sleeping Bags - Dom	2
	Sleeping Bags - Chris	1
	Bivvy Bags	4
	Thermarests	4
	Rollmats	4
	Silk Sleeping Bag Liners	4
	Snow Shovels	2
	Bothy 2	2
	Tent 3 (cheap)	1
	Tent Repair Kit	1
Climbing	Single Rope	2
(total)	6mm static cord x 60m	2
	Rock Shoes (pair)	4
	Harnesses	4
	Helmets	4
	Climbing Axes (pair)	4
	Crampons (pair)	4
	Ski Poles (pair)	4
	Snowshoes (pair)	4
	Set of Nuts (1-10)	2
	Hexes	4
	Cams	4
	Quickdraws	16
	Screwgates	12

	Belay Devices and HMS Karabiners	4
	Slings	8
	Ice Screws	12
	Tricams	8
	Nut Keys on snapgate	2
	Ab Tat 4 x 7.5m x 8mm	30
	Prussiks	8
	Pitons	20
	Skyhook	2
	Deadmen	2
	Snowstake	2
	Maillon	10
Clothing/equipment	Merino Baselayers	2
(per person)	Merino Leggings	2
	Mountaineering Trousers	1
	Softshell	1
	Overtrousers/Salopettes	1
	Waterproof Shell Top	1
	Dachstein Mitts	1
	Ice Climbing Gloves	1
	Waterproof Overmitts (Shell)	1
	Liner Gloves	1
	Warm Hat	1
	Mountaineering Socks	2
	Mountaineering Boots	1
	Overgaiters	1
	Approach shoes	1
	Boxer Shorts	5
	Down/Synthetic Jacket (~-15C)	1
	Climbing Sack (~50L)	1
	Duffle Bag/Expedition Pack (~100L)	1
	Ski Goggles	4
	Sun Glasses	5
Personal/ Hygiene	Sun Block (Factor 50+)	4
(total)	Foot Powder	1
	Lip Salve	4
	Toothbrush and Toothpaste	4
	Soap	4
	Towel	4
	Toilet Rolls	12
	Antibacterial hand gel	4
Bear Deterrent	Rifles	2
(total)	Rifle Cleaning Kit	1
	Ammunition, rds	40
	Flares, pens	2
	Flares, cartridges	20

Medical	Personal First Aid Kit	4
(total)	Base Camp First Aid Kit	1
Communications/ Other	Digital Camera	2
(total)	Satellite Phone and Charger	2
	GPS	2
	EPIRB	1
	Headtorches	4
	Lithium Batteries	24
	Maps (laminated)	4
	Dry Bags	4
	Compasses	2
	Notepad	2
	Playing Cards	1
	Ipods	4
	Books	4
	Altimeters	2
	Barrels	4
	Duffle bags	3

APPENDIX D – FOOD

Base camp food

Breakfast

We tried to vary the options for breakfasts with the following four options:

1) Granola, 2) Porridge, 3) Muesli, 4) ASDA Vitality Cereal

This order was our preference for each on the expedition, it should be noted however that the Granola did not go very far at all, but was a welcome change from porridge. On that note, and porridge fans look away, we did add things to the porridge for variety, these included sugar, golden syrup, caramel sauce, chocolate and raisins and sultanas. Not all at the same time, well not every time.

Lunch

We didn't have set lunches planned, and so had bits and pieces from the day bags (see below) more often than not it was noodles, or chocolate and biscuits, or as a treat pate on oatcakes. This is because we had generally planned to be on a route during the day, some more savoury items would have gone down well in base camp.

Dinners

For our base camp meals we had the options presented below for each dinner combining one item from each category into a meal:

1) Carb – Smash/Pasta/CousCous

2) Sauce – Meat-free bolognaise/Meat-free Mexican chilli/Meat-free savoury mince

3) Meat – Tuna/Pilchards/Ham/Corned beef

The outcome was generally good, with no major culinary disasters and the meat-free sauces also added a little extra protein to our diet.

Puddings

Typically we didn't eat puddings, we had taken sachets of instant custard and instant strawberry whip desert. The custard with raisins added was a popular choice, however opinion was divided on the strawberry whip with one team liking it, the other not.

Mountain Food

A mountain day bag for two people contained:

2xBe-Well Meals (Details Below), 1xNoodles, 2xCereal bars, 1xChocolate, 1xOther Snack

Where the other snack consisted of a random choice of Pork Scratchings, Dolly Mixtures or Wine Gums. This day bag could be supplemented as necessary with cereals for breakfast and other snack items such as biscuits, tray bakes etc. In all we had ~60 day bags.

Drinks

We took about 80 tea bags, a jar of coffee and two jars of hot chocolate, much of the coffee was not drunk but everything else was consumed. In addition we had brought 4.8kg of Lucozade Sport energy drink in powder form; we got through half of this in two weeks or so. It was excellent and easy to carry on routes to dilute with water from streams.

Freeze-dried meals

Our expedition foods bought in the UK were supplied by Be-Well and we ordered 8 packs of 7 flavours which were, again in some semblance of preference (all being meat eaters):

1) Lamp Pilaf, 2) Beef Shepherd's Pie, 3) Chili Con Carne, 4) Chicken and Vegetables Pasta, 5) Thai Chicken with Rice, 6) Vegetable Bolognese, 7) Thai Vegetables

In addition to the Be-Well meals we were fortunate enough to be gifted some expedition foods manufactured by other companies whilst we were waiting for our freight to arrive.

A clear winner was the www.drytech.no REAL Turmat meals, in the flavours Cod and Potato Casserole and Chicken with Herbs which were both truly excellent.

We also tried the double portion Reiter meals in the following flavours:

Chilli Con Carne, Pasta and Cheese Sauce, + two others.

In addition we tried two satchets of 5 portions Bláberjasúpa – an Icelandic blueberry/bilberry pudding/drink which was very nice.

Some additional dried fruit would have been a welcome addition to the diet, however we were able to snack on wild Arctic bilberries on the lower slopes and around base camp where they grew in profusion. Crowberries were also observed, however we were unfamiliar with identifying them and decided not to risk finding out if they were edible whilst on the expedition.

APPENDIX E – MEDICAL KIT LIST

Base camp first aid kit contents:

Item	Quantity	Use
Ambulance dressing no.2	1	Wounds and general trauma
Conforming bandage 5cm	1	Wounds and general trauma
Adhesive bandage 5cm	1	Wounds and general trauma
Triangular bandage	1	Wounds and general trauma
Small low-adherent dressing	1	Wounds and general trauma
Medium low-adherent dressing	2	Wounds and general trauma
Large low adherent dressing	2	Wounds and general trauma
Gauss swab 5 pack	1	Wounds and general trauma
Steri strips 3 pack	2	Wounds and general trauma
Latex gloves	2pr	Wounds and general trauma
Antiseptic wipes	2	Wounds and general trauma
Safety pins	2	Wounds and general trauma
Betadine bottle	1	Wounds and general trauma
Surgical tape roll	1	Wounds and general trauma
Germolene	1 tube	Wounds and general trauma
Plaster lenghts 10cm	10	Wounds and general trauma
Assorted plasters	9	Wounds and general trauma
Tuffcut scissors	1	Wounds and general trauma
SAM splint	1	Wounds and general trauma
thermometer	1	Wounds and general trauma
steripod saline	5	Wounds and general trauma
Paracetamol	32	Pain relief
Co-codamol	40	Pain relief
Ibuprofen	32	Pain relief
Aspirin	16	Pain relief
Dioralyte sachets	12	Rehydration
Loperamide caps	12	Diarrhoea
Co-Amoxiclav 375mg	42	Chest, urinary, skin and wound infections
Ciprofloxacin 250mg	40	Diarrhoea
Metronidazole 400mg	42	Amoebic dysentery
		Giardiasis
		Peritonitis
		Dental infections
Prochlorperazine 5mg	56	Nausea
Chloramphenicol tube	1	Eye infections