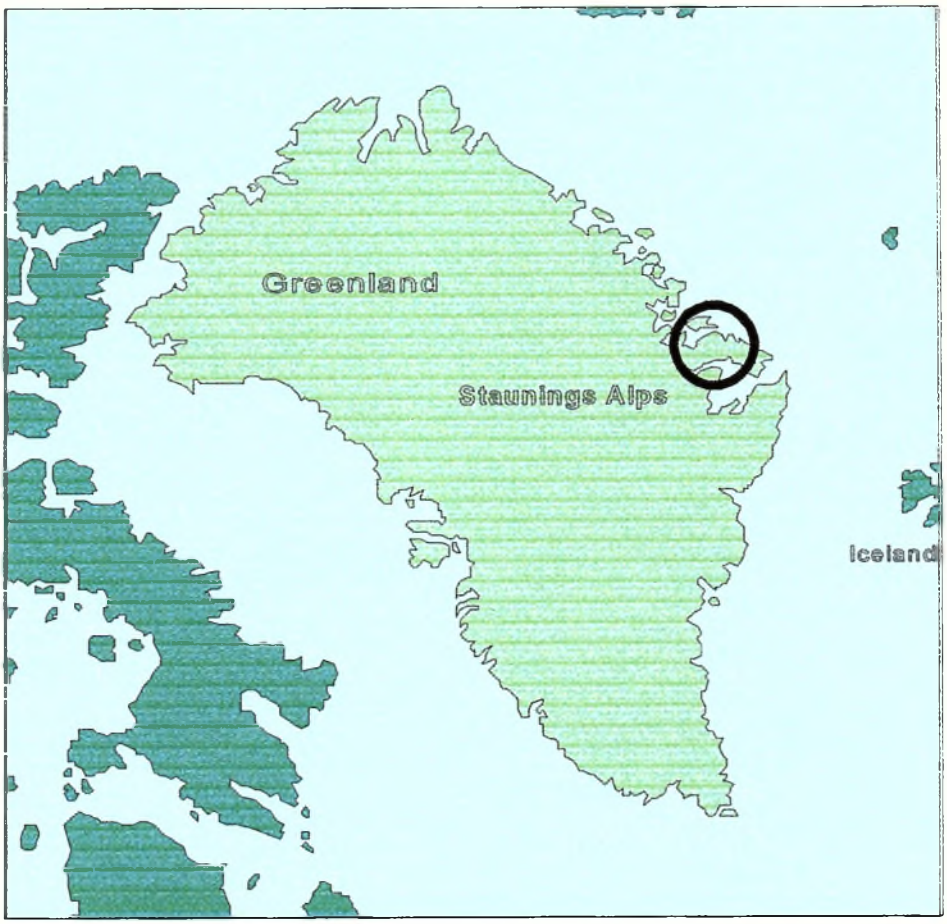
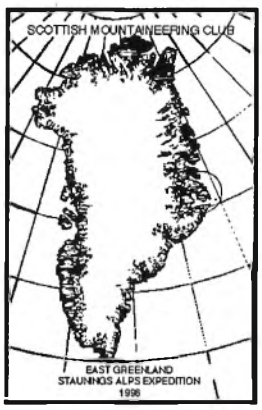
Expedition Report
The Scottish Mountaineering Club
Greenland Expedition 1996

North East Greenland National Park
The Staunings Alps



Supported by The Scottish Mountaineering Trust
The Mountaineering Council of Scotland
The Mount Everest Foundation and
The Foundation for the Sports and Arts.

Scottish Mountaineering Club, East Greenland Expedition 1996.



Colwyn Jones
Expedition Coordinator
c/o Department of Dental Public Health
Tameside General Hospital
Ashton under Lyne
Lancashire OL6 9RW
England

Chapter 2 - Expedition Summary.

Scottish Mountaineering Club, East Greenland Expedition 1996.

Danish Polar Centre ref 532-50.

Mountaineering Council of Scotland ref; MCS96/3.

Foundation for Sports and the Arts.

Mount Everest Foundation ref; 96/27.

The Central Staunings Alps of Scoresby Land in North East Greenland, between 72^{0}N to 72^0 30' N and 24^0 to 26^{0}W, were the target for this successful 3 week climbing expedition.

The eight members assembled at Glasgow International Airport on Monday 22nd July and flew in 2 stages, by scheduled airline, to Akureyri on the Northern coast of Iceland. After an overnight stop a chartered ski-equipped Twin Otter flew them north across the iceberg studded Denmark Straits to Greenland. The first stop was the gravel airstrip on the Hurry Fjord serving Scoresbysund, called Constable (Pynt) Point (Nerlerit Inaat). A flight of 2 hours 15 minutes duration.

At Constable Point 250Kg of freighted equipment, food and fuel was collected. The Twin Otter then continued north to the Central Staunings Alps where the clear weather and good snow conditions allowed an exciting landing on the Gully Glacier, within a kilometre of the top of Col Major, in the early afternoon. This was the first time an aircraft has been recorded as landing in this area. The aircraft GPS altitude was 6700ft or 2040m.

After establishing camp a nearby peak was ascended by all 8 members of the expedition and was named **Susan's Peak (PD-, 2238m).** The Peak is South of the actual descent gully called Col Major, which gives access to the upper Bersaerkerbrae glacier and is connected by a short ridge to Shirley's Peak. The first ascent of Shirley's peak was made by an SMC party in 1994.

On the 24th July 4 members ascended the north eastern most of 3 rock peaks on the continuation of the South West Ridge of Dansketinde. The Ridge was named Dødørnryggen (Dead eagle ridge) as it bore a resemblance to a dead eagle lying on it's back. A party of 2 made the ascent by forking right in a snow gully named the Jones/Bickerdike couloir which delineated the body and one wing of the deceased raptor. Thereafter rocks were climbed to the awkward summit ridge. The peak was named **Aliertinde (AD+, 2580m).**

The second party reached a snow col between Dødørnryggen and the start of the South West ridge of Dansketinde. This col was ironically christened Col Wyn. A rock peak on the Dansketinde (north east) side of the col was ascended and named **Jaalspids.** The second party then climbed directly from the col to the summit of Aliertinde and both parties descended by this route. The West Ridge of Lambeth was attempted but poor snow conditions forced a retreat.

Two members of the expedition experienced nausea and vomiting on the first day. Recovery was swift and the likely diagnosis was mild altitude sickness coupled with dehydration. Both members had recovered sufficiently to climb the next day.

26th July. In overcast weather (50mm overnight snow) camp was struck and an attempt was made to descend the Gully Glacier. Despite absolute calm, the weather worsened to a whiteout and the move was abandoned. The ridge from Susan's to Shirleys' peak **(PD+)** was later climbed.

On the 27th July a party of 4 ascended the larger snow gully on the other side (south) of the body of the dead eagle. This more Westerly gully was called the Preston/Reid couloir. It forms a high col and the excellent rock peak to the North East was climbed. It has two distinct pointed summits both of which were climbed and presumptuously named Dianesketinde 2532m. On return to the UK we found it had been climbed and named Tårnet (The Tower) 2 months earlier by a Norwegian ski-mountaineering expedition.

The other peak to the South West was climbed by a complex and often shattered ridge, leading to an excellent and sound summit which was named **Annsketinde (D, 2460m).** Descent from the summit was by abseil. Tårnet also received it's second ascent by these expedition members.

The same day, Dansketinde was climbed by a party of 4 via the original East col route (Tourist route) which the first ascensionists had used. This group included **the first Lady to ascend Dansketinde**, the highest peak in the Staunings Alps.

On the 28th July a party of 2 ascended the long unclimbed **North West ridge of Dansketinde (TD),** the highest peak in the Staunings Alps (Aneroid height 2870m). After crossing Col Wyn they ascended a steep 500m couloir (Reid/Preston Couloir) to the ridge.

A snowfall of 150mm overnight led to a day (29th July) of rest and recuperation. An attempt to descend the Gully glacier revealed a badly crevassed icefall which proved impassable to the lightly equipped party

On 30th July a party of 2 ascended the unclimbed **south ridge of Hjornespids (TD+, 2860m).** Another 2 reached the same summit by the col between Hjornespids and Dansketinde (D). During the descent a huge avalanche was triggered on the north face as the party of 4 descended the slopes of Hjornespids to the col.

On 31st July, Lambeth (height unrecorded) was ascended by the North Ridge. A prominent pinnacle on the ridge was climbed and named **Point Jilly.**

On the same day a party of 3 left camp at 1900hours to ascend Dansketinde by the Tourist route. The summit was reached after midnight and it was confirmed the sun never dips below the horizon. It was a perfectly still night and **all 8 expedition members had reached the summit of Dansketinde.**

August 1st, 2nd & 3rd, Overcast and light snow. Descended Col Major. Soft snow and large Bergeschrund. Roped together, skied as 2 parties of 4 in very poor visibility to the main icefall on Bersaerkerbrae. Fixed ropes down icefall and skied roped to a camp in centre of Glacier. Tortuous descent over crevassed left side of glacier.

On 4th August. Better visibility but initially wet snow then drizzle. Descent of Glacier which became dry. Total distance 12.7km.

5th August. Better visibility. View into Skel valley and down to the coast of Kong Oscars fjord. Crossed onto lateral (south) moraine of glacier and established camp in Skel valley. Ferrying loads. Sadly there was plenty of evidence of previous expeditions. Plastic sleds, tin cans, broken survey poles and tattered lengths of tape meaure, heralded our return to *'civilisation.'* The Sun came out in the evening and the mosquitos were now a problem.

6th August. Crossed Skel river by wading and ferried loads over the Gefion pass.

7th August. Sunny day greets us. Lone Musk ox circles camp before fleeing media attention. Carried loads down to Washburn hut above Mestersvig. Some ferried, others carried huge single loads. Camped close to hut. Mosquitos much in evidence.

8th August. Carried loads to Mestersvig and papers checked by Danish Military personnel. Returned to stay in Washburn hut overnight.

9th August. Overcast. Return flight cancelled owing to bad weather. Danish Military personnel allow us to stay in Mestersvig overnight and kindly provided rations from previous expedition to supplement our meagre supplies.

10th August. Overnight storm. Snow down to 200m. Fairchild Metroliner collects us at 12.30 (midday). Cloudy all the way to Akureyri. Continue to Reykjavik later in day.

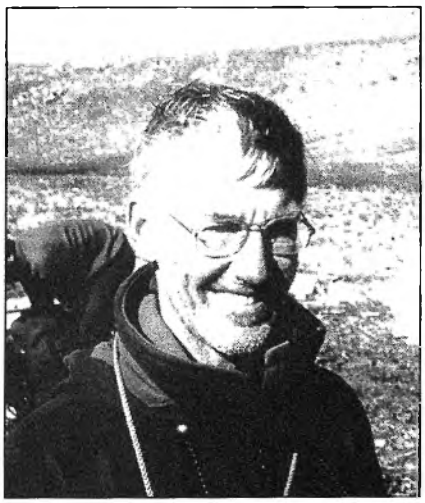
11th August. Day in Reykjavik.

12th August. Return to Glasgow.

With thanks to The Foundation for Sport and the Arts, The Mount Everest Foundation, The Scottish Mountaineering Trust and the Mountaineering Council of Scotland for their financial support.

Scottish Mountaineering Club
East Greenland Expedition 1996
Expedition Members

Colwyn Jones
Expedition Leader & Medical Officer



Ian Angell

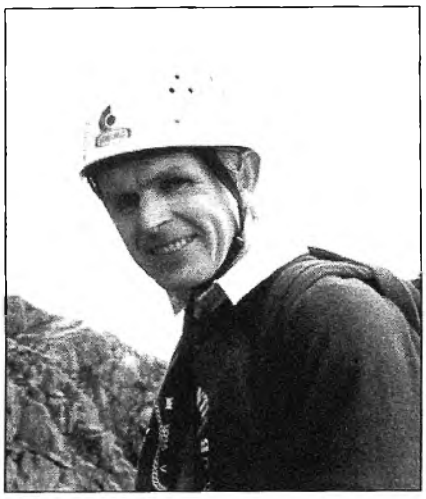
John Bickerdike

Susan Mackenzie

Gordon Mackenzie

Jonathan Preston

Stephen Reid



Brian Shackleton

Chapter 3

Expedition Members

Colwyn Jones. Expedition coordinator and Medical Officer.
c/o Department of Dental Public Health
Tameside General Hospital
Ashton under Lyne
Lancashire OL6 9RW

Date of Birth; 19,02,58. Qualified Dentist and Surgical fellow of the Royal College of Physicians and Surgeons of Glasgow.

Member of Scottish Mountaineering Club, Alpine Club and Junior Mountaineering Club of Scotland. (President, Junior Mountaineering Club of Scotland, 1991-93). Qualified ski instructor. Medical Officer, Scottish Mountaineering Club trip; Tatra Mountains, Czechoslovakia, September 1989. Road and Fell running, 14 marathons to date. Five Alpine seasons, two to the Czech Tatras, Borneo and the USA. Climbed extensively throughout Britain in winter and summer. Ski touring in Norway, France, Austria, Italy and Switzerland.

John Bickerdike. Date of Birth; 01,02,49. Production manager.

Nine alpine seasons and three to the USA. Formerly member of Alpine Climbing Group. Ski-mountaineer, rock and winter climber. First British Alpine ascent of North Ridge Direct Les Droites. Routes climbed include Kanzelgrat(Rothorn), Gervasutti Pillar, N Face Piz Badille.

Jonathan Preston. Date of Birth; 08,06,57. Mountain Guide.

Eleven alpine seasons, 2 to Himalaya, Mt Kenya, Corderilla, Alaska, Canada & USA. Traverse of Mont Blanc, Route Major - Brenva Face, Aiguille de Blatiere - W Face, W face DRU (American Direct), Eiger - W ridge, Matterhorn, Monte Rosa, Zinal Rothorn,Lenzspitze - NE Face. First ascents of Laspa Dhura & Nanda Bhanar in Garhwal Himalaya, India 1995 1st British ascent of Nando Kot S. Face. Diamond Couloir - Mt Kenya, Barafu route - Mt Kilimanjaro. Cordillera, Jurau 'D' 1st ascent. Mount Hunter - S Face, Mt McKinley - W Buttress. Salathe wall, The nose, El Capitan. Mt Watkins

Ian Angell. Date of Birth; 18,01,39. Engineer. Mountain Guide.

Twenty Alpine seasons; Many Alpine peaks ascended including N. Face Aig D'Argentiere, 2 trips to Greenland, Himalayas Mera Peak & Kusum Kanguru. Haute route, Vanoise & Bernese Oberland ski touring. USA, Mt Whitney, Yosemite. Climbed extensively throughout Britain in winter and summer. Member of the Scottish Mountaineering Club & Alpine Club.

Stephen Reid. Date of Birth; 29/11/53. Shop Proprieter.

15 Alpine Seasons. Bonatti pillar and Inomminata Ridge of Mont Blanc in summer. N. Face of Tour Ronde and Forbes Arete in Winter. Extensive winter and summer climbing in UK with many new routes established. Member of the Fell & Rock, Climbers Club and the Alpine Club. In 1995 part of a 4 man team which reached 6000m before abandoning the attempted because of rockfall and avalanches on the unclimbed peak Ultar (7388m) in Hunza Karakorum. Ski-mountaineer Haute Route etc. Co-author of guidebook to lakeland climbing, successful mountaineering journalist and guide book author.

Brian Shackleton. Date of Birth; 14/7/51. Project Manager.

Member of Scottish Mountaineering Club, Ferranti Mountaineering Club (President 1981/83) & Scottish Ski Club(President 1988/89). 18 Alpine Seasons. 2 to Norway. Extensive winter and summer climbing.

20+ of the 4000m peaks. Traverse of the Grepon, Biancograt of Piz Bernina, N spur of Chardonnay. Barre de Ecrins & Meige Traverse. Himalaya in 1995 on 1st British ascent of Nando Kot . Half blue skier Aberdeen University.

Gordon Mackenzie. Date of Birth; 06/01/54. Divisional Water Engineer.

Member of Scottish Mountaineering Club, Carn Dearg Mountaineering Club, Eagle Ski Club and both Austrian & Canadian Alpine Clubs. Extensive climbing, walking and ski touring experience in Scotland. Ten summer alpine seasons, three seasons in Pyrenees plus backpacking trips to Picos de Europa and Corsica. Eleven ski touring seasons in Alps, two in Canada and one in New Zealand.

Susan Mackenzie. Date of Birth; 11/05/51. Senior Lecturer in Human Resources Management.

Member of both Grampian & Cairngorm Climbing Clubs, Eagle Ski Club and both Austrian & Canadian Alpine Clubs. Completed all the Munros in 1980 and has climbed a good selection of Scottish classic rock and ice routes. Extensive ski touring experience in Scotland. Eight summer alpine seasons, three seasons in Pyrenees plus backpacking trips to Picos de Europa and Corsica. Eleven ski touring seasons in Alps, two in Canada and one in New Zealand.

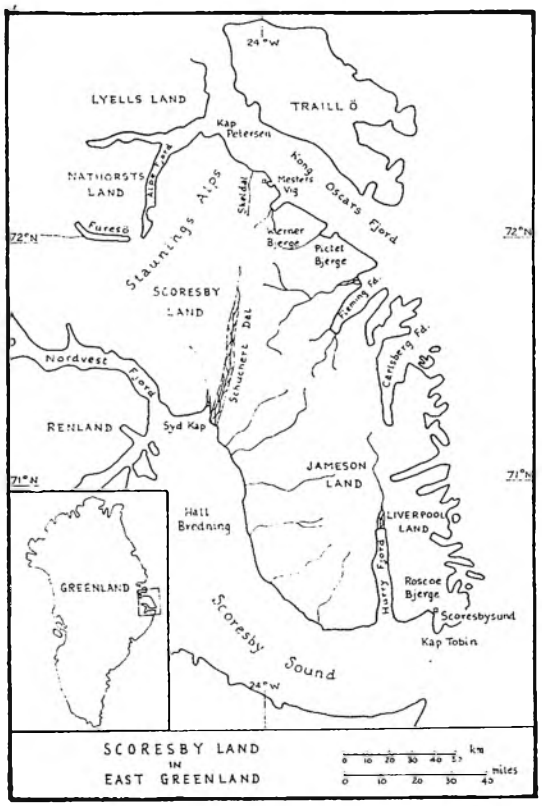
INTRODUCTION.

The target for the Scottish Mountaineering Club East Greenland Expedition 1996 was the Northern Staunings Alps lying between 72°N to 72° 30' N and 24° to 26°W.

Scoresby Land forms the northern part of a peninsula bordered to the south by Scoresby Sound and Nordvest Fjord - the Worlds largest fjord. Cape Tobin and Cape Brewster sit at the northern and southern limits of the mouth of Scoresby Sound, with the only settlement in the area, Scoresbysund, lying on Cape Tobin. To the east of the penisula is the Arctic ocean and further north King Oscars Fjord divides it from Trail Island. The Northern tip of the land mass is Cape Petersen from where the Alpe Fjord cuts a deep trough southwest to form the final coast of the peninsula. The umbilical cord joining the penisula to the mainland is the southern Staunings range which merges westward into the impassive Greenland icecap.

The south eastern part of the peninsula is divided from Scoresby Land by the Schuchert valley running south and the Skel valley going north almost along the 24°W line of longitude. Jamesons Land forms most of this south eastern area where the tundra covered hills are lower and more rounded. The very south eastern tip of the peninsula is the coastal range of mountains of Liverpool Land.

The Staunings Alps



From Bennet 1972, Staunings Alps Expedition Guide, Gaston's Alpine books & West Col Productions.

The Staunings Alps of Scoresby Land in North East Greenland sit within, but close to, the southern edge of the largest national park in the World. The North and East Greenland National Park covers 972,000sq. km and was established in 1974. The Staunings Alps lie 500km north of the Arctic Circle at 72°N and cover an area of some 6000 square kilometres. They are a complex range of granite peaks named after Thorvald Stauning (1873-1942). Stauning was Denmark's leading Social Democratic statesman, social reformer and an influential Government Minister from 1924 to 1940. He helped to shape the modern state of Denmark and died during the Second World War when Denmark was under German occupation.

The highest peak in the Staunings Alps is Dansketinde (Denmarks Peak) 2795m which forms the natural centre of the impressive northern peaks. From there a number of huge glaciers radiate slowly outwards to reach the northern, eastern and southern coasts. In contrast those flowing steeply west have dangerous icefalls with a name for onerous travel. The mountains have a well earned reputation for sound granite, soaring faces and complex ridges. Further south the rock is softer, more weathered and the mountains are more rounded reflecting this difference.

To allow ready orientation for those unfamiliar with the area a central pass called Col Major (Majorpasset), which links the Bersaerkerbrae (Bersaerker glacier) to the east and the highest reaches of the Gully Glacier to the west, should be identified. In the only published mountaineering guidebook to the area by Bennett in 1972, Col Major was accurately described as *"The heart of the Staunings Alps."*

The first European to set foot on the rocks of North East Greenland was the Scottish whaler William Scoresby in 1822. The following year the English Captain Clavering met a group of Eskimos on the southern side of an island which was later to bear his name. His ill-judged decision to demonstrate the power of a rifle scared the locals away and this is the first and only recorded meeting with the indigenous people of this side of the coast. There were no inhabitants when the next expedition returned in 1869.

Scottish climbing has had a long association with the Staunings Alps starting with the 1958 Scottish East Greenland Expedition. Many of these early pioneering trips of the late 50s, 60s and 70s were organised under the auspices of the Scottish Mountaineering Club, the Junior Mountaineering Club of Scotland and numerous Scottish and English Universities. In the early 90s two successful trips to the area rekindled interest among a small number of Scottish Mountaineering Club members. Their success, the association with Scottish Mountaineering and the dewy eyed reminisences of many of the established members of the club, formed the inspiration, and provided much of the the information, necessary for this trip.

The region is largely uninhabited and isolated with a reputation for beauty and mountain grandeur. There are only 53,000 people in the whole of Greenland, the majority living in the South and West of the country with fishing, hunting and sheep farming the main occupations. Greenland has been a Danish colony since 1721 and in 1933 the International Court in The Hague granted Denmark sovereignty over all of Greenland following a dispute with Norway. It obtained home rule Status in 1979 and along with Denmark and the Faroes form part of the Danish Realm.

The latitude means continuous daylight during the summer months with the combination of the low angle of the sun and searing white glaciers contributing to the beauty of the area. During the short summer season settled anticyclonic weather and very dry air give extraordinary views especially early in the season. It is with good reason that Scoresby Land has been named the 'Arctic Riviera.'

This report records many details about the organisation, activities and outcome of the expedition and will, we hope, be of interest to our sponsors without whose help this expedition would not have been possible. Good organisation and logistics proved to be an important factor in the success of the trip and are covered in detail to give future prospective visitors to the area an idea of what is involved.

Arctic Fever - A Non Government Health Warning.

Climbing in the Arctic is reputed to lead to a condition known as 'Arctic Fever.' The diagnosis can be made after a short observation of the sufferer and manifests itself in fanatical attempts to return to the Arctic to the exclusion of all other activities. Clearly an obsessional disorder.

The expedition leader presented an unusual case as he had never previously visited the area to become infected. He was, however, exposed to a series of conversations and slide shows of previous trips to the area and quickly succumbed to the disorder. While the supposed route of his infection is only based on circumstantial evidence, it should act as a warning to climbers everywhere that Arctic Fever may be contagious!

Scottish Mountaineering Club East Greenland Expedition 1996

Expedition Aim & Objectives.

Aim.

The stated aim of the expedition is to have a safe and successful mountaineering exploration to the Staunings Alps in the North East Greenland National Park.

Objectives.

The primary objectives of the expedition are the ascent of unclimbed peaks and the reascent of the highest peaks in the area by new routes as follows;

The 4th ascent overall of **Dansketinde** the highest peak in the range, by a new route involving one of the unclimbed ridges.

An ascent of **Hjornespids** by a new route.

First ascents of 2 peaks believed to be unclimbed in the **Korspids** Massif.

A first ascent of a rock peak between **Bersaerkertinde** and **Royal Peak** at the head of the Bersaerkerbrae glacier.

An ascent of one of the unclimbed ridges of **Norsketinde** the second highest peak in the range, and probably the 3rd ascent overall.

An attempt at the intimidating North face of **Bersaerkertinde**. This face has repulsed at least 2 attempts at climbing it and will only be attempted if conditions are ideal.

The commercial maps available are known to be inaccurate and of such a small scale that they do not contain sufficient detail for serious expedition planning. We have had access to photographs from an aerial survey done in 1958. This information plus expedition reports from 1961, 1986, 1989 and 1994 have allowed us to identify the unclimbed peaks and the area of flat glacier where a ski-equipped aircraft can land safely.

The best map we have been able to obtain is hand drawn from an original in the guide book written by Donald Bennett in 1972. The information our recent research has provided allowed improvment of the original. With thanks to John Peden and Donald Bennett.

One further objective is to improve the accuracy of these maps and we will be using global positioning satellite hand sets to do this. This information will be available for future expeditions to the area.

The expedition tested our personal endeavour and physical fitness and is a continuation of the strong explorative association between British Mountaineering and the remote Eastern Coastal Mountain ranges of Greenland.

Chapter 6. Expedition Planning.

"Fools rush in where angels fear to tread".

Although

"He who hesitates, is lost".

If any hint of the problems and hassle had been known beforehand it is extremely unlikely that any attempt would have been made to organise this expedition. This is a warning to anyone contemplating such a trip. If at all possible, get someone else to organise it.

However, when reviewing the pleasure of visiting the area, the success of the expedition and the events surrounding it, I am pleased I did not have the benefit of hindsight. A trip to such a remote and beautiful place as North East Greenland is well worth the time and effort invested in getting there.

Having access to the notes, records and personal advice from members of previous expeditions was essential and it is the recognition of the utility of these past reports and advice that provided the motivation to eventually complete the present one. I apologise unreservedly for the delay.

A rational planning approach was attempted with timetabling and the use of a Gantt implementation chart (page 12) to try and provide structure to the pre-expedition phase. First the expedition team had to be assembled. There was no formal recruitment plan which appears to be the usual way a successful climbing trip starts. Experienced climbers were preferred and the team seemed to form by a process of coalescence. Everyone had climbed with at least one other member prior to the trip so it was a process of mutual approval that brought us all together.

One overriding features with this type of trip was the use of two person tents so that people were effectively split into separate pairs. Each person had to be able to tolerate and support their tent-mate. They also had to raise at least £1500 each.

STATUTORY REQUIREMENTS.

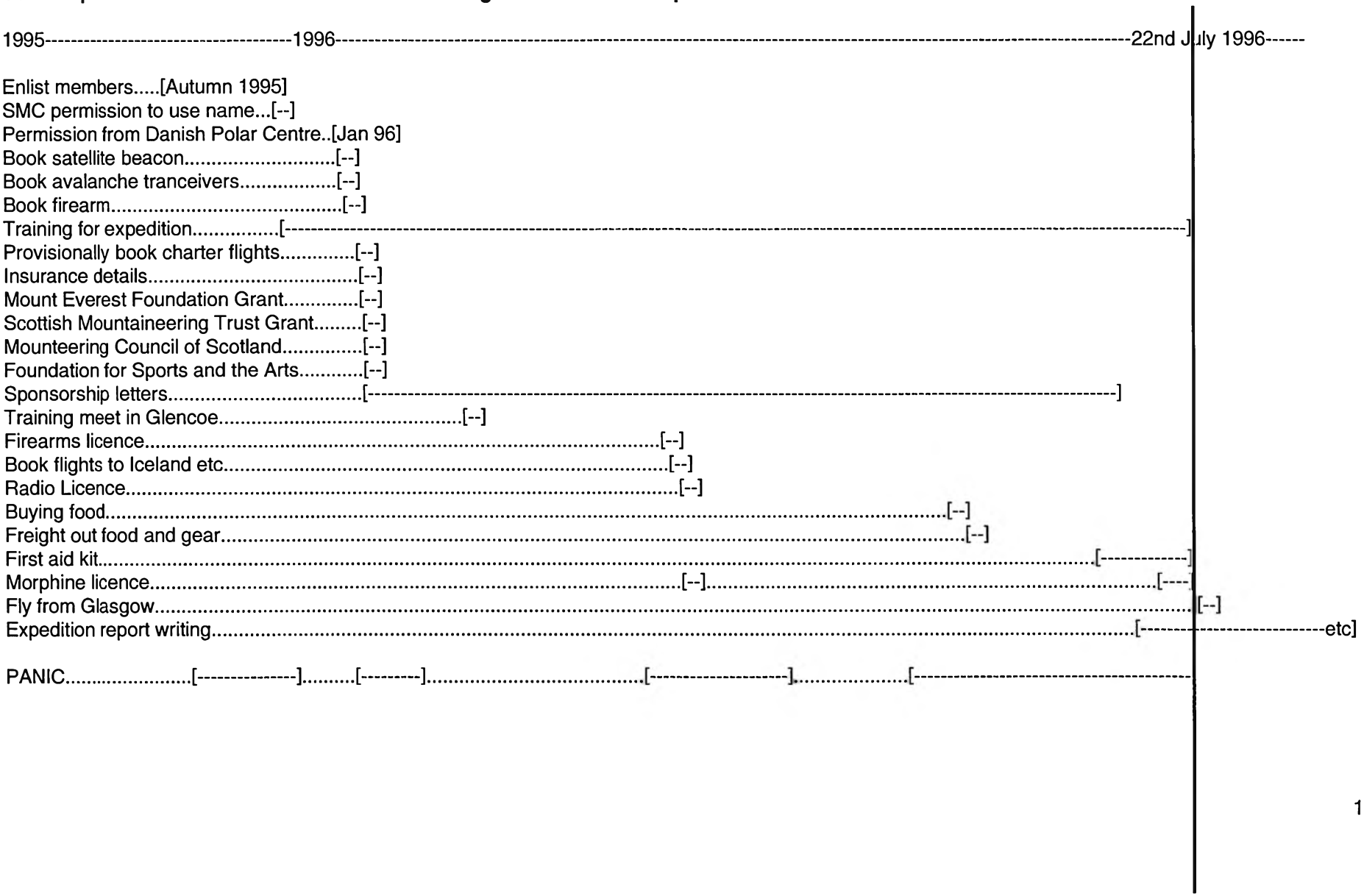
The Danish Polar Centre.

As mentioned previously, The Staunings Alps are in the North East Greenland National Park and by law expeditions of any type planning to visit the area have to be approved. Permission is granted by;

The Danish Polar Centre,
Strandgade 100 H,
DK - 1401,
København K,
Denmark.

Tel & Fax. (+45) 32 88 01 01

Gantt implementation chart. Scottish Mountaineering Club Greenland Expedition 1996.



An application form can be obtained by writing to the above address and expeditions must submit completed application forms by December 31st in the year prior to the planned visit. In addition, applications from any scientific expeditions have to be submitted at least 6 months before the trip is planned. Sports expedition applications have to be in at least 3 months before the trip.

On receipt of the application form, the Danish Polar Centre return a pack of application forms for a radio licence, a firearms licence, a certificate of insurance and three pages of instructions. The expedition is also given a reference number for use with all further correspondence with the authorities.

Radio licence.

Expeditions to uninhabited areas have to take an emergency radio beacon (personal locator beacon : PLB). They can be hired or borrowed and re part of the standard equipment on yachts and other small boats. A Greenland radio licence is required to operate a PLB. The application form for the radio licence and a photocopy of a British radio licence was sent to;

Greenland Telecom
PO Box 1002
DK - 3900 NUUK
Greenland

Again, this should reach the authorites 3 months before the expedition is due to leave. There is a charge for the licence (£59 at 1996 exchange rates) and we had problems in directly transferring money to a bank in Greenland. Finally we resorted to sending a Eurocheque airmail direct to Greenland.

The PLB was one of the items inspected by the Danish Army personnel at Mestersvig. One additional piece of radio equipment suggested as an addition to this minimum requirement was a simple hand help VHF radio. Communication should be possible with a commercial airliner if it is in direct line of sight (requiring clear weather) and could be used for both emergency and routine communication. Throughout the 18 days of the expedition only 3 aircraft, or more accurately their contrails, were seen. Further south scheduled flights are reported to cross Greenland more regularly.

Firearms licence.

Expeditions to the North East Greenland National Park are required to carry a firearm for protection against polar bear attack. Polar bear deterrents are also recommended and commercial airlines are often reluctant to carry these. It appears that the use of firearms (rifles and shotguns) is unregulated in Greenland, except in the National Parks. The licence application form and a copy of a British licence are sent to;

The Chief Constable
PO Box 1006
DK - 3900 NUUK
Greenland

The firearms licence also has a charge (about £100). There is still some confusion in our minds over whether a pistol or revolver can be legally carried. It is also questionable whether a pistol of any calibre would be effective in stopping a polar bear attack.

We had the kind loan of a .303 BSA semi-automatic rifle with lead tipped ammunition. Despite our intention to practice firing the weapon prior to leaving Scotland, we were unable to organise a suitable practice session. Two of the expedition members were instructed in the safety and routine working of the weapon. It was kept loaded ready to fire with the safety catch on throughout the trip.

Travelling through Iceland en route to Greenland, you need a firearms transit licence and you should contact Icelandic customs at Keflavik. We had omitted to apply for one and had considerable problems on arrival in Iceland, being accused of the attempted illegal importation of a firearm. Rifles and polar bear deterrents (thunderflashes etc.) should always be declared at national borders!

Insurance.

A further requirement is adequate insurance to cover all search and rescue costs which could be incurred. The authorties insist on insurance cover of 900,000 Danish Kroner (About £100,000). This was arranged through the British Mountaineering Council where their trekking insurance gives cover to a maximum of £20,000 per person and also gives standard travel insurance cover. Their insurance underwriter undertook to pay any claim from the Danish Authorites but one expedition member has to sign a contract stating they would pay back any extra costs. This was an excellent reminder to the expedition leader that if a rescue was required, personal bankruptcy was a real threat!

This is a major problem for expeditions to the National Park and the insurance cover associated with membership of a variety of National Alpine clubs has been suggested as an alternative, although we have no details on this. Any insurance under writer would still have undertake to pay all rescue costs up to a value of 900,000 Danish Kroner.

Travel.

Travel from the UK to Iceland could be done through any travel agent. From personal recommendation we used;

Dick Philips
Specialist Icelandic Travel Service
Whitehall House
Alston
Cumbria CA9 3PS

Through them we booked return flights Glasgow to Keflavik with Icelandair, return coach travel from Keflavik to Reykjavik airports, and accomodation in Reykjavik, which all proved to be very agreeable. Payment was via a deposit which secured the bookings followed by the balance a set time before departure as with all travel agents.

Return flights from Reykjavik to Akureyri and the charter flight to Greenland were handled by Flugfelag Nordurlands based at Akureyri airport whom we payed directly. This small charter airline is very experienced in flying to remote areas and were a valuable source of information and advice. Local information allowed us to book a guest house in Akureyri for one night on the outward travel.

Survival.

Equipment and food for the expedition was left to the preference of each pair of climbers. Expedition equipment (rifle, radio beacon and first aid kit) was distributed between the 4 pairs.

Three season mountain tents of 4 varieties were used. Sleeping bags were 4 season, 5 season or expedition quality. Clothing was similar to that for Scottish winter use, although lightweight waterproofs (2 ply gortex) proved adequate for summer use.

Seven expedition members used plastic climbing boots and one used plastic ski-mountaineering boots. Problems were the ankle rivet of a Scarpa Vega boot falling apart, although an effective temporary repair was successfully effected. The plastic eyelets of Asolo AFS expedition boots also tore out of the boot outer and were successfully stiched back in place.

Skis were alpine style with a variety of makes and ski-mountaineering bindings were also varied with Silvretta 404s proving the most popular. One pair of older Marker bindings broke, but again an effective repair using climbing cord saved the day.

Avalanche tranceivers were carried by all expedition members.

Training for the expedition was carried out individually except for a training weekend held in Glencoe in the Spring of 1996.

First aid kit.

The remote area and the likelihood that in an emergency help would take 72 hours to arrive at best, meant that a comprehensive first aid kit was carried. The kit included the opiate analgesic morphine which is a class 1 controlled drug and a licence to export it under section 3(2)(b) of the misuse of drugs act 1971 must be obtained from the Home Office;

Licensing Section
Action against drugs unit
Home Office
50 Queen Annes Gate
London SW1H 9AT

The following information, with a covering letter from the prescribing doctor, must be sent to obtain a licence;

1 Country of Destination (and transit countries)

2 Dates of departure and return to the UK.

3 Drug details (name of drug, form, strength and total quantity)

4 Outline justification for the need to carry the drug.

The licence does not appear to have any legal standing outside the the UK and import clearance / permission must be obtained from the country of destination (and transit countries).

We took 200mg of morphine in 10mg/ml ampoules of Cyclimorph (10mg of morphine and 50mg of cyclizine, an anti-emetic) for intramuscular injection. We calculated that at the minimum repeat interval of 4 hours, it was enough to keep one adult pain free for 3 days.

In addition we carried three other analgesics. Voltarol (diclofenac), paracetamol and asprin. One expedition member was allergic to pencillin and we carried only the antibiotics erythromycin and a cephalosporin. A steroid dexamethasone (decadron) was carried for IM injection in case of a head injury.

Various proprietary antiseptic solutions and creams with suitable dressings were also carried. Chloromycetin and local anaesthetic gel for snow blindness were included. Black silk and vicryl sutures and local anaesthetic injections were carried for minor cuts and lacerations. With 24 hour sunlight and reflected light from the glaciers, sun block was perhaps the most important medication we took.

Chapter 7

Food & Supplies

Ian Angell & Colwyn Jones

The expedition had a number of logistic and statutory limitations to meet which were strong influences on the field diet. Mountaineering is a strenuous activity and relies on nutritious, tasty and simple to prepare meals as a constant source of energy and heat to combat the elements. The optimum food ration is only 50% of the calorie requirements and a 2500 calorie daily intake is sufficient for 'several days hard climbing above 3000m'. The remaining energy coming from fat and glycogen metabolism stored in the body tissues. This cannot be sustained for longer than a few days and calorie intake is necessarily higher on rest days.

The expedition food needed to be;

- Simple and quick to prepare, portage of fuel is a major weight penalty when hauling pulks.
- High calorific value.
- Tasty, to combat the boredom which can follow a diet of dried food.
- Minimum weight - light and easy to carry by pulk.
- A long shelf-life and robustly contained, for air freighting.
- Minimum rubbish disposal.

The expedition had a self imposed limitation of not carrying food in any glass or tin containers to ensure that there was no pollution of the fragile Arctic environment by dumping such waste. Sadly there was ample evidence of this on the moraine of the Bersaerkerbrae glacier. Rubbish in the form of a large dump of empty tin cans was found which was presumed to have been left by the 1963 Italian expedition of Guido Monzino. The pristine condition of this discarded waste after 23 years, allowing precise identification of its source, shows how anything left to pollute the Arctic will lie in perpetuity to remind future generations of the unthinking, uncaring attitude some past climbers had for the beauty of the area. Lower down on the tundra and on the valley floor there was also evidence of waste left by previous expeditions, both mountaineering and scientific.

Food was arranged by each pair of climbers (guidelines in table 1 overleaf) as it suited them but as all followed the same criteria similar diets were inevitable.One expedition member ignored this limitation by carrying two tins of sardines and one of salmon. The empty tins were carried out to the coast and disposal at Mestersvig.

Oats featured prominently with porridge as the most popular breakfast and ample supplies of oat cakes provided by Walker's of Aberlour as the staple replacement for bread. Various toppings were used with the oatcakes, margarine, jam, marmalade, chocolate topping, cheese etc.

Day food was a mixture of chocolate, Tunnocks caramel wafers and assorted confectionary bars, shortbread, trail mix, fruit cakes, pepperami etc.

Table 1, Guidelines for the SMC Greenland Trip 1996, Food and weight calculations

Food for 2 people in 1996. 18 days camping + spares, = 20 days

FOOD	WT/per. per	wt/2per gm	Total Kg	cal/ 100g	cal/ per	Type	Total Kg	brand	Notes
Breakfasts									
Porridge,	50g	100	1.8 Kg	370	185	4*500gm packs.Oats + bran.	2.00	Health food shop.	@ 70p/pack
Muesli	100g	200	0.4 Kg	385	385	1*500g packs	0.50	Supermarket	
Oatcakes	75g	150	3.0 Kg	315	236	20 6*4 piece packs (300g).	6.00	Supermarket	20 300g packs
Margarine,	10g	20	0.4 Kg	787	79	2*250g packs	0.50	Supermarket	56p/pack.
Marmalade	20g	40	0.8 Kg	280	56	1*1Kg container	1.00	Home	
Coffee	10g	20	0.4 Kg	0	0		0.50	Christian Aid.	£1.50/100g
Tea bags	2 bags		0.0 Kg	0	0	50 bag lemon tea + 50 bag.		Supermarket	95p/50bag pack.
brown sugar	10g	20	0.4 Kg	385	39	2*500g packs(double for evngs)	1.00	Supermarket	66p/Kg
Milk	10g	20	0.4 Kg	469	47	2*285g btls(double for evngs)	0.60	Supermarket	£1.75/450g pack, 85p/285g bottle.
					0	Total	12.10		
Midday bits							20 days		
Milky ways	2 (20g)	40	0.8 Kg	560	112	4 bags minibars,365g each	1.46	Supermarket	£1.60/365g minibars, £1.30/8*42g bars.
Fruit cake	2(150g)	300	6.0 Kg	400	600	40 day portions	6.00	Supermarket	£6 each
Dried fruit	50g	100	2.0 Kg	420	210	20* Trailmix,150g pack.	2.00	Hasties	75p/150g.
Chocolate	50g	100	2.0 Kg	648	324	10*200g bars	2.00	Supermarket	79p/200g bar.
Flapjack	2 (70g)	140	2.8 Kg	300	210	40 bits	2.80	Supermarket	
Sausage	1 (25g)	50	1.0 Kg	560	140	40*Peperami 25g wrapped.	1.00	Supermarket	39p each.
Cheese			1.0 Kg	403	0	200g spread or 150g tube.	1.00	Supermarket	£1/200g
Malt loaf.					0				
					0	Total	16.26		
Evening									
Packet 1	6 Off								
Soup		15	0.3 Kg	392	29	8*31g double packs	3.1	Supermarket	
Macaroni	100g	200	1.2 Kg	350	350	2*1 Kg packs.	2	Supermarket	95p/1 Kg pack.
Beanfest	95g	190	1.1 Kg	333	316	12 packs	1.14	Supermarket	75p/pack.
Dried apples	26g	52	0.3 Kg	280	73	10*40g packs	0.4	Supermarket	£1 pack.
Custard		86	0.5 Kg	420	181	6 pkts.1 pkt/3person meal.	0.5	Supermarket	26p/pkt.
					949	Total	7.14		
Packet 2	6 off				0				
					0				
Soup		15	0.3 Kg	392	29	8*31g double packs	3.1	Supermarket	
Spaghetti	100g	200	1.2 Kg	350	350		1.8		
Chilli c c	180g	360	2.2 Kg	308	554	12*370g packs	4.44		
Dried apricots		250	1.5 Kg	280	350	6*250g pack	1.5	Supermarket	£1.35/pack.
Custard		86	0.5 Kg		0	6 pkts.1 pkt/3person meal.	0.5	Supermarket	26p/pkt.
			0.0 Kg		0				
					0	Total	11.34		
packet 3	6 off				0				
					0				
Soup		15	0.3 Kg	392	29	8*31g double packs	3.1	Supermarket	
Potato	40g	80	0.5 Kg	333	133	3*240g double packs.	0.72	Supermarket	
Vesta	50g	100	0.6 Kg		0	12 packs for 6*3 person meals.	1.2	Supermarket	
Dried apples		250	1.5 Kg	280	350	6*250g pack	1.5	Supermarket	£1.35/pack.
Custard		86	0.5 Kg		0	6 pkts.1 pkt/3person meal.	0.5	Supermarket	26p/pkt.
					0				
					0	Total	7.02		
Salt					0				
Pepper					0				
Herbs					0				
Tomato					0				
Oxo cubes					0				
Parmesan					0				
Vitamins					0				
Bacon					0				
Muscle builder			0.2 Kg		0				
						Grand total	53.86 Kg		

Day drinks proved difficult to obtain as powdered lemonade etc. do not seem to be manufactured nowadays. Expensive high energy soluble mixes such as Isostar or High 5 seemed the best substitute and were added to water bottles, becoming weaker towards the end of the trip, as supplies ran out.

Evening meals were invariably prepared using soya based "bean feasts" with rice, various pastas or dried potatoes for carbohydrate bulk. Instant soups have improved over the past few years but the real treat were the instant puddings such as banana or chocolate crunches. They needed only boiling water and energetic stirring to produce an appetising course to finish a meal. Dried fruit and instant custard were also used but the fruit rarely seemed to rehydrate properly and remained chewy.

Teas of various types were more popular than coffee, plus horlicks or ovaltine drinks for variety. Packets of cappuccino coffees proved popular and were used up early in the trip. Very little added sugar was used except to the sweet courses at the main meal. An example of a planned diet for 2 climbers is shown in Table 2 overleaf.

Whisky was the main source of alcohol with most stocking up on duty free ½ litres in plastic bottles. They were also a useful currency for thanking our Danish friends at Mestersvig.

Stoves and cooking.

Cooking was never easy. Some preferred to have the cooking area outside and built elaborate fitted kitchens in the snow, complete with a breakfast bar. Others managed to cook in the porch or front of their tent, where the chef could remain warm inside a sleeping bag, although the recumbent position meant that the elbows suffered. With enough forethought snow for melting could be arranged within reach.

Everybody took MSR GKI stoves burning Jet A1 aviation fuel using paraffin jets. Priming paste and cigarette lighters were also used for convenience.

The stoves all served the purpose but were never entirely satisfactory although probably the best available for the conditions. Gas stoves were ruled out because of the problem of empty canisters, Methylated spirit burning stoves required too great a quantity of fuel and traditional "Primus" stoves are heavier.

The jet A1 aviation fuel was bought in Greenland at Constable Pynt - expensive but convenient and avoiding freight charges. Only one stove burnt the Jet A1 cleanly and this was the oldest of the selection. Others were invariably sooty causing dirty pans and frequent pricking to get a reasonable flame. The new shaker jet was an advantage but cannot be retrofitted. Experimentation with the white gas/petrol jet produced a very hot stove(!) but no improvement in the sootiness of the flame.

It may be worth checking with the manufacturers of MSR stoves to see if they produce a fuel jet specially for burning aviation fuel.

At Constable Point 27 litres of fuel was picked up with some left over for burning rubbish. The amount of fuel required per person per day was around 200ml when cooking in pairs. It was preferable to have some surplus as until we were low down the Berserkerbrae most water had to come from melted snow, and dehydrated food and climbers need a lot.

The alternative method of producing water, by leaving snow in a black plastic bin bag, worked intermittently as it relied on the variable amount of insolation available throughout the day. Those arriving late off the hill found a block of ice in the bottom of their bin bag.

Despite all efforts it never seemed possible to produce and eat an evening meal of soup, main course, pudding and drinks in less than two hours. Breakfast took one hour consisting of porridge, chocolate, oatcakes and drinks.

Table 2, Food for two people in 1996

Allowed for 18 days camping plus two spare days

Total weight = **31.97 Kg** Total cost = **£ 167.53**

Item	Pack Quantity	Kcal/100g	Unit Weight	Total Wt.	No.	Price each	Price
Bounty Funsize	1	550		300	2	1.79	3.58
Milky Way Funsize	1	560		300	1	1.79	1.79
Mars Bars Funsize	1	550		300	1	1.75	1.75
Pepperami	40	560	25	1000	40	0.47	18.8
Fruit Cake	1	400	400	3200	8	0	0
Oat Cakes	1	315	300	6000	20	0	0
Strawberry Jam	1	280	400	400	1	0.59	0.59
Strawberry Topping	1	300	400	400	1	1.59	1.59
Chocolate Topping	1	300	400	400	1	1.59	1.59
Flora Spread	1		250	500	2	0.49	0.98
Cheese mix ?		403		0	1	0.42	0.42
Cheese	1	403	0.5	0.5	1		
Porridge	1	370	1000	2000	2	0.75	1.5
Coffee	1		100	200	2	1.69	3.38
Chocolate (Richer)	1	650	100	300	3	1.65	4.95
Chocolate	1	648	100	300	3	1.35	4.05
Chocolate	1	648	100	1400	14	1.25	17.5
Horlicks (8)	8	382	32	512	16	1.63	26.08
Ovaltine	2			200	8	0.45	3.6
Sugar	1	400	500	500	1	0.75	0.75
Fruit Teas	1			100	40		2.8
Teabags	100			0	1	1.49	1.49
Tomato Puree	142			200	1	0.42	0.42
Parmesan Cheese	80	403		200	2	0.99	1.98
Oxo beef cubes				100	1	1.25	1.25
Cup Soup	2	466	32	64	2	0.39	0.78
Cup-a soup	4	466	32	128	4		0.69
Mush/Garl Soup	2	466	32	64	2	0.82	1.64
Variety Soups (8)	8	466	32	480	15	1.27	19.05
Knorr Pea/Ham	2	466	32	64	2	0.39	0.78
Chicken Supreme	2	322	150	300	2	1.55	3.1
Beanfeast	3	322	120	360	3	0.85	2.55
Beef Curry	3	322	120	360	3	0.95	2.85
Beanfeast Bolognes	2	322	120	240	2	0.85	1.7
Bat Beanfeast	2	322	120	240	2	0.83	1.66
Chow Mein	4	322	120	480	4	0.95	3.8
Savoury Mince	2	322	120	240	2		
Mexican Chilli	2	322	120	240	2		
Macaroni	2	250	500	3000	6	0.64	3.84
Smash Potato	6	333	120	960	8	0.61	4.88
Spaghetti	2	350	500	3000	6	0.85	5.1
Primula Chives	1			0	1	0.99	0.99
Choc. Crunch	1		144	720	5	0.65	3.25
Banana Crunch	1		144	720	5	0.65	3.25
Dried Pears	1	250	250	500	2	1.49	2.98
Dried Apricots	1	250	250	500	2	1.49	2.98
Apples	1	165	250	500	2	0.41	0.82
Mixed	1		250	1000	4		
Custard	1	420	210	2100	10		

Table 3 overleaf is a diet sheet giving the calorie intake on 2 typical days for one expedition member. Other than Tunnocks caramel wafers, Walker's oatcakes and fruit cakes all the food was bought locally in Britain.

The food was about half of the advance freight (the other half being climbing gear etc.) sent out by Icelandair from Glasgow to Keflavik and onward by Greenlandair to Constable Point. The total cost was £841.12 for a nominal 250 Kg and we had to pay cash at Glasgow airport.

The Air Waybill was made up as follows:

Icelandair	Glasgow to Keflavik @£1.48/Kg	£370.00
Greenlandair	Keflavik to Constable Point @ £1.535/Kg	£383.75
	"Basic" ?	£17.65
Servisair	Export Handling	£14.00
Servisair	Air Waybill fee	£6.00
Servisair	Preparation fee	£16.00
Servisair	Process labelling	£6.00
Servisair	Security X-Ray	£5.00
Servisair	Transit Fee	£22.72
	Total	**£841.12**

Most of the food was freighted wrapped in polythene bags inside strong cardboard boxes and survived the transit well. Despite good intentions the contents could have been better arranged as day packs, so that all the boxes need not have been opened at once. In the event we all had sufficient to eat and some drastic reductions (by burning) were made before the walk/ski out to the coast. Ian Angell personally lost about a half stone in weight which he reckoned is pretty good for this kind of trip.

Table 3, Specimen diet sheets for SMC Greenland trip 1996

Day 1

Time	Food	Quantity	cals/wt	Total cals
8 hours	Tea	3 cups		0
	Milk in tea	3 cups		5
	Porridge	1/2 cup		190
	Mars bar	1 small	452/100gms	90
	Oatcakes	4	57	228
	Marmalade	4 tablespoons		280
	Biscuit	1		120
12 hours	Oatcakes	4		228
	Sardines	1/2 tin		120
	Fruit cake	1/2 cake	364/100gms	728
	Caramel W	2	120	240
	High 5	1/2 packet		150
20 hours	Soup	1/2 packet	256	128
	Beanfeast	1 packet		386
	Smash	1/2 packet		425
	Custard	1/2 packet		186
	Dried apples	1/2 packet		375
	Coffee	1 cup		50
	Tea	2 cups		0
	Biscuits	1		120
		Total daily calories, Day 1		**4049**

Day 2

Time	Food	Quantity	cals/wt	Total cals
8 hours	Tea	2 cups		0
	Milk in tea	2 cups		5
	Porridge	1/2 cup		190
	Mars bar	2 small		180
	Oatcakes	6	57	342
	Marmite	Small disc		24
	Biscuit	1		120
12 hours	Oatcakes	4		228
	Cheese	4 slices		308
	Fruit cake	1/2 cake	364/100gms	728
	Caramel W	2		240
	High 5	1/2 packet		150
20 hours	Soup	1/2 packet		128
	Beanfeast	1 packet		386
	Pasta	1/2 packet		863
	Custard	1/2 packet		186
	Fruit cake	1/2 cake	364/100gms	728
	Coffee	1 cup		50
	Tea	2 cups		0
	Biscuits	1		120
		Total daily calories, day 2		**4976**

Chapter 8

SMC Staunings Alps, Greenland, Expedition 1996 - Climbing Report

by Stephen Reid

Equipment

Twin axes, crampons and plastic boots were essential. Rock shoes were useful but one could manage without. A fairly light, alpine style, rack is sufficient though it should include some larger camming devices (2.5, 3). A few ice screws and lots of slings complete the climbing kit. Skis were useful for travelling and all members of the party used them. Crossing snow bridges on the Upper Berserkebrae would have been more dangerous without them, but at lower altitudes they had to be carried and became a liability. Seven of the team skied in plastic climbing boots, one climbing in ski-touring boots. Pulks or Snow Sledges were used by all. Mostly these were simple home made versions constructed from children's plastic toboggans and bamboo canes but one "Snow Sled" was taken. The latter was considerably more stable and provided useful storage at basecamp. But it was also expensive, awkward to carry, and suffered some damage on the dry glacier that was costly to repair. The home made ones, by contrast, cost under £30 to make, lasted well and could simply be burnt when they became redundant. Their only fault was their lack of stability when fully laden; some sort of outriggers could possibly rectify this.

Basecamp

The expedition was fortunate in being landed by ski-equipped Twin Otter on Col Major (2040m) in the heart of the Staunings Alps, the first time that an areoplane has ever been landed on the col. This gave us relatively easy access to a number of unclimbed peaks that had been ignored by previous expeditions. Col Major, a large depression shaped plateau at a height of around 2000m is the source of both the westward flowing Gully Gletscher and the eastward flowing Berserkebrae, arguably the two most important glaciers in the range. It is defined at its boundaries by some spectacular peaks and other important features.

To the immediate north lies the highest peak in the Staunings, Dansketinde (2930m) with the formidable looking Hjornspids (2860m) to its east. Coming south one crosses the head of the huge couloir which provides the only reasonable descent to the Berserkebrae. South of this are Shirley's and Susan's Peaks (2238m) and then a 500m cliff topped by seracs drops away steeply to the Berserkebrae Glacier below. The southern edge of Col Major is defined by Lambeth (2500m) with its rocky North-East Ridge and north-westerly snow arete and subsidary snow dome. Moving westwards the Gully Gletscher drops steeply and presents a complex maze of crevasses in summer though in spring it proves an easier passage. The west side of Col Major is bordered by the impressive South-West Ridge of Dansketinde and its numerous subsidary peaks. This ridge was named by us the Dødøenryggen (Dead Eagle Ridge) (2580m) due to its appearance as viewed from base camp.

Climbing Conditions

Our initial impression was that the rock climbing potential was considerable but that the crags themselves looked forbiddingly difficult for a lightweight alpine style approach. However closer acquaintance with the rock soon proved it to be very user friendly being composed largely of

extremely rough well weathered golden-red granite liberally supplied with holds and cracks. As was to be expected there was much loose rock but hardly any rotten rock and the little that there was easily distinguished.

Snow conditions were generally good, though the overlying layer of neve was generally thinly applied to very hard brittle ice and this could be encountered on steeper slopes of any aspect. The snow was at its best in the early hours, becoming quite soft by mid-morning. Although avalanche debris could be seen, avalanches were not a great problem except after heavy snow fall. Such was the one triggered by Jones and Bickerdike on the Hjornspids. Cornices were present but were seldom worrying, that encountered by Preston and Reid on Dansketinde being a notable exception. Alpine type stonefall was virtually non-existent.

Susan's Peak

On the evening of their arrival (23rd July 1996) all members of the team made the first ascent of Susan's Peak (PD, 2238m), a southerly outlier of Shirley's Peak, in an hour or so from base camp. The route, via the southern flank, was a simple snow slope ascended on ski to the foot of a 50m rock scramble which led to the summit.

Aliertinde, Jaalspids

The following day, Jones, Bickerdike, Preston and Reid made a concerted assault on the northern most of the three major peaks lying on a superb ridge of three major peaks and several minor tops forming the tail end of the South West Ridge of Dansketinde. Jones and Bickerdike climbed the east facing couloir between the northern most and central peak, (This we have christened the Jones/Bickerdike Couloir, though it seems likely that it was climbed in May by a Norwegian expedition who were making the first ascent of the Tårnet and may already have been named). They followed this couloir for 400m taking the right hand branch until it petered out. From there they moved left onto rocks and climbed a short corner and a slab. A short steep wall led to easier ground from where the left hand of two V grooves was followed, moving right at the top. The ridge beyond was gained by a rising traverse leftwards, and then followed for about 30m with an awkward move across a gap to gain the summit which they called Aliertinde (AD, 2580m). Meanwhile Preston and Reid climbed the same peak via its North East Ridge (AD-) which they gained from a prominent col at the start of the ridge which they named Col Wyn. The knife edged ridge led to leftward slanting snow slopes with some hard ice patches and finally three, quite awkward, mixed pitches slanting leftwards to the summit. En route they also climbed a small but significant rock peak to the north of Col Wyn (they called this Jaalspids, PD+, 2100m approx.). This was climbed by slanting diagonally rightwards from the col for one pitch and then out-flanking the steep summit tower on the right. Despite the detour, Preston and Reid arrived on the summit of Aliertinde whilst the others were still in situ and all descended via the NE Ridge which had proved to be the easier of the two routes climbed. Meanwhile the two McKenzies and Shackleton failed on the NW ridge of Lambeth due to dangerous snow conditions.

Susan's Peak to Shirley's Peak

White out conditions stopped play for the next two days though on the 26th Bickerdike and Angell took advantage of short clearer spell to traverse the ridge from Susan's Peak to Shirley's Peak (PD). Meanwhile a reconnoitre of the route to Gully Gletscher Glacier showed that it would be impassable to skiers towing pulks due to its seriously crevassed nature.

Tårnet, Annsketinde, Dansketinde

On the 27th better weather saw Preston, Reid, Jones and Bickerdike return to the fray in the Dødøenryggen. Both teams followed a broad east facing couloir (which we named the Reid/Preston Couloir) to a breche between the central and southernmost peaks. Here Preston and Reid opted for the formidable looking central peak (D, 2532m) via its SW face. This was found to go easily in three pitches by a route following more or less a gully line leading to a gap to the left of the central tower but they were disappointed to find a cairn on the lower of its twin summits. It has since been discovered that a Norwegian team had previously climbed the peak in May this year via the Jones/Bickerdike Couloir and its NE ridge, naming it Tårnet (The Tower). Meanwhile Jones and Bickerdike succeeded on the southernmost peak which contrarily proved much harder than it had looked from base camp, and which they christened Annsketinde (D, 2460m). Their route was spectacular and is described as follows. from the breche the snow arete leads leftwards to a short pinnacle. Descend from the pinnacle and climb the corner to the left of the buttress. From the top of the corner move right onto the west face for about 20m. Climb a short chimney to gain the ridge, then descend into a small bay to the right of the ridge. A pinnacle bars the way. Move up and left and gain a downward sloping ledge on the east face to a corner. Cross the face to gain the ridge again. Descend the ridge to below the imposing corner that leads to the summit block and climb this to the top. They then went on to repeat Tårnet. On the same day Angell, Shackleton and the MacKenzies climbed Dansketinde (the highest peak in the Staunings at 2930m) by the original route (D+) from the col to the east via a broad icy couloir and then easier snow slopes to the summit. Susan MacKenzie seems likely to have made the first female ascent of this mountain.

North West Ridge of Dansketinde

On the 28th Preston and Reid left base camp at 4am for the beginning of an arduous 24 hours during which they gained and climbed the previously unexplored North-West Ridge of Dansketinde which proved to be an exceptionally spectacular route wending its way amongst gigantic towers. They crossed Col Wyn and descended diagonally northwards on steep hard ice slopes to the unnamed glacier beyond. At the head of this they climbed a 400m couloir (Preston/Reid Couloir, III/IV), exiting via its left hand branch, to a heavily corniced col overlooking the Vikingbrae Glacier and at the foot of the unclimbed Northwest Ridge (8hrs). The route then taken was as follows.

Initial gendarmes are outflanked on the left by steep snow slopes with some rock, narrowing to an open gully that in turn led to an obvious nick in the ridge at the foot of a formidable gendarme (6-8 pitches in total). From here the route is described in pitches. The actual measurements were not recorded but most pitches were less than 30m.

1. Climb the broken groove in the crest and continue directly through the break in the roof to the top (IV).

2. Follow the crest to the next Gendarme and outflank this on the right via a loose ledge system (IV).

3. Climb the chimney 20m left of the corner and follow the crest to belay in the bowels of a monster gendarme (IV).

4. Avoid the chimney by a line on the left up rock and mixed ground almost to the top and then drop down a small snow chimney on the south side (III).

5. Traverse right and up a short chimney to the top of the Gendarme (a short pitch) (III).

6. Follow crest to exposed platform halfway up face on the north side of the next gendarme (looks unlikely from below but is actually quite easy) (III).

7. Climb the corner on the left to rejoin the crest and follow it to a belay (III).

8. Traverse on to the south side and easier ground and go up to a big block belay (III).

9. Carry on traversing right and up to a belay on a snowpatch in a corner (III).

10. Avoid the corner on the right by climbing the left side of the flake on the front of the face, then dropping down the right side of the flake to spikes. From the lowest spike tension right across a groove and climb up to belay immediately so as to protect the second (V). It may well be possible to avoid these rope manoeuvres by climbing round leftwards from the base of the flake but it would require better snow conditions.

11. Staying on the south side of the ridge, climb rightwards to a disintegrating chimney and up this for 15m. Make a difficult descending traverse to the bottom of an icy corner and climb it and easier ground above to dodgy pinnacles (IV). There may be better lines.

12. Regain the crest and follow it with an exposed hand traverse on the north side to the foot of a vast rock tower. Cross the breche and climb steeply up rightwards for 10m to a belay.

13. Traverse rightwards on disintegrating flakes, crossing the base of a loose chimney and climb up and right to a solid spike belay on a snow ledge (IV)

14. Climb back left into the chimney and follow it to its top (IV). Abseil down the other side to snow patches.

From here the route became easier, a good thing as the beautiful weather of the morning had given way to a Cairngorm style blizzard. The rocky ridge was followed for several more mixed pitches until several isolated towers could be easily outflanked by snowfields on their left. The final tower (a subsidiary summit) was climbed. Beyond this, what would no doubt have been a simple snow arete in good visibility led to the summit and the welcome discovery of footprints left by Angell's party on the previous day. It was 1am. The original route was followed in virtual whiteout conditions and heavy snowfall to a welcome return to basecamp at 4am.

The climb was graded TD+ for overall seriousness though technically the difficulty was not high.

Hjornspids, North west and South Ridges

The following day, Angell and Shackleton repeated the North West Ridge of the Hjornspids (2860m) (at least D+ in the prevailing conditions and probably the fourth ascent), gained from the col between Dansketinde and the Hjornspids. Meanwhile Jones and Bickerdike made the first ascent of the South Ridge of the same peak. They climbed a prominent couloir ("Pearly Gates Gully") leading from the upper glacier basin to a breche between two shattered pinnacles, the right hand pinnacle being on the South Ridge proper. From the breche a shattered gully led to the ridge and the rock improved. From here the route is described as follows,

1. & 2. Cross the ridge onto the face beyond. Climb the groove line diagonally rightwards for two pitches to a small snow gully.

3. Continue moving up rightwards to a small overhanging corner, moving up left at first before again moving up right to a thin corner.

4. Up snow to shattered ground.

5. Up trending leftwards, steep in parts then to easier ground.

6. Climb up steepening ground to the crest below a steep wall.

7. Follow a thin traverse line, in the impossible looking wall above, rightwards around a corner (VI+) to a 5m detached flake with a "Thank God" jammed block. Climb the flake (VI) to a wide ledge.

8. Move right and up the snow gully and the ice choked chimney to the crest.

9. Above is a steep thin corner to the left and a shorter but overhanging crack line, which can be avoided by moving up and traversing rightwards round the corner, into a short V groove. This is climbed, exiting left to arrive at a big ledge above the steep alternatives.

10. Climb up the pleasant 4m crack and move left onto a large platform 3m below the summit block.

The route was described as committing and graded TD+ overall.. Both parties met on the summit and descended via the NW Ridge, triggering a major slab avalanche en route!

Shirley's Peak

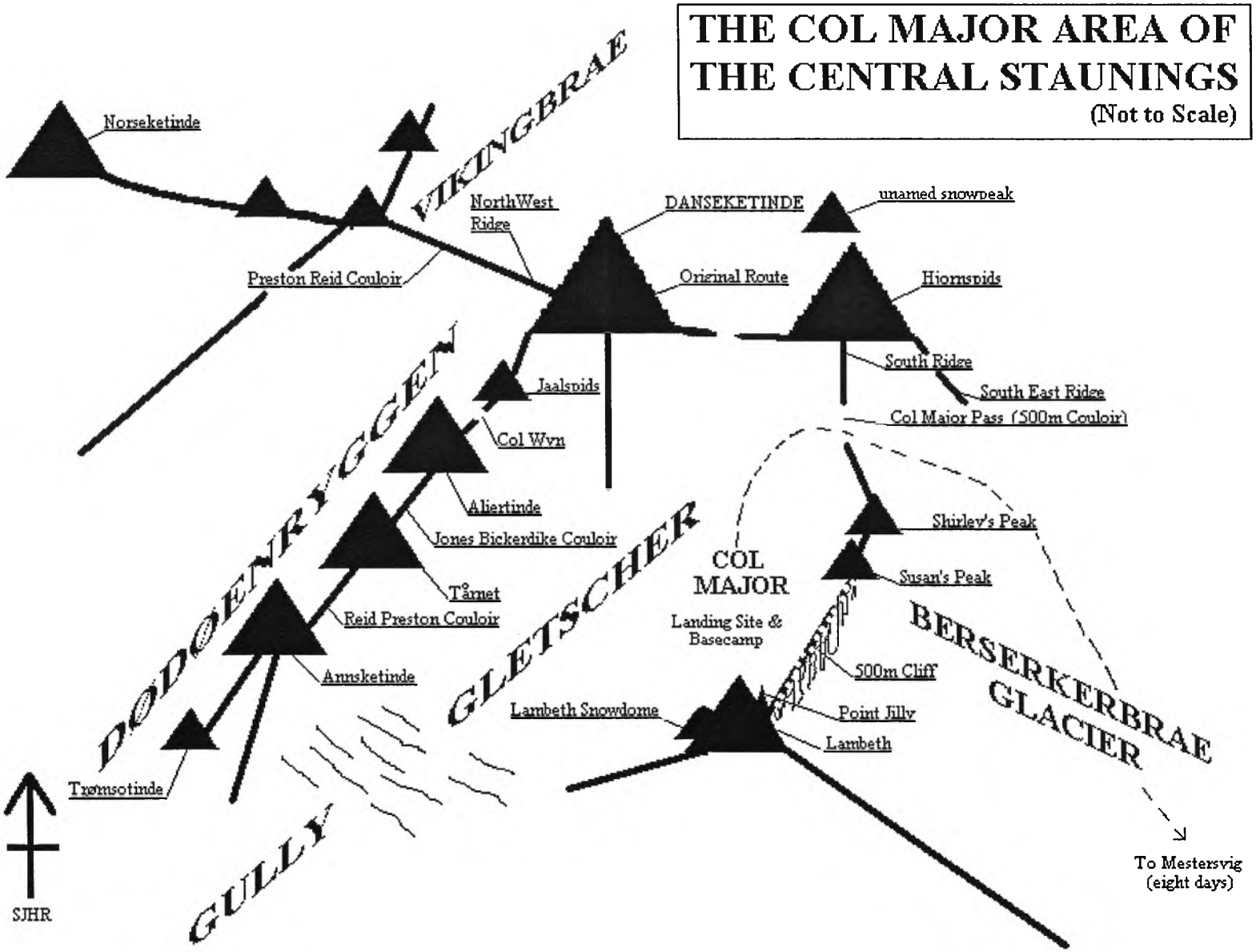
On the same day, the Mackenzies attempted an unnamed and possibly unclimbed snow peak to the north of the Hjornspids but were thwarted by a very large bergshrund. They then repeated Shirley's Peak via the original route from the north (PD).

Lambeth, Point Jilly and Dansketinde

On the 31st Bickerdike, Shackleton, Preston and Reid climbed Lambeth (ca 2500m) via its rocky NE Ridge (PD). This mountain has had at least three previous ascents. On the descent, Reid and Shackleton made a detour to climb the most prominent gendarme on the ridge which they named Point Jilly. The same evening, Jones, Bickerdike and the indefatigable Preston repeated the original route on Dansketinde arriving on the summit in time to enjoy magnificent views provided by the midnight sun. The route up Lambeth was repeated by the MacKenzies the following morning.

The Journey to Mesters Vig

On the 1st August, worsening weather and snow conditions prompted a descent to the Berserkerbrae Glacier with a view to climbing at a lower altitude. In the conditions encountered (soft snow, temperatures seldom below freezing, poor visibility and incessant drizzle) the journey to Mestersvig took an arduous eight days and no further climbing was attempted. Problems encountered included difficult route finding amidst crevasse mazes, a complex though thankfully short icefall, an awkward glacier stream crossing and fording the Skel. A final three and a half days walking, via the Gefion Pass, with heavy loads completed the exercise. It is noteworthy that the same journey undertaken by Angell in May 1994 had taken only two days and was skiable in its entirety.


THE COL MAJOR AREA OF THE CENTRAL STAUNINGS
(Not to Scale)
Norseketinde
VIKINGBRAE
NorthWest Ridge
DANSEKETINDE
unamed snowpeak
Preston Reid Couloir
Original Route
Hiornspids
South Ridge
South East Ridge
Jaalspids
Col Wyn
Col Major Pass (500m Couloir)
DODOENRYGGEN
Aliertinde
Jones Bickerdike Couloir
Shirley's Peak
COL MAJOR
Landing Site & Basecamp
Susan's Peak
Tårnet
Reid Preston Couloir
GLETSCHER
BERSERKERBRAE GLACIER
Annsketinde
500m Cliff
Lambeth Snowdome
Point Jilly
Lambeth
Trømsotinde
GULLY
To Mestersvig (eight days)
SJHR

CHAPTER 9

The WEATHER and SNOW CONDITIONS

John Bickerdike and Jonathan Preston.

The Weather.

John Bickerdike.

"The weather has been terrible this summer, you have been very unlucky with the weather for July and August."

"The Norwegians came in May and they didn't have a cloud for three weeks" -Thus were we greeted at the Mestersvig airstrip at the end of the trip. Up until that time, despite speaking to many who had previously visited the area, we had been blissfully unaware of exactly what to expect and equally unaware of whether we had been getting a good meterological deal or not. I'm still not really sure, but one thing is certain, the weather did appear to be unusual!

On our approach to Greenland we left from Akureyri airport on the 23rd of July in reasonably sunny weather and about 70% cloud cover. The sea level barometric pressure was sitting at 1014 mb and on arrival at Constable Point, some two and a half hours later, this had dropped to 1007 mb. Ordinarily this would have been ominous, but the weather was hot, bright and sunny with virtually no wind. *En route* there had been a spectacular demonstration of localised weather effects due to the presence of ice and icebergs. As we approached the Greenland coast near Scoresbysund the larger icebergs could be seen punching there way up through the thick offshore sea mist.

The flight north to the Staunings Alps was a further hour and the weather improved the further north we went. The landing on Col Major was made in perfectly clear, sunny and windless conditions, possibly the best day of the whole trip, now that's what I call lucky, especially in view of the traumatic landing.

Making allowances for the 1040 metres at which we were now based, the sea level barometric pressure was still sitting at 1007mb, but not for long. The following morning it had fallen to 1004mb and over the next two and a half weeks remained between 1000 and 1004 mbs. Surely the portents of seriously bad weather but, it never really came.

During the whole period the weather was virtually windless. The only exception to this was one instance at the end of the first week. The day had dawned bright, sunny and again windless but with well defined lenticular cloud formations. This corresponded with, what turned out to be, Jonathan and Stephens' 24 hour first ascent of the North West Ridge of Dansketinde (TD). Their return at 4.00 am on the following morning with ice plastered to eyebrows and newly sprouting beards, was evidence that yes, it had been quite windy on the tops. Whereas for our part at base camp we were blissfully ignorant of the trauma evidenced only by the 2 inches of fresh snow around the tents.

We remained at the centre of a very stable albeit cyclonic weather system for the whole three week period broken only by a storm on the day we were leaving Mestersvig when fresh winds and a warm front brought rain at sea level, fresh snow above 300m and a barometric reading returning to 1012 mb. The weather had apparently been influence by a large stable area of high pressure over Scandinavia during the period, which had held the deep low we had been experiencing securely in place over Greenland

So how did this weather compare to the norm? Historical information obtained from Glasgow Weather Centre is reproduced below. This is for Scoresbysund some 100 miles further south in 1949 to 1960. Slightly warmer, drier and less precipitous data was available for Myggbukta, about 100 miles further north than where we were based.

Scoresbysund / Cap Tobin, 70 25'N, 21 58'W, Altitude 42m, Period 1949-60

Temperatures, degree celsius							Relative humidity		Precipitation		
Month	Mean daily		Mean monthly		Absolute		Timing		millimetres		
	Max	Min	Max	Min	Max	Min	0630am	1430pm	Mean monthly	24hr max	Days of 0.1mm or more
January	-12.3	-19.8	-2.0	-32.5	4.6	-40.0	74%	73%	29	19	10
February	-12.7	-20.0	-0.7	-30.9	7.4	-41.6	73%	75%	32	28	8
March	-12.9	-20.8	-3.1	-32.3	0.6	-37.8	78%	76%	26	17	9
April	-8.5	-16.9	-0.2	-27.4	4.7	-32.5	73%	78%	25	24	9
May	-1.0	-8.1	5.2	-19.1	8.2	-25.6	83%	85%	10	13	4
June	3.0	-2.0	9.1	-5.4	11.2	-8.0	86%	85%	21	34	4
July	5.2	0.1	10.6	-2.9	16.1	-4.4	87%	85%	26	27	5
August	5.7	0.1	10.8	-3.3	14.1	-5.0	85%	80%	33	31	6
September	2.0	-2.1	7.4	-6.7	10.5	-11.5	86%	87%	67	51	8
October	-3.4	-7.7	3.3	-14.4	7.1	-20.5	86%	85%	49	114	11
November	-7.7	-13.1	0.1	-22.0	3.6	-30.6	82%	80%	76	140	11
December	-11.1	-17.3	-1.9	-27.9	5.5	-34.1	79%	84%	59	70	12
Year	-4.5	-10.6	11.7	-36.4	16.1	-41.6	81%	81%	443	140	97

As far as temperature is concerned the average daily minimum for July and August one would expect is in the region of 0 degrees Celsius. Allowing for the altitude of 6,700 feet at which we were based this would translate into an average minimum of about minus 18 degrees Celsius. In practice even though it did freeze most nights the coldest temperature we experienced was minus 7 degrees Celsius. The stable air mass would appear to have kept away cold winds from the ice cap and from further north. During the daytime the breathless conditions did mean that in the sunshine it was at times very warm and minimal clothing was the order of the day -very pleasant.

As far as precipitation is concerned we had snowfall on two occasions. One fall of 50 mm and a more substantial fall later of 150mm giving a rain equivalent of 20mm. This compares reasonably well with the statistical figures. During the two week period we were based at Col Major there were only two days when we were unable to climb because of low cloud and snow. Even then it was not particularly unpleasant, again because of the windless conditions.

There were also some localised conditions it is possibly worth commenting on. Because of the location of our base camp on the downward western slope of Col Major, when there was a slight breeze from the East we were often enveloped in a leeward cloud. This was particularly frustrating because the mountains above and around us were clear and sunny. The warmer and damper air from the coast via the Berserkebrae was cooling and condensing as it rose over the Col and the pressure dropped in the lee

Another phenomenon was that there was often a cloud inversion and poor conditions in the lower valleys something with which we had to contend during the last week of the trip whilst we made our way slowly towards Mestersvig. During these six days we had to contend with poor visibility overcast conditions and the very occasional drizzle.

Weather and snow conditions.

Jonathan Preston UIAGM

Out of a total of 19 days spent in Greenland we experienced 7 days of sunshine and 12 days when it was cloudy. Out of the 12 cloudy days, 6 resulted in snow and one, when we were lower down, in rain. There were 5 days of cloud with no precipitation.

In general the weather in the Staunings Alps was poor for much of the summer (May and June appears to have been good throughout). A blocking High over Scandinavia, deflecting mid-Atlantic frontal systems North to effect the East coast of Greenland may have been responsible. Also, it would appear that there are more unstable air masses in August, after summer insolation and subsequent high levels of humidity. However, the weather did not interfere with the climbing programme in July and rest periods were enjoyed during the short spells of bad weather, which never lasted for more than 24 hours at this point.

Very little wind was in evidence at any time, except on the summit of Dansketinde, 2930m, the highest point In the massif when over 28/29th July gusts of circa 50 mph were experienced in white-out conditions.

Cold air sinking off the ice cap and the Staunings glaciers led to frequent temperature inversions and the lower glaciated valleys often remained in a bank of cloud while the higher ground above about 600m stayed clear.

August saw a deterioration in the weather with the pattern of one bad day sandwiched between 2 good days broken for the first time. More prolonged periods (up to 4 days) of bad weather ensued.

The average freezing level was at around 800m, this was the level at which the snow petered out on the Beserkerbrae glacier. However, by August 10th there had been overnight snow down to 150m above sea level in Mestersvig.

Though the sun never sets in Greenland until August 5th, when it begins to actually dip below the horizon, the temperature drops dramatically at 'night' once the sun disappears briefly behind the high peaks. Air temperature by 9pm was down to -5 C, to never lower than -10 overnight and warmer during cloudy spells at night. The daytime temperature varied with cloud cover, in direct sunlight it could rise to 19 C, when cloudy during the day, between 5 and 10 C.

Snow Conditions

Snow conditions experienced varied tremendously with aspect of slope. Cornice formation at the top of South facing slopes indicated North winds had been blowing at some point, but bad weather seemed to originate mainly from the south and therefore during our visit it was the North facing slopes that proved most troublesome. The one slope which did avalanche was the North West slope of Hjornespids. On 30th July a one metre deep crown wall was observed stretching for 50m across the slope along with a smaller one on the North East side of Dansketinde. The North West slope on the snow dome adjacent to Lambeth, was also judged to be unsafe on the 24th July. Some residual avalanche debris was noticed at the foot of grade 1 couloirs.

In general it was very rare to be able to walk on the surface of the snow below about 2,000m without breaking through, usually up to the ankle. Good spring snow skiing and good cramponing conditions did exist on occasions most commonly on the more windswept Southerly and Easterly slopes.

On 25th July about 5cms of fresh snow fell with very little wind, a light South Easterly if anything at all. Snow pits dug the next day, to a depth of about l.5m revealed good adhesion between layers on shear tests and Rutschblock analysis. On 29th July a further 15 cms. of fresh snow fell with a strengthening Southerly wind resulting in some slab build up on North facing slopes.

Other observations included on one occasion finding a 2cm thick ice layer one metre beneath the surface. After clear, cold nights big surface hoar crystals were in evidence. High up, close to the summit of Lambeth at around 2400m almost 20cm of soft depth hoar was encountered. On other slopes here some suspect layers were observed in 8cm sections of soft slab which lay under 2cms of fresh snow on top of a much firmer base layer. In the couloirs that we climbed in order to reach the start of rock or mixed routes we often found hard ice covered by a layer of unconsolidated soft snow. The snow pack below the East side of Col Major contained a layer of soft ice granules in places, 10cms in thickness, sandwiched between a 5cm layer of wet fresh snow above and pure Ice below. Soft, wet fresh snow, up to 10cms deep, hindered navigation on the lower part of the glacier on the ski out.

Chapter 10

Wildlife (Flora and Fauna) seen in the Staunings Alps and environs.

Brian Shackleton

The opportunities for studying wild life during the expedition were limited to the latter stages of the expedition, when the Bersaerkerbrae glacier was left behind and the journey to Mesters Vig was completed on foot. Up until this point, there were neither sightings of birds, animals nor greenery, either near the camp or on any of the mountains around Col Major. In contrast to earlier SMC expeditions to the area, we were never troubled by foxes or other inquisitive animals looking for food around any of our campsites.

This lack of wildlife can be most probably attributed to our campsites being at elevated altitude (above 2000m at Col Major) or at points on the glacier far from exposed rocks. The first sighting of any wildlife took the form of a well preserved bird skeleton far down the Bersaerkerbrae, it almost certainly being that of an Arctic Skua from its size. The following notes are from my own observations during the trip and are not necessarily fully comprehensive. Fuller coverage is devoted to flora since the opportunities to study birds and animals were limited.

The Flora of the Staunings Alps.

Many of the plants were familiar to the visitor from Scotland to this part of Greenland, since the areas covered by vegetation is similar in many ways to that found on the high Cairngorms plateau. There is, however, greater diversity in the plant life on the Greenland tundra and with the short growing season concentrating the growing and flowering period to a short 3-4 month period, there is much to catch the eye of the visitor when the snows of the glacier are left behind.

On leaving the Bersaerkerbrae and descending the lateral moraines towards the Skel valley, the primary colonisers were Moss Campion, and Arctic Willow Herb but principally Dwarf Willows. Other less prolific early colonisers included Purple Mountain Saxifrage and Mountain Sorrel. The Skel flats with ample supply of water on stable surfaces provided our first campsite off snow of the expedition surrounded by Arctic Willow Herb in profusion. Across the Skel river, once the moraines were left behind, the vegetation changed to basically that of dense arctic heathland. On the south facing slopes leading to the Gefion pass, this heathland was chiefly made up of large areas of Cassiope, Willow and Mountain Avens with very little grass which one would find at home. Additionally, Harebells, Alpine Cinquefoil, Alpine Fleabane and Arctic Bilberry were apparent, the latter providing a good excuse to remove a heavy load and enjoy the ripe berries before continuing towards the Gefion.

The top of the Gefion pass provided a very contrasting site for plants, the wet flats including springs and expanses of windswept gravel. Here, several species of Saxifrage as well as colonising mosses were apparent, extending down on the more sheltered slopes on the north side of the Gefion. Beyond, the heath habitat reappeared, although with increasing diversity when compared with the slopes above the Skel river. The damp areas around streams appeared well suited to Yellow Mountain Saxifrage, and Dwarf Birch became apparent elsewhere. Yet more plants appeared on the approach to Mesters Vig with Arctic Mouse-ear and various Drabas colonising the screes beside our track and extending to the very edge of the Air Strip itself. As ever, the Mountain Avens and Moss Campion were prolific and isolated yellow Arctic Poppies provided an occasional surprise.

Bog Cotton was seen in the more water logged areas near to the coast only.

Plant List:

Betula Nana	Dwarf Birch
Campanula Rotundifolia	Harebell
Cassiope Tetragona	Bell Heather
Cerastium Alpinum	Alpine Mouse-ear
Cerastium Arcticum	Arctic Mouse-ear
Chamaenerion Latifolium	Purple Arctic Willowherb
Diapensia Lapponica	Diapensia
Draba Aizoides	Alpine Whitlow Grass
Dryas Octopetala	Mountain Avens
Erigeron Alpinus	Alpine Fleabane
Lychinus Alpina	Alpine Catchfly
Oxyria Digyna	Mountain Sorrel
Papaver Radicatum	Yellow Arctic Poppy
Potentilla Hyparctica	Arctic Cinquefoil
Salix Arctica	Arctic Willow
Salix Herbocea	Dwarf Willow
Salix Polaris	Dwarf Willow
Saxifraga Aizoides	Yellow Mountain Saxifrage
Saxifraga Cernua	Drooping Saxifrage
Saxifraga Nivalis	Arctic Saxifrage
Saxifraga Oppositifolia	Purple Mountain Saxifrage
Vaccinium Uliginosum	Northern Bilberry

The Fauna seen on the expedition.

Very few if any birds were seen until the moraines were left behind, the Skel flats with ample water and insect life (mosquitoes) being a more hospitable environment. The Plover was a familiar sight, as was its call, here and on the slopes leading to the Gefion pass. The smaller Snow Bunting and Wheatear were also seen around the camp at the top of the Gefion. By far the most exciting observation, however, was that of a solitary Musk Ox one morning on the Gefion. Only the previous day, fresh foot prints had been seen in the area and it was now particularly exciting to see this the largest of Greenland's mammals relatively close to our camp. The beast was clearly shy and moved away up the hillside once cameras and binoculars were trained on it.

Although a rifle was carried throughout the expedition, Polar Bears were not encountered and the use of the rifle was restricted to practice firings only.

However, at Dr Washburn's house another party reported a Polar Bear in the vicinity of Mesters Vig harbour, their decision being to spend a couple of days away from the coast to allow the bear to move on.

Once at the coast, we saw no sign of the Polar Bear, but evidence of an attempt to enter a deserted hut, via the wall, was a sobering reminder of this potential source of danger.

It is interesting to note that the Danish military personnel stationed at Mestersvig reported that two wolves had been sufficiently inquisitive to visit the area in the spring. Previously wolves have been reported to be extinct in the area.

Arctic Tern were seen at Mesters Vig harbour, this barren section of coast generally being rather disappointing from the ornithological point of view.

Chapter 11

A study of group dynamics in an isolated and challenging environment

Susan Mackenzie

Contents

1. Background

Research suggests that when aggregates of people come together for a purpose, they may, or may not form a psychological group which achieves goals and produces member satisfaction. Most studies of group effectiveness have been carried out in organisational contexts. In this case, the added dimension of an isolated and challenging environment with the absence of other groups presents further interest.

The expedition to the Staunings Alps in East Greenland, took place in July and August 1996. There were eight group members who organised food and equipment in pairs and slept in two person tents. Discounting travelling time from Scotland, the actual time spent in Greenland was 18 days. The group flew into and camped on the remote Col Major and satisfied various climbing objectives from there. The final part of the expedition involved moving out to Mestersvig on the coast, ski-ing as far as the snow would allow, with full packs and pulling sledges.

2. Research methods

Pre-expedition questionnaires were issued to individual group members in order to gather data on preferred team roles, personality type and preferred method of handling conflict. It was felt that these individual variables would all have an effect on actual group behaviour once in Greenland.

Observation of group members and behaviour was a useful source of data both prior to and during the expedition (Group members came together at two planning meetings prior to the expedition). All group members were encouraged to contribute to the observation process and observation sheets and behaviour analysis sheets were issued to group members.

A post expedition questionnaire was also issued to group members to assess group effectiveness in terms of teamwork and achievement of objectives and to identify factors which contributed to this level of effectiveness.

3. Findings

3.1 Pre-expedition findings

There were a number of pre-determined factors. With reference to Kretch, Cruchfield and Ballachy`s model of group functioning, some independent structural variables were pre-determined. For example, firstly, *group size* for the expedition was fixed at eight members. (This was determined by transport requirements, however Belbin has found this to be the optimum number for a team).

Secondly, there was little choice about *characteristics of members* since members volunteered for the expedition and were not selected on account of personality, for example, (though presumably previous mountaineering experience would give some indication here).

Thirdly, *status hierarchy* was established in that there was an appointed expedition leader. There was obviously some indication of what the environmental and task variables might be, but the exact nature of these could only be established during the expedition.

Observation of group members at planning meetings showed close adherence to Tuckman`s model (1965). The first stage being the 'forming' one. The set of individuals had not yet become a group. The members sought to find out about each other, to establish attitudes and background and to establish their own identities in the group. There was then a move into the 'storming' stage as some decisions had to be made and individuals had their own ideas and goals. However there was a generally good atmosphere and attempt to work together moving into the 'norming' and 'performing' stages.

Analysis of questionnaires produced the following information.

There was a wide mix of preferred team roles. With reference to research (Belbin, Honey, Margerison and McCann) this is a contributory factor to an effective team. It would be disastrous, for example, if every team member wanted to be leader. Using one of Honey's questionnaires, it was found that there were strong coordinators, challengers, doers, thinkers and supporters.

Amongst the group, there was a tendency towards the Type A Personality, defined as being more impatient and less relaxed. However, there were variations amongst team members.

Since personal differences and environmental stress are known to contribute to situations of conflict, conflict management strategies were investigated. These appeared to vary within the group. It has been found that the only win-win conflict management strategy is a *collaborative, integrative* approach. Although it is not appropriate for every situation, when used properly, it has the most beneficial effect on the parties involved and addresses everyones' concerns. Three team members found this to be their preferred conflict management strategy, whilst three others used it as a secondary strategy.

Three team members showed an inclination to the *compromising* strategy which 'splits the difference', resolving differences but not necessarily solving problems.

One team member found *forcing* to be the preferred style. This is an attempt to satisfy one`s own needs at the expense of others and can breed hostility and resentment.

3.2 Findings during the expedition

The expedition fell into two parts. Firstly people were operating as two party teams satisfying the objectives of these pairs(sometimes splitting into fours). Later in the expedition, the whole party had to move together and work as a team of eight.

One of the features of the whole expedition was the fact that people were split into separate pairs in two person tents. This led to difficulties in group communications at times (particularly when weather was bad). However, pairs developed fairly strong relationships and came out with firm objectives. There was a strong tendency, in any case, to be supportive, probably knowing that everyone relied on everyone else and that people could never really avoid each other over the 18 days. When operating together, there were clear objectives and certainly a willingness to change them when necessary. There was always consensus after discussions. Conflict was never really apparent and always dealt with by discussion (though sometimes it was difficult to get everybody together for this essential discussion). Personalities, though different, were generally compatible leading to interest rather than anguish.

Certain factors later in the expedition led to interesting group situations. The most notable would have to be the descent of Col Major. This was a long effort. It might have benefitted from more planning, but no-one could have predicted the extent of the effort. Having a member of the party who had knowledge of the area was extremely helpful.

Decisions were made by consensus taking into account the environmental circumstances. Leadership style encouraged this approach. One of the reasons for this being successful was the level of expertise within the group. People would have behaved differently with others who were less experienced. Throughout the expedition individuals took control to manage specific tasks utilising their expertise. Good equipment was also a positive factor. Despite the extreme cold at times, people were reasonably comfortable. Reasonably good weather early on led to achievement of objectives, which left people happier and more prepared to put up with the worse weather and to concentrate on moving out during the later stages.

3.3 Post expedition findings

A comparison of self-assessment (on behaviour and leadership style through pre-expedition questionnaire) with observers findings did not show up any real discrepancies. There would appear to have been a high proportion of 'doers', but people were prepared to take on different roles on different occasions. A person may have a preferred style but actual behaviour will depend on the situation. People reported on their feelings about team behaviour and objectives. These comments are reflected above.

4. Conclusions

Whilst it would seem desirable to select people for group expeditions based on research findings (a mix of team roles etc), in reality this will seldom be practical. If people know that they are dependent upon each other for survival and must co-exist, they will make an effort to work together in any case. However, having a mix of team roles was undoubtedly helpful and the group worked together, both in terms of achievement and member satisfaction. The Type A personality was seldom evident. Collaborative and compromising means of handling conflict preferred by group members certainly proved to be effective. A sense of humour also helped. It is best to achieve consensus through discussion rather than becoming antagonistic or avoiding the issue.

5. Recommendations

a. Take experienced people with good equipment.

b. Make some attempt to ensure compatibility before going (pre-meetings).

c. Have clear objectives but be prepared to change them if circumstances dictate.

d. Be prepared to accommodate and adopt a contingency approach (it is much better to apply different behaviours according to circumstances).

e. Try to get the whole group together for discussion and decision-making on a regular basis throughout the expedition.

f. Have some previous experience and knowledge of the area if possible.

g. Where personal or sub-group objectives are important, it may be wise to allow for these early in the expedition.

Chapter 12

FINAL FINANCIAL STATEMENT.

The finances for the SMC Greenland Expedition 1996 were handled by the expedition leader who opened a dedicated current bank account for the expedition. The status of the expedition allowed the choice of a charge free account so long as it was never overdrawn.

The first money collected was a deposit of £200. This was collected early to ensure each individual had a financial committment as well as a verbal committment to the expedition. All monies collected were non-refundable unless the place was subsequently filled by another expedition member. The BMC trekking insurance would have covered anyone who pulled out for reasons covered by normal travel insurance.

Subsequently the cost of the expedition was paid by individual members in instalments (£500, £432 then £170) as and when the various expenditure was needed.

Money was withdrawn from the expedition account usually by cheque although two international direct transfers were used to pay for the flights from Iceland. There was a small charge for this service. As mentioned earlier, it was not possible to transfer money to Greenland at reasonable cost and we resorted to sending Eurocheques airmail, which are valid in Greenland.

Expenditure.

Charter flight Iceland to Greenland(Flugfelag Nordurlands hf)		£2900
Charter Greenland Staunings Alps(Flugfelag Nordurlands hf)		£1445
Charter flight Greenland to Iceland (Flugfelag Nordurlands hf)		£2875
Travel Reykjavik to Akureyri return	8 @ £82	£656
Travel & accomodation Iceland (Dick Phillips)	8 @ £253	£2024
Insurance (BMC)	8 @ £149	£1192
Radio licence		£58.16
Firearms licence		£48
Freight charges		£900
Ammunition used & service of firearm		£115
Misc (priming paste, etc)		£26
Bank transfer charges		£36
Food etc.		£890
Total expenditure		**£13,165.16**

Income.

Mount Everest Foundation Grant		£800
British Mountaineering Council Grant		£800
Scottish Mountaineering Trust Grant		£800
Foundation for Sports and the Arts Gift		£385
Individual contributions	7 @ £1302 + 1 @ £1270	£10,384
Total Income		**£13,169**
Balance		£3.84.

Chapter 13

A comparison of toothpaste formulations for the Arctic.

Colwyn Jones

Introduction.

It is well recognised that, as with appetite and other aspects of personal hygiene, the motivation to maintain good oral health may diminish when individuals are isolated from their normal living routine.

While in a familiar home environment the routine of family life provides, as one benefit, regular prompts and opportunities to carry out the grooming, eating, social and leisure behaviour each individual has adopted through socialisation as appropriate. Once isolated from the routine of home life in a unknown and unpredictable environment an individual looses the prompts and ques for behaviour which is appropriate at home and may also place a different value on the need for activities such as eating and grooming behaviour.

Many of the routes which were climbed on this successful expedition took over 18 hours to complete and some were of even longer duration. The opportunities for preparing and consuming regular meals were few and the ordinary preventive oral hygiene measures normally undertaken at home were similarly affected.

Against this background, diet has to change in the Arctic when performing strenuous activity with an increase of mainly carbohydrate to ensure an adequate calorific intake of up to 5000 calories per day (see chapter 7). The frequency of food intake rises with convenient high calorie snacks, easily consumed and carried while climbing, making up a large part of the increase. Refined carbohydrate therefore constitutes a major proportion of this increased intake and this has implications for the dental health of individual undertaking arctic expeditions. Dental decay (caries) is a dynamic balance of acid attack leading to demineralisation followed by quiescent periods where remineralisation of dental enamel occurs. Although an individual may have achieved a dentally healthy balance at home by eating a suitable diet and performing routine toothbrushing, dietary and behaviour changes in the Arctic may tip the balance, such that tooth decay and periodontal inflammation occurs. Against this background the preventive action of fluoridated toothpaste on caries and of toothbrushing on periodontal inflammation cannot be overestimated.

This scientific research was carried out in co-operation with Professor AS Blinkhorn of the Department of Oral Health and Development at the University of Manchester Dental School and will allow future expeditions to the Arctic to make the best choice of toothpaste to protect dental health.

Method.

The trial was designed to allow a maximum of 3 types of toothpaste to be tested in a simultaneous, crossover design using a single group of subjects. All expedition members gave informed consented to take part. Each individual was randomly allocated to brush twice daily with one of the three test toothpastes for seven days. They then used another randomly selected second paste for seven days before using the third paste for the final seven days.

Three types of fluoride paste were tested, a 'standard' family toothpaste(Paste 1), a sensitive tooth formula(Paste 2) and an anti-tarter formula(Paste 3). All contained fluoride at 1500ppm

The scoring of taste, texture, ease of use and convenience in the arctic environment used 10cm visual analogue scales as the measurement tool. A score of zero was given for an ideal toothpaste and a score of 100 for a paste which was subjectively useless under the experimental conditions.

The scores of each individual were recorded for each of the randomly allocated pastes at the end of each 7 day period. There were no washout periods between the different toothpastes and a qualitative questionnaire was also used to record any comments about each paste.

The subjects used a separate Colgate Precision® toothbrush for each toothpaste. Statistical analysis used a simple t-test. $P<0.05$ was taken as showing statistical significance.

The null hypothesis for the study was that there was no differences between the three different fluoride toothpastes.

Results.

All of the subjects completed the trial and complete data sets were collected for each phase of the toothpaste trial.

The mean age of the 7 male and 1 female subjects was 44.77 years.

The mean subjective scores for convenience, taste and suitability for each of the three pastes are shown in table 1 below. There were significant differences between the scores of paste 2 and the other two study pastes for taste and suitability.

Table 1, Mean score for each paste.

Study paste	Convenience score	Taste score	Suitability score
Paste 1	31.63	24.38	38.88
Paste 2	28.13	11.38*	23.13*
Paste 3	29.00	20.00	31.63

*P<0.05

Discussion.

The subjects used in the study were a convenience sample of 8 individuals choosing and paying to spend 3 weeks climbing and skiing in a hostile and isolated environment. Five were members of the Scottish Mountaineering Club, one a member of the Alpine Club and one was a qualified mountain guide.

Each member had at least 10 years of climbing experience in both winter and summer to a high technical standard. They all displayed well above average fitness and had a high awareness of general health. The results from this study cannot therefore be extrapolated to the general population, only to a similar biased group.

The finding that the suitability of the three pastes was not significantly different can be largely explained by their identical packaging. All the individuals in the group completed the study protocol.

There were significant differences in the mean taste scores between paste 1 and paste 2 and paste 3 and paste 2. There was no difference between paste 1 and paste 3.

The same differences were found with regard to the overall suitability of the toothpastes with significant differences between the scores for paste 2 and the other pastes. This strongly suggests that the taste of toothpaste is a major factor in the overall suitability of a toothpaste for the arctic.

As significant differences were found in favour of paste 2 the null hypothesis was rejected and the working hypothesis for the study was that paste 2 is better suited for an Arctic environment, by members of a similar expedition than either a normal fluoride toothpaste or an anti-tarter formula toothpaste.

There were no adverse effects recorded during the study except that one toothpaste tube lost a cap resulting in soiling of the interior of a rucksack. Although this may be regarded as trivial, it is good practice to store food away from sleeping tents in areas which are inhabited by bears. They are attracted by strong odours (including toothpaste) and the prospect of a meal. The strong minty smell of toothpaste could not be removed from personal gear forming a theoretical risk for that individual.

The qualitative analysis showed 3 study subjects preferred the taste of paste 2. There was also widespread agreement in the group that a screw cap and not a flip top cap on toothpaste tubes was preferable. There was also a consensus that small tubes of toothpaste were sufficient for a short expedition.

Paste 2 was Colgate® sensitive formula and the results of this study show it is the preferred toothpaste for expeditions to the Arctic.

Acknowledgements.

The author would like to acknowledge the help and support of Dr Robin Davies, Director of the Oral Health Unit of Manchester University and to Colgate UK for providing the toothpaste and toothbrushes for this study.

Chapter 14

The Purity of water samples from the Staunings Alps.

Colwyn Jones

The following research was only possible because of the help and co-operation of Ray & Jan Castle of the Quality Department of North West Water, a United Utilities company.

Water is essential for all life. The flora and fauna of the Arctic survive because of their specialisation and adaptation to the very harsh environment. They have a precarious existence. Humans usually in the form of climbers or skiers are rare visitors to the area and to maintain the quality of this true wilderness, every effort must be made to do no damage to the fragile ecosystem which struggles for existence there.

Damage from pollution would undermine the existence of many rare forms of life in the Arctic and the aim of this study was to discover if the pollution associated with the 20th Century had reached this remote area of North East Greenland by examining the purity of the water found there.

Early discussions with North West Water Laboratory Services led to a realisation that the amount of water necessary for full chemical and microbiological analysis and the carriage and storage of these samples was prohibitive. A compromise was reached which balanced the needs of the laboratory for sufficient water to produce meaningful results, with the ability of the expedition to return with an additional large, fragile and heavy burden.

Three analyses were to be attempted;

- Organic analysis
- Metals
- Microbiological analysis

Each type of analysis required collection of the sample in different types of container and ideally the microbiological sample should be delivered to the laboratory within 12 hours of the sample being taken. As this was not possible samples were refrigerated on the return journey.

Water sample collection.

The water samples were taken from the same source at 8.30am local time on the 10th of August 1996. The site was chosen for convenience and was a free flowing stream originating from melting snow, behind (West of) the Washburn Hut (72,14.03^0 N, 24,03.22^{0}W) approximately 5 kilometres from the coast at Mestersvig.

Organic analysis

Two one litre glass demijohns were used to collect and bring water back to test for organic compounds. The water was treated to extract the base / neutral compounds and also the acid compounds.

The extracts were then combined and concentrated for analysis by headspace gas chromatography with an electron capture detector.

The sample was found to be free of any significant amount of organic pollutants detectable by this method.

A special effort was made to find polychlorinatedbiphenyls (PCBs), DDT (2,2-Bis-(p-chlorophenyl)-1,1,1-trichloroethane), other long lasting pesticides and polyaromatic hydrocarbons (PAHs). Again, the sample was found to be free of any significant amount of these compounds detectable by this method. The detection limits for these compounds is 0.2 ug/l.

The results are as follows.

Organic compound	**Detected level**		**Prescribed concentration value**
Bromodichloromethane	< 2.5	ug/l	100 ug/l
Diromodichloromethane	< 2.5	ug/l	100 ug/l
Tetrachloroethane	< 1	ug/l	100 ug/l
Tetrachloromethane	< 0.3	ug/l	3 ug/l
Trichloroethane	< 3	ug/l	30 ug/l
Total trihalomethanes	= 0	ug/l	100 ug/l

Metals

The water sample for the metals was analysed by inductively coupled plasma-mass spectroscopy the results were as follows.

Metal	Detected level	Prescribed concentration value
COPPER	< 20 ug/l	3000 ug/l
ZINC	< 34 ug/l	5000 ug/l
LEAD	< 3 ug/l	50 ug/l
IRON	= 18 ug/l	200 ug/l
ALUMINIUM	= 60 ug/l	200 ug/l
MANGANESE	< 2 ug/l	50 ug/l

Apart from iron and aluminium the presence of metals was below the level of detection.

Microbiological pollutants

The water for microbiological examination was a collected in a sterile plastic 250ml bottle and refrigerated as much as was possible on the return journey.

The water was analysed by membrane filtration. As there were a small number of large mammals (musk ox, wolf, polar bear and humans) and birds in the area an attempt was made to find Coliforms, specifically Escherichia Coli.

No bacteria were detected.

Discussion

The results from this study failed to show that any of the organic pollutants which cause problems for water supplies in the UK are present in measurable quantities in melt water in North East Greenland.

The mineral content of the water showed low levels of iron and aluminium but no detectable copper, zinc, lead or manganese. A commercial lead mine had previously been operated in the area in the 1970s but this does not seem to have affected the sample of water analysed. The levels of minerals was not significant from the purity of water aspect.

Our inability to culture any bacteria from the water samples can be interpreted as confirming that the water was not contaminated by coliforms. However, the carriage of the water sample was less than ideal and there was an unavoidable delay in the sample reaching the laboratory which may have killed any bacteria present.

These results can now be used as a baseline for the long-term monitoring of water purity in North East Greenland.

Acknowledgements.

The author acknowledges the help and advice of Ray and Jan Castle and Keith Osborne of North West Water in planning and carrying out this research.

Chapter 15

Mapping the Staunings Alps.

Colwyn Jones

A number of the maps in this chapter have been generated on DMAP for Windows software[1].

The commercial maps of North East Greenland are produced by the Geodætisk Institute in Denmark at a scale of 1: 250,000 and were originally surveyed in 1933 with some updating in 1981. The sheet number covering the expedition area is 73 Ø2. These 1:250,000 scale maps are known to have many inaccuracies and they do not contain a great deal of detail for expedition planning.

The map which was most helpful was the hand drawn one which came with Bennets Expedition Guide to the Staunings Alps published by Gaston's Alpine books and Col Productions in 1972. The original map of the North Staunings Alps had been updated by John Peden of Oban, to whom we are indebted for numerous copies. His personal experience of the area and careful research of photographs from an aerial survey done in 1958 allowed many changes to be made. This information plus expedition reports from 1961, 1986, 1989 and 1994 allowed us to identify the unclimbed peaks and the area of flat glacier where a ski-equipped aircraft could land safely.

One objective of the expedition was to improve the accuracy of the maps in the area. The latitude and longitude of features were recorded using a Magellan global positioning satellite (GPS) handset loaned by Tim Pettifer of Adventure Direct. This information may be helpful in planning for future expeditions to the area.

The (GPS) works by receiving signals from a number of US military geostationary satellites to give an accurate triangulated position and altitude. The system can be accurate to a few metres although it is encrypted to reduce accuracy for non-military users. The maximum number of satellite signals acquired by the GPS system was 4. The acquired satellites are shown on a screen on the Magellan GPS and were displayed as being on the horizon. It is reputed that overhead satellites produce a more accurate fix.

We attempted to quantify the accuracy of the system by comparing the position and altitude of the door of the tent used by Bickerdike and Jones in Base camp. The variation in position is shown in the table below. The GPS altitude measurement was very inaccurate varying by many tens of metres and has not been reported.

Table 1, Variation in base camp Position.

Date	Latitude	Longitude
23/07/96	72,06,29N	24,55,37W
24/07/96	72,06,27N	24,57,30W

The base camp latitude measurements varied by up to 2 seconds. This is estimated to be a distance of 60 metres.

The series of longitude measurements varied by 1 minute 53 seconds . Which is estimated as a distance of 1090 metres at this latitude.

The conclusion is that a Magellan GPS handset is accurate to a latitude of 60 metres and a longitude of 1090 metres at this latitude. One reason for this may be the ratio of latitude to longitude so far north. This is called the aspect of the map and can be calculated from the reciprocal of the cosine of the latitude. We estimate the aspect to be 3.28.

Using these results, photographs and diagrams we found that the peak we had ascended on the 27th July and provisionally named Diannesketinde (72,06,57N, 24,58,34W, Aneroid height 2532m), had been climbed by a Norwegian expedition on 14/05/96 by the North Ridge. The name they had given the peak was Tårnet (The Tower) and the details they provided were (72,06,40N, 24,54,45W, Height 2310m). The method the Norwegian expedition used to collect this data is unknown.

The difference in position in 17 seconds Northing and 3 minutes 49 seconds Westing. There is also a height difference of 222 metres.

The difference in latitude and longitude do not fit within the accuracy of the GPS found earlier. Despite these differences, diagrams and photographs confirms that Diannesketinde and Tårnet are the same peak. Therefore, Stephen Reid and Jonathan Preston were the second ascentionists by a new route on the south Ridge.

The position of the other peaks climbed and miscellaneous features is given below.

Site	Latitude	Longitude	Aneroid Altitude (Metres)
Base camp	72,06,29 N	24,55,37 W	2040
Aliertinde	72,07,03 N	24,58,49 W	2580
Annsketinde	72,06,53 N	24,58,39 W	2460
Dansketinde	72,07,39 N	24,57,18 W	2870
Hjornespids	72,07,38 N	24,55,26 W	2860
Tårnet	72,06,57 N	24,58,34 W	2532
Susans Peak	72,06,41 N	24,55,36 W	2238
Col Major (Top)	72,07,02 N	24,54,14 W	2110
Gefion Pass	72,10,20 N	24,14,04 W	648
S. Peak of Hesteskoen	72,11,19 N	24,14,03 W	n/a
Washburn Hut	72,13,22 N	24,03,22 W	190
Mestersvig	72,14,03 N	23,56,00 W	n/a

Expedition travel.

The expedition initially relied on scheduled aircraft to travel from Glasgow to The Staunings Alps as detailed in figure 1 at the end of the chapter. An Icelandair Boeing 737 took us from Glasgow to the International airport at Keflavik where we caught a coach to the domestic airport in Reykjavik. Here a Fairchild Metroliner, a small turboprop, took us to Akyreyri airport on the north coast of Iceland.

Next morning the weather forecast was favourable and we were flown by a chartered and ski-equipped Dehavilland Twin Otter to the gravel airstrip at Hurry Fjord which serves Scoresbysund. A short flight north landed us on the top of Col Major and a ski landing.

On our return we flew from the gravel airstrip at Mestersvig to Akyreyri by Fairchild Metroliner, from Akyreyri to Reykjavik in an Icelandair Fokker turboprop and from Keflavik to Glasgow by Icelandair 737.

Staunings Alps area.

The area we visited was the Northern Staunings Alps at the top of the peninsula which forms Scoresby Land (see figure 2).

The rock forming these mountains is predominantly granite and the highest peak in the Staunings Alps is Dansketinde (Denmarks Peak) 2795m.

South east of Dansketinde and directly south of its neighbour Hjornespids is a central snow pass called Col Major (Majorpasset), which links the Bersaerkerbrae (Bersaerker glacier) flowing to the east and our route of return to the coast, and the highest reaches of the Gully Glacier flowing to the west. North of Dansketinde the lengthy Skjoldungerbrae flows north then doglegs east. The Linne Glacier lies west of it and further west the Vikingerbrae flows west to Alpe Fjord.

An unusual feature is the confluence of the Gully and Sefstroms glaciers which flow most of the way over the foot of Alpe Fjord and produces what Bennett described as 'a secret inner fjord' called Dammen.

Southeast of Dansketinde and radiating from a group of peaks around Bersaerkertinde, the Bersaerkerbrae flows northeast, a branch of the Skel glacier (Kishmul glacier) joins the main body of ice which almost meets the snout of the Bersaerkerbrae to the east and the Schuchert glacier flows southeast. On the opposite side of the wide and comfortable Crescent col seen from Dansketinde the Lang glacier or Storgletscher (big glacier) drains south.

Where these glaciers flow towards the coast there are wide gravel valleys or Dals from the snout of the glaciers to the coasts. We reached the end of the Bersaerkerbrae and found a gentle descent along the south moraine to the Skel valley. Here the Skel river was an intimidating obstacle and the option of fording was only available in the early morning. This prompted the establishment of an overnight camp in the lovely skel valley where the first real vegetation of the trip was found. We noted that later in the day water levels in the river rose alarmingly and retreat up the Skel valley to the ice of the Skel glacier snout would be the only option for a safe crossing.

From the Skel valley we ascended the Gefion pass where we saw the first bird life of the trip. There were many small tufts of fine soft hair on the tundra which we thought came from Musk oxen and we were lucky enough to see a lone individual early the next morning on the Gefion Pass.

Descending from the pass we came across the old mine workings at Blyklippen and the abandoned accomodation and industrial buildings. They still contain the utensils needed for cooking and there is plenty of bed linen altough not in a useable state. Permission to use the buidings can be granted by the military personnel in Mestersvig and the 'bothy book' makes interesting reading. From the mine

buildings a rudimentary track leads to the coast at Nyhavn where there is a jetty made from sunken barges, where the mined ore was loaded for shipping to Europe.

The next building on the track is the Washburn Hut, apprently built as a family holiday home by an American millionaire called A.L. Washburn who was fortunate enough to be able to visit the area in his private yacht. There was still headed notepaper with his New Hampshire address in the hut, but no wood for the stove.

When approaching the coast we were surprised to see a roadsign warning of an airport ahead which could only be crossed with permission. This is the carefully maintained Mestersvig gravel airstrip run by the Danish defence forces. There are strict access restrictions in force around the airstrip (see appendix 1).

Col Major area.

The Col Major area at the top of the Gully glacier was the landing site and basecamp for the expedition. Basecamp was simply established where the expedition equipment was unloaded from the Flugfelag Nordurlands Twin Otter (see figure 3).

We have been able to using compass sightings taken from the summits of Hjornespids to Aliertinde and Annsketinde to try and calculate the magnetic variation in the Central Staunings Alps.

The recorded magnetic bearing from Hjornespids to Aliertinde was 267^0 and from Hjornespids to Annsketinde was 257^0.

These magnetic bearings and their respective measured latitude and longitude bearings from the 1:50,000 scale map of the Central Staunings Alps we have produced are recorded below.

Magnetic	Grid	Magnetic variation
267	240	27
257	232	25

We therefore estimate that the magnetic variation in the area in August 1996 was 25 degrees although anecdotal information suggest it was greater than this figure.

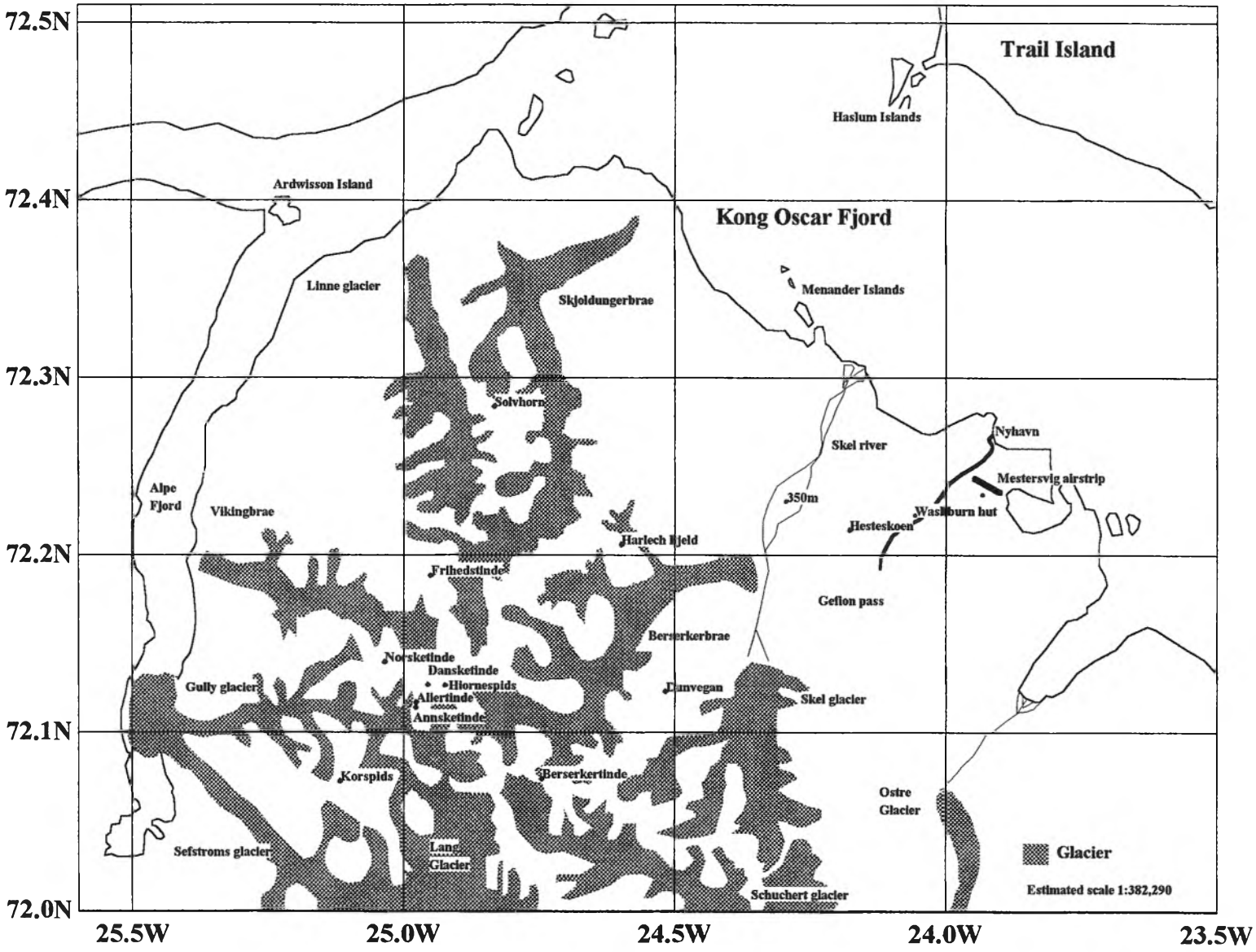
Immediately west of basecamp was the Dead Eagle Ridge. This formed the area for early exploration with three new peaks, Aliertinde, Annsketinde and Jaalspids, being climbed and a new route up the south ridge of Tårnet which saw two ascents. The ridge is a continuation of the South West ridge of Dansketinde and is seperated from the peak by the aptly named Col Wyn.

Diagram 4 at the end of the chapter is a digital reproduction of a photomontage of the ridge showing the peaks and the couloirs used for the ascents and descents.

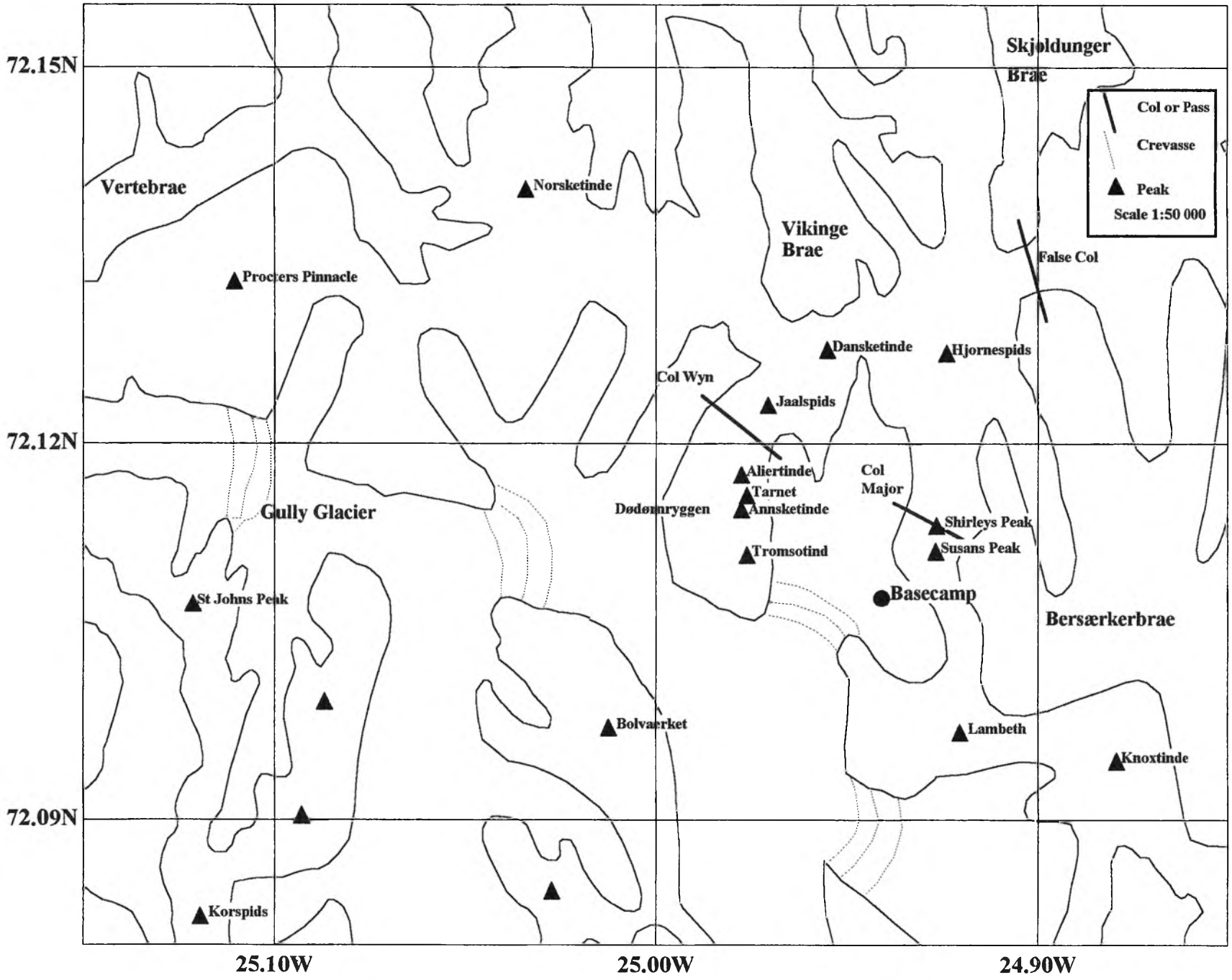
1, DMAP, Distribution and coincidence mapping software. Contact;
Dr Alan Morton, Blackthorn Cottage, Chawridge Lane, Winkfield, Windsor, Berkshire SL4 4QR

Greenland & the Arctic

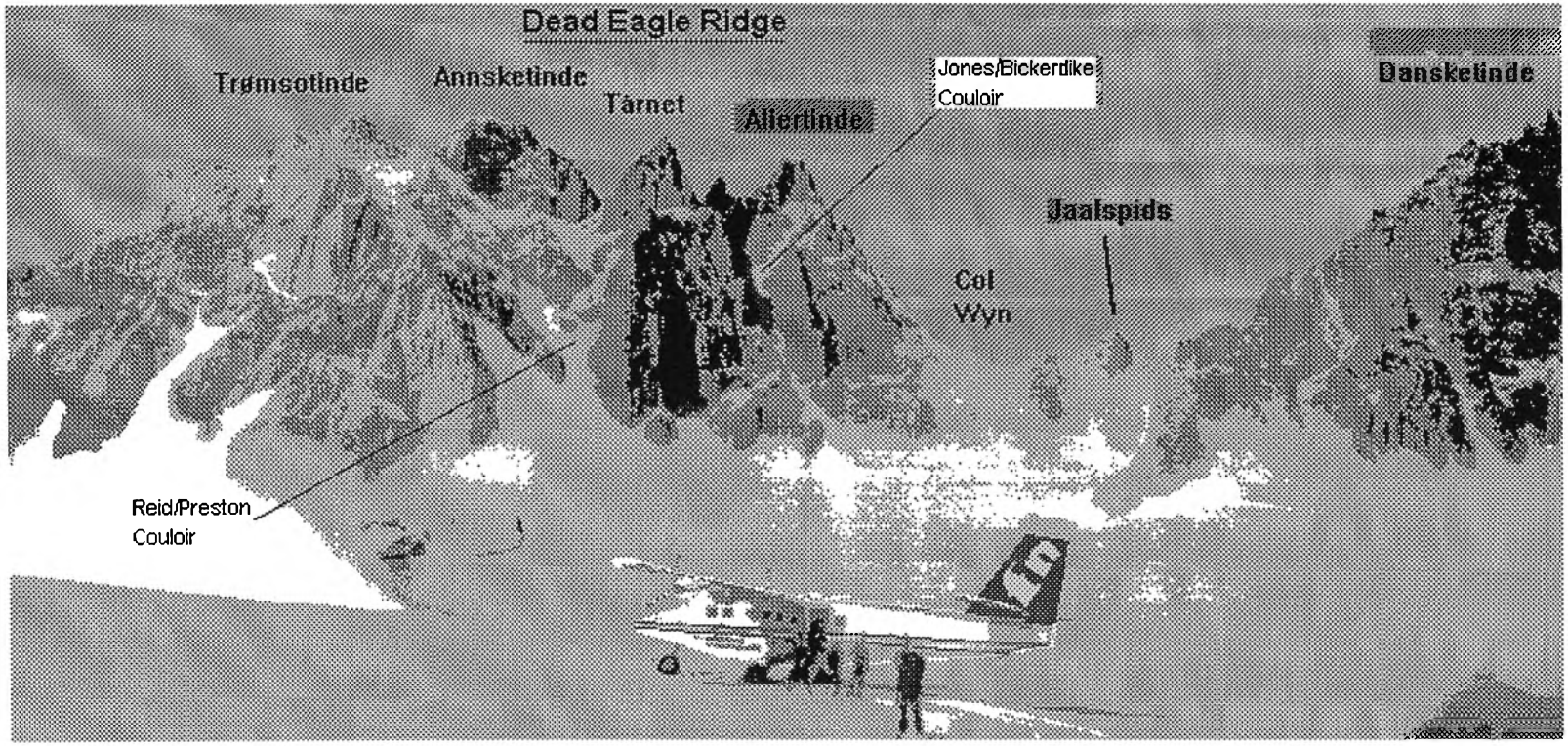
Northern Staunings Alps



Col Major Area, Central Staunings Alps



The view West from Basecamp



Acknowledgements.

No expedition of this type can be a success without the help and advice of many different people and organisations. For everyone who helped, whether you appear on our list or not, we offer our deepest thanks.

The Scottish Mountaineering Club

The Scottish Mountaineering Trust

Mount Everest Foundation

Foundation for Sport and the Arts

Mountaineering Council of Scotland

British Mountaineering Council

Needle Sports of Keswick

Walkers of Aberlour

Tunnocks of Uddingston

Adventure Graphics

Mailbox international, Stalybridge

ASDA Stores, Ashton under Lyne

Flugfelag Nordurlands of Akureyri

Dr Donald Bennett

Dr Robin Davies of Colgate Palmolive

Ray & Jan Castle of North West water

Ms Ann MacDonald

Dr Alan Morton

Mr Barry Nixon

Mr John Peden

Mr Tim Pettifer of Adventure Direct

APPENDIX 1 THE DANISH MILITARY OUTPOST OF MESTERSVIG

Welcome to MESTERSVIG.

Expeditions entering Mestersvig have to realize, that besides the magnificent scenery of the landscape, nothing more substantial can be offered from the "Danish Military Outpost in Mestersvig". The dimension of the outposts resources is exactly balanced by the Defence Command to correspond with the task of maintaining the outpost. The crew of two cannot be expected to service expeditions in any way.

Background

In connection with establishing a lead mine, a harbour facility was constructed at Nyhavn and an airfield at the delta of Gaseelv. The airfield was named Mestersvig after the bay Mestersvig just a few kilometres to the East and Nyhavn -New Harbour- to the Northwest at the shore of the fjord was to be the port of shipment for enriched lead ore to Europe.

The lead mine which is situated approx 10 kilometres from the airfield was closed down at the beginning of the sixties and later the Civil Aviation Administration and then the Defence Command operated the airfield. The harbour at Nyhavn has been used as a port of discharge of supplies and fuel for the Mestersvig airport.

The Civil Aviation administration utilized Mestersvig as a weather station and during the summer months the Defence Command based a temporary squadron at Mestersvig for rescue operations and also as a support function for the Sirius Sledge patrol. The squadron was withdrawn in the seventies and the weather station was closed down in 1984. The Civil Aviation administration remained the owner of Mestersvig, but in 1988 all installations was transferred to the Defence Command.

Mestersvig is now under the administration of the Patrol Service of North and East Greenland, which additionally administrate the Sledge Patrol Sirius. The runway and installations no longer have the status of an airfield and the maintenance of the runway is kept at a marginal level only for the aircraft of the Danish Airforce. Civilian aircraft are allowed to use Mestersvig depending on established arrangements with the Greenland Home Rule Authority and the Defence Command.

All buildings and installations at Nyhavn and the huts within a distance of 20 kilometres from Mestersvig are Home Rule Property and managed by the personnel at the Military Outpost at Mestersvig.

General stipulations for visits and travels in Greenland.

The Greenland Home Rule Authority - in accordance with the Danish Authorities - attach great importance to environmental considerations and spend a considerable amount of money in protection of the environment. All general rules concerning pollution and contamination of any kind are also valid in Greenland. Land, coastal and sea areas, fjords, lakes, ponds, and rivers must not be exposed to any kind of pollution, organic as well as inorganic compounds.

Vegetation and the animal life are extremely sensitive to artifacts and other foreign elements - human beings included. Therefore, it is of vital importance for all visitors to Greenland to give high priority to protection and preservation of all life forms present.

Unnecessary trampling down of vegetation and frightening of animal life must be avoided.

Special stipulations for visits and travels to the National Park

When you set foot on the runway in Mestersvig you are inside the largest National Park in the World. The southern border enters Fleming Fjord and proceeds Southwest to a point at the ice cap divide. The

area between the southern border and Hall Land and the Petermann Glacier in the Northwest is National Park territory.

Besides the general rules for travelling in Greenland, special stipulations for visitors travelling in the National Park are described in "Order no. 7 of 17 June 1992 from the Greenland Home Rule Authority concerning the National Park in North and East Greenland".

Visitors to the National Park are obliged to be acquainted with - and act according to - the stipulations laid down in the above mentioned order.

Certain regulations of the Order will be mentioned in this folder, but be especially aware of the areas in the Kong Oscars Fjord where visitors are not allowed.

The special status of the National Park as a wildlife reserve makes collection of remains of animals, skulls, antlers etc. or pieces of vegetation prohibited. Incidentally, it is not allowed to establish new species of plants in the area.

Logistic support at Mestersvig.

1. As earlier mentioned, the resources presented in Mestersvig is balanced with the demands of the Military Outpost at Mestersvig.

2. All provisions, fuel and personal equipment must be transported to Mestersvig by the expedition.

3. If the expedition has its own HF-radio, radio communication schedules can be arranged with the personnel in Mestersvig. If expeditions do not call up at scheduled communication times, the personnel in Mestersvig will not identify the absence as an emergency situation.

4. An emergency situation has to be initiated by activation of the PLB.

5. The expeditions are normally not allowed to use the radio communication facilities at Mestersvig, but under special circumstances it can be allowed based on military regulations of radio communication.

6. Based on agreement with the personnel in Mestersvig mail can be received for further conveyance assuming the mail is stamped with Icelandic or Danish stamps.

7. The personnel will inform expeditions of available sources of drinking water.

8. Expedition members and aircraft crews are responsible for handling of equipment including loading and unloading aircraft. Personnel of the Military Outpost in Mestersvig can in certain situations assist in loading and unloading of aircraft and transportation of equipment inside the station area.

9. In Mestersvig no toilet facilities exist outside the control tower, which is solely for use of the personnel in Mestersvig. All visitors are requested to dig a hole as a lavatory a certain distance of the station. After use the hole must be covered, levelled with the surface and the turf replaced with vegetation as intact as possible.

Regulations for visits in the Nyhavn area.

1. There is no admittance to buildings locked as well as unlocked.

2. Buildings and equipment stored in Nyhavn are under surveillance of the Military Outpost at Mestersvig. Visitors are not allowed to utilize anything in Nyhavn.

3. The personnel of the Military Outpost at Mestersvig can authorize storage of equipment as long as 2 years. At the termination of the 2 year period remaining equipment will be confiscated or destroyed at the expense of the expedition.

The Military Outpost at Mestersvig is in no way responsible for stored equipment. Equipment will be stored in the big storage building in Nyhavn.

Stipulations for traffic in Mestersvig and buildings in the vicinity.

1. Traffic on the runway is prohibited. The road running along the southern limit of the runway can be used. It is allowed to use the apron during loading and unloading operations.

2. All buildings in the vicinity of the control tower are in a restricted area. Admittance to buildings in this area is allowed only when accompanied by the personnel.

3. Admittance to and stay or storage in buildings located at Expeditions-hytten can be authorized by the Personnel of the Military Outpost at Mestersvig.

Stipulations regarding usage of huts in the vicinity of Mestersvig.

Huts in the vicinity of Mestersvig are the Greenland Home Rule property and are subject to supervision by the Military Outpost at Mestersvig.

Personnel of the Military Outpost can authorize use of the huts on the following conditions:

Provisions and fuel stored in or outside the hut can be utilized in an emergency situation, but as a general rule all provisions and fuel must be brought along by the expedition.

The huts are to be kept permanently in an orderly way during the stay. As a main objective for users of the huts; these should be left in such a order, that later visitors in an emergency situation easily can utilize the facilities in the hut. It can be of vital importance especially in the winter time.

Upon leaving, expeditions are obliged to clean the huts thoroughly. Improvement of the standard of the huts will always be appreciated.

Expeditions authorized to use the huts can be prescribed to carry out specified repair work. Paint, repair materials, and tools will be provided by the personnel in Mestersvig.

The repair work can be identified as a payment for the use of the hut.

All waste is returned to Mestersvig, where disposal of the waste is arranged with the personnel of the Military Outpost.

Combustible waste can be burned at the hut if sufficient facility is available.

Canned goods and provisions with long storage capability can be left in the hut and fuel can be left in or outside the hut provided that the container is marked properly with a description of the content.

Upon leaving the hut doors must be closed in a proper way.

If the hut is damaged, the expedition is obliged to repair the damage or report the situation to the personnel of the Military Outpost at Mestersvig.

Special conditions related to the buildings at the closed mining town and the shafts.

1. The two remaining buildings in the mining town can be used by the expeditions as housing and/or storage facility during the stay.

2. Trailers in the mining town are also available as a housing facility for expeditions.

3. Stipulations regarding the use of huts in the vicinity of Mestersvig are also in force regarding buildings and trailers in the mining town.

4. A considerable amount of waste and garbage is buried is and around the mining town. Expeditions to the mining town are kindly requested to take care of surfacing waste and take it along to Mestersvig for disposal.

5. It is strictly forbidden to enter the mining shafts. The concrete foundations securing the mouth of the shafts are unstable and subject to collapsing. - Anyway, nothing of interest is to be seen in the shafts.

SPECIAL conditions during the stay of expeditions in Mestersvig.

1. As mentioned earlier the personnel of the Military outpost at Mestersvig are not obliged to assist visitors. However, the personnel are always prepared to assist expeditions if possible. The limitation of the assistance to expeditions is defined by the resources set aside to maintain buildings, runway roads and other installations. The maintenance requirements engage the personnel of the Outpost during normal working hours.

2. Expedition personnel staying in Mestersvig are kindly requested to be available as assistants to the personnel of the Outpost. This is of benefit to;

- The personnel of the Military Outpost in Mestersvig.
- The goodwill towards members of the expedition.
- Mestersvig, that in this way remain as a hospitable port to the National Park with a certain service level.

3. The personnel in Mestersvig has been in the area at least one year including a winter in North or Northeast Greenland. The personnel have a considerable knowledge of conditions in the National Park. Based on favourable relations to the personnel of the Outpost, expeditions can obtain valuable information on relevant conditions in the area.

The personnel of the Military Outpost in Mestersvig.

The personnel in Mestersvig are officers or non-commissioned officers originating from the Danish Defence Services. The personnel is delegated general police authority by the Chief Constable in Greenland - with special regards to the "Order concerning the National Park in North and East Greenland".

As officers of the Defence Services the personnel are responsible in relation to the military stipulations concerning Defence installations in the area.

The personnel of the Military Outpost are authorized to report all violations of the "Order concerning the National Park in North and East Greenland" to the Chief of the Sledge patrol Sirius and the Chief of Patrol Service of North and East Greenland. The reports are subsequently distributed to civil and military authorities

The instructions from the personnel of the Military Outpost at Mestersvig are to be followed at all times.