

APUSEQ 93  
East Greenland Expedition  
Final Report

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[1993]



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# **APUSEQ 93**

**THE BRITISH EAST GREENLAND ANNIVERSARY EXPEDITION  
TO THE CALEDONIAN ALPS , AMMASSALIK DISTRICT**

**JULY 9TH TO JULY 31ST 1993**

**FINAL REPORT**

**EDITED BY LEWIS JONES**



## **CONTENTS:**

## **Page**

Expedition Members

4

### **SECTION ONE - ACCOUNT OF APUSEQ '93**

1.1. Introduction

5

1.2. Expedition Aims/Objectives

7

1.3. Diary Of Events

8

1.3.1. Expedition Preparation

8

1.3.2. The Ski In From The Coast

9

1.3.3. Mountaineering History Of Rytterknoegten

10

1.3.4. Our Attempt On Rytterknoegten

11

1.3.5. From Rytterknoegten To The Air Drop

12

1.3.6. Routes From The Airdrop

14

1.4. Food Rations

18

1.5. Finance

19

1.6. Acknowledgements

19

## CONTENTS CONT.

### SECTION TWO - GUIDANCE NOTES FOR FUTURE EXPEDITIONS

	<b>Page</b>
2.1 Getting To East Greenland - Routes To Recognised Runways	21
2.1.1 Kulusuk Island	21
2.1.2 Constable Point	22
2.1.3 Mesters Vig	22
2.2 Onward Travel From Kulusuk Airport (Ammassalik District)	23
2.2.1 Helicopter charter	23
2.2.2 Boat travel	23
2.2.3 Dogsledge	24
2.3 Routes To Rough Landing Strips/Ski Plane Landings	26
2.4 Routes From The Coast To The Mountains (Caledonian Alps)	27
2.4.1 "Wolf Gully"	27
2.4.2 "Tuno Glacier"	29
2.4.3 "Access Glacier"	30
2.4.4 Knud Rasmussen Glacier	31
2.5 Logistics Above The Snowline	33
2.5.1 Use of skis	33
2.5.2 Types of sled	33
2.5.3 Airdrops	35
2.5.4 Packaging for airdrops	36



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## **SECTION ONE - ACCOUNT OF APUSEQ 93**

### **1.1. INTRODUCTION**

This report contains the account of APUSEQ 93 - a lightweight ski touring expedition to the Caledonian Alps north of Ammassalik, East Greenland.

The 3 members of the expedition between them have been leaders and members of 6 expeditions in East Greenland from 1982 to date. These expeditions have consisted of mountaineering, ski touring (Alpine and Nordic techniques), scientific study and geographic exploration. These expeditions are :

- 1982 - BSES 50th Anniversary Expedition
- 1983 - BSES Over-Winter Expedition
- 1986 - British Universities East Greenland Expedition  
(Mount Forel And Schweizerland)
- 1988 - British East Greenland Expedition  
(Watkins Mountains and Knud Rassmussen Land)
- 1990 - British East Greenland Expedition  
(Traverse of Kronprins Frederiks Mountains)
- 1993 - Apuseq 93

The team first worked together on the 1983 BSES overwintering expedition to the Ammassalik district and the initial idea for APUSEQ 93 was as a tenth anniversary celebration of that expedition.

We hope that those reading this report find the account of APUSEQ 93 an interesting and entertaining read. The spirit in which we set out for Greenland in summer 93 was one of friendship and excitement in venturing forth again into the wilderness to enjoy the unique experience of this region and its native people with which we have become so fascinated and enthralled.

Over the last 10 years the Apuseq 93 team have accumulated a considerable amount of experience and information relating to expedition experience in East Greenland.

Much of this has been gained first hand, often learning from our mistakes, plus a considerable amount has been gained through contacts and communication with others from outside the UK who share our love of this region and have been active with their own expeditions in recent years.

We feel it is constructive to draw together in this same document our collective experience on a number of issues relevant to this region where they may be of positive benefit to other parties who are planning to go to this part of East Greenland, possibly for the first time.

Consequently in Section Two will be found some "Guidance Notes For Future Expeditions" which attempts to draw together information relating to the logistics of operating successfully in this part of the world.

Section Two covers getting to East Greenland from the outside world, options on travel from entry points to the mountains and some points on moving around above the snowline.

In particular it covers specific access routes from the coast up into the mountains of the Caledonian Alps and attempts to describe the topography and suitability of these options with updated information where possible with regards to the conditions of glaciers, icefalls and cols.

Forewarned is forearmed as they say, so we hope some of the information in Section Two will help smooth the passage of future groups to the region.

*Perched on my city office stool,  
I watched with envy, while a cool  
And lucky carter handled ice . . .  
And I was wandering in a trice,  
Far from the grey and grimy heat  
Of that intolerable street,  
O'er sapphire berg and emerald floe,  
Beneath the still, cold ruby glow  
Of everlasting Polar night,  
Bewildered by the queer half-light,  
Until I stumbled unawares,  
Upon a creek where big white bears  
Plunged headlong down with flourished heels,  
And floundered after shining seals  
Through shivering seas of blinding blue.*

W. W. GIBSON

## 1.2. EXPEDITION AIMS & OBJECTIVES

The broad aim of APUSEQ 93 was to carry out a ski-touring exploration of the Caledonian Alps, one of the most easily accessible "big" mountain regions of East Greenland.

Much of the region has been visited over the past 30 years, principally by mountaineering parties. However, access into and travel through the mountains of the Caledonian Alps has often been carried out along the same major valley glacier "highways".

Our aim was to explore alternative access routes into the mountains and to assess the suitability of the unfrequented glacier systems for lightweight ski touring groups.

In order to achieve this aim, a number of specific objectives were identified:

- i) To prove an entry route to the mountains via "Tuno glacier" a short distance to the North of Kuummiit settlement.
- ii) To make a mountaineering ascent of Rytterknoegten, a striking peak close to the coast.
- iii) Prove nominated high level cols and passes.
- iv) Explore the unfrequented glacier systems between Knud Rasmussen Glacier/Habets Glacier and the coast.
- v) Update topographical data.
- vi) Utilise developments in ski plane access & airdrops to develop a logistical methodology for lightweight expeditions to the region.

### 1.3. DIARY OF EVENTS

#### 1.3.1. EXPEDITION PREPARATION

We were fortunate in having experience of several previous expeditions to East Greenland and in having built up a comprehensive network of contacts in UK, Greenland and elsewhere in Europe. This eased the planning and execution of APUSEQ 93.

Our itinerary was planned around the movement of 2 other groups who also planned to be active in East Greenland during July allowing all 3 expeditions to benefit from the cost-sharing of transport, logistics and plane charters. In the event this worked extremely well. In particular we were able to enjoy the benefit of having 75% of our food supplies airdropped onto the 16th September Glacier. We therefore proposed to travel from the coast inland in light-weight style. Secondly, on our return we were able to take advantage of an airlift from the mountains by ski plane rather than having to ski back to the coast and rely on boats and sea-ice conditions. With the increased number of expeditions to the area this cost-sharing allows smaller groups to achieve their objectives far more cost-effectively.

Permission was received from the Danish Polar Centre in Copenhagen after presenting a detailed expedition plan with routes. This was prepared by studying aerial photos of the area and the 1:250,000 map published by the Geodaetisk Institute. However, we were only too aware that the topographical detail continued on these is now approximate. Many changes have occurred since the surveys in the 1930's on which they are based and many of the available aerial photos were taken in the early 1940's!!

The main task after this was to get all of the rations together and prepacked for the airdrop. Fuel, it was decided, would be picked up in Iceland. The food was then assembled into 2-day expedition rations which were then packed into specially made triple walled corrugated cardboard cases. These were then taped up and each was banded with 5 tensioned steel bands. Such precautions were necessary to ensure each case would withstand the impact of the air drop. Whilst waiting for our recovery airlift we assisted in the airdrop of stores for another expedition and witnessed the consequences of not taking measures similar to ours!!

Our stores were airfreighted to Iceland with Icelandair under the guardianship of Paul Walker from Tangent Expeditions who ensured their transfer to the charter company in Reykjavik who would carry out the airdrop. The same plane was to carry out our airdrop, Paul Walker's Mount Forel expedition airdrop and the airdrop for the commercial groups organised by the Swedish company "Mountain Adventure" run by Bengt Rodin.

We are indebted to Paul Walker and Tangent Expeditions for ensuring the airdrop got made in the correct place, at the correct time and in one piece. It would have been a long, hungry ski back to the coast if it had not gone so smoothly!!

After much correspondence and many phone conversations with Bengt Rodin at Mountain Adventure the likelihood of there being a ski-plane to pick us up was "on", "off" then "back on" again several times before, in late May, everything seemed to have "dropped" into place - with the airdrop a certainty and the pickup by ski Twin Otter finalised.

All we had to do was be at a certain set of co-ordinates on a certain day and we would be picked up. Again with the prospect of a long, hungry ski home if it did not show up!! However, this certainty came into doubt when, on our arrival in Reykjavik we asked for the location of our airdrop and were given a range of answers from "yes it's where you asked for it to be", to "it is at the drop at Mount Forel!". In the event both airdrop and pickup worked superbly.

Finally, the day of departure arrived and on Friday 9th July we headed for Heathrow with only 5 days rations, our pulks, ski and rucksacks of personal equipment. We overnighted in Iceland and flew from Reykjavik on a scheduled Greenlandair Dash 7 to Kulusuk island. We landed at the old airstrip on Kulusuk now called Kulusuk International Airport in bright sunshine - it was great to be back in Greenland.

### 1.3.2. THE SKI IN FROM THE COAST

Having landed on Kulusuk island at about 18.00 hours on Saturday 10th July we were met after a few hours by Tobias, a local hunter from Ammassalik, together with John Christensen, the chief nurse from the Ammassalik hospital. They had a 15ft boat which we chartered to take us north up Ammassalik fjord to the delta at the southern end of "Tuno" valley. Boat journey times in Greenland are notoriously difficult to predict, particularly in early summer. We were very lucky - the sea ice had broken up and we only had minor problems around Kulusuk itself. We arrived at about 01.00 hours, after a three hour journey, and waved farewell to our friends. They would be the last people we would see for two weeks.

The snout of "Tuno glacier" is now about five kilometers from the sea. Access is up a wide glacial outwash plain that is crossed by numerous shallow streams and one deep and powerful meltwater river. We started backpacking our equipment at about 02.00 hours, and spent the next eleven hours taking two loads up to the edge of the glacier on the eastern side of the valley. The final kilometre up to the glacier is hard work, scrambling over loose moraine and large boulders. Considerable care was taken on this last stretch. We camped at the edge of the glacier, just above a large roaring meltwater stream which emerged from beneath the glacier.

The following night we began our ski tour. The ascent up onto the glacier was very easy - a gentle walk up the dry surface of the glacier until we hit the snow line after about two kilometres. The crevasses were very small and not dangerous. We skied on a hard surface, initially using skins, and then waxes as the angle of slope became more gentle. We continued until early morning when the rising sun began to soften the snow and the exertions of the previous 48 hours began to tell. We camped about two thirds of the way up "Tuno glacier".

On the subsequent two nights we skied on over a small pass and down onto Karale Glacier, and then up to the north side of Rytterknoegten. The skiing was good, and the only major obstacle was a large crevasse system which covers the width of the Karale Glacier, about halfway down its length. These crevasses are deceptive. The route up Karale Glacier appears to follow the centre of the glacier, past a row of large boulders (apparently a very small lateral moraine), and up through a steep snow slope and gully complex between two heavily crevassed areas.

The route needs to be reconnoitred during summer months as this zone is a mass of small crevasses and snow bridges. If one picks the correct line the crevassed zone can be crossed in about one hour, however one could waste considerable time trying to find a route (as we found to our cost). The skiing above this zone is good, though one needs to give the icefall at the western end of the Rytterknoegten massif a wide berth.

### 1.3.3. MOUNTAINEERING HISTORY OF RYTTERKNOEGTEN

Rytterknoegten is a fine looking peak presenting a formidable challenge to an expedition, much of which is actually getting to the base of the mountain massif itself, let alone succeeding in reaching the summit.

The first time that the 3 of us saw Rytterknoegten was, in fact, 10 years earlier when we were members of the BSES overwintering expedition in the Ammassalik region.

At the very end of the overwintering expedition we left Ammassalik on a recce for a suitable base camp location in the Tasilap Kua valley to be used by the considerably larger BSES 1983 summer expedition. Having located a site suitable for the base camp we ventured up one of the glaciers feeding into Tasilap Kua to gain some of the high snowfields leading towards the mountains of the Caledonian Alps.

We spent a very enjoyable 2 days camped on a high col above the Karale Glacier marvelling at the scale of the glaciers and mountains before us.

Rytterknoegten stood jagged and proud above the heavily crevassed glacier - easily out of our reach on that occasion.

It was quite fitting, therefore, to make the mountain an objective for APUSEQ 93.

The massif is situated on the northern side of the Karale Glacier and is only a few kilometres from the sea at the head of Sermiligaq Fjord. Not only is the summit one of the highest in the Caledonian Alps but the whole massif stands head and shoulders above other surrounding mountains and is a very obvious landmark when flying in to Kulusuk from Iceland.

According to records at the Danish Mountain Club, Rytterknoegten had received 7 ascents up to 1976 and none since.

- The first ascent of the peak was made on 24/8/38 by members of the expedition from the Gronlands Expedition de Akademischen Alpenklub Zurich under the leadership of Andre Roche. The route of this first ascent was via the long rocky west ridge.
- The second and third ascents were made coincidentally on the same day (15/8/63) by members from two different expeditions; The Scottish East Greenland Expedition 1963 and the Swiss-German Greenland Expedition 1963. The Scots put up a new route via the north ridge and east face whilst the Swiss-German party repeated the Roche route along the west ridge.



- In July 1974 a Swiss expedition made the fourth ascent of which few details are available.
- Three separate ascents were made in July 1976 by two different Swiss expeditions:

19/7/76 Schweiz - Bergsteigerschule Jura

21/7/76 Schweiz - Alpenclub Expedition (Group 1)

24/7/76 Schweiz - Alpenclub Expedition (Group 2)

All of these 1976 ascents appear to have followed the west ridge again.

#### 1.3.4. OUR OWN ATTEMPT ON RYTTERKNOEGTEN

After skiing up through the crevasse belt which stretches across the Karale Glacier we had skirted round the icefall at the western edge of the Rytterknoegten massif and turned eastwards, travelling up the glacier which flows past the northern side of Rytterknoegten to feed the upper snowfield of Karale Glacier.

We skied up this glacier looking upwards to our right at the rocky wall of the west ridge. After a couple of kilometres we pitched camp facing a large open snow couloir leading up to rocky slopes almost directly beneath the summit rocks.

We spent the next day basking in sunshine assessing which route we thought to be best for us. The Roche route along the west ridge appeared to be very long, entirely on rock (of dubious quality?) and steep to finish. In our view it looked too time consuming. We were a rope of 3 with limited hardware to use as protection.

We decided a route up the large snow couloir to reach the east ridge was the best route for us to follow. Our main concern was the number of hours that this snow slope was bathed in sunshine and the possible danger of avalanche which may result.

We left camp at around 01.00 on Friday 16th July after the sun had set on the snow slopes above where a number of small snowslides had left their mark over the previous few days.

It started as a moderately steep snow-plod crossing three very big crevasses which seemed well bridged. The slope steepened slightly as it became more of a couloir. The surface now being quite well frozen and easily supporting our weight without breaking the crust.

We zig-zagged up the steepening slope after a few hours passing some impressive seracs to the left as we reached the upper slopes of the couloir. Mark stopped the ascent here after having badly strained an ankle tendon.

Lewis and Greg continued up and left across steep frozen slopes crossing a bergschrund to reach a snowy plateau looking over towards the triple summited "Trident de Neptune" peak and beyond to the 'berg scattered fjords of the east coast.

From where we sat on the edge of this snowy plateau the route up the rocks of the east ridge to the summit tower looked quite short.

However, as we front pointed up a steep ice slope to gain the true east ridge it wasn't long before the perspective changed. It became apparent that the route lay across steep slabs to the right which hung over the upper slopes of the couloir we had ascended. The slabs were exposed and we only had with us a single rope and limited hardware to place as protection.

We calculated roughly that it would probably take about a further 4 hours to reach the summit, pitching all the way and a similar length of time to get down again to the top of the couloir where Mark was patiently waiting for us.

Insufficient quantity of climbing equipment and lack of time conspired against us in our attempt on Rytterknoegten on this occasion.

A photo stop back at the snowy plateau (probably the site of Gribbon's "Eyrie Camp" from the 1963 Scottish expedition) ensured we recorded the fantastic views and then we descended to rejoin Mark at the top of the couloir.

It was a great shame not to have been successful in climbing Rytterknoegten. It had greatly impressed us when we first saw the peak in 1983 and we went on our way all the more respectful of the mountain.

We had left the coast with five days of food supplies and we had now completed our fifth day of activity as we sat beneath Rytterknoegten packing away our gear.

We still had some distance to go to reach our airdrop containing the food for the rest of our time in the mountains.

After arriving at the base of the Rytterknoegten we all felt comfortable in going onto "reduced rations" as the quantity of food seemed plenty. Consequently we had sufficient reserves to allow us to take several days to reach the airdrop if necessary.

### 1.3.5 FROM RYTTERKNOEGTEN TO THE AIRDROP

We left Rytterknoegten in the early hours of Saturday 17th July and skied back down onto the head of Karale Glacier, and then back east towards the top of *Access Glacier*. We wanted to see if we could ski over the pass which linked our glacier to *Access Glacier* which runs south from Slangen Pass, thus avoiding the steep climb through *Deep Freeze*.

The climb up to the top of the pass involved pulling the pulks on foot up a steep snow slope (though much shallower than *Deep Freeze*). At the top of this we came to an enormous crevasse. Though we spent some time trying to find a safe route across or round the crevasse it proved impossible.

We had to retreat back down and ski across to *Deep Freeze*. This was bitterly disappointing. It wasted a lot of time, and was frustrating. We thought this route had been used occasionally before and may be passable early in the season. We saw evidence that a large snow bridge had recently collapsed.

We reached the base of *Deep Freeze* pass at about 06.00 hrs, and climbed up it twice carrying our equipment in our packs. *Deep freeze* is a large ice fall with a steep snow ramp at its left (west) edge up which it is possible to climb round the ice fall.

At the top of the snow ramp are two rock bands. The lower one is quite steep, but can be climbed through up a small rock gully. The higher rock band is much more gentle and affords an excellent campsite overlooking *Access Glacier*.

The climb was relatively easy to begin with as the snow was still hard, however our second ascent started at 11.00 hrs, by which time it was very hot in the sun. This is not to be recommended, particularly as the snow slope could be avalanche prone.

We climbed up the snow slope to the left of the ice fall, and through the rock band. It may be possible to climb up the snow slope above this rock band, however we considered the snow conditions too poor to attempt this as a series of crevasses cross the snow slope making it quite tricky.

We finally reached the relative safety of the upper rock band with our second equipment load at about 13.00 hrs. There are the remains of an old camp site from the 1966 Royal Navy Expedition. From this site one has a magnificent view of Rytterknoegten and the top of Karale Glacier.

The snow and ice on *Deep Freeze* appear to have melted considerably since the mid-1980s. On our first expedition through this region in 1986 we were able to climb up the snow slope dragging pulks. This is not possible now as the slope is too steep to do this safely. One also now has to climb to the left or through the lower rock band. In 1986 we were able to climb to the right of this rockband. The seracs of the icefall now extend across up to the right hand edge of the rock band.

After *Deep Freeze* pass we skied east towards Slangen. Getting off the upper rock band at the top of *Deep Freeze* is rather awkward because of the steepness of the snow slope and crevasses. We had to cut tracks for about 50 metres across a snow slope to the east of the rock band in order to stop the pulks slipping down the slope and pulling us down towards the crevasses at the top of the icefall.

Once past this minor obstacle we had a wonderful downhill ski towards Slangen pass. In the past we have been able to cross over into Slangen pass quite easily, around the rock ridge to the west of the pass. However in 1993 we had to cross a bergschrund that has begun to develop up against the ridge.

Though this route is still possible it is getting more difficult. We arrived at the rock ridge at about 04.00 hrs and made slow progress over the bergschrund, and then carrying the pulks individually across the rock ridge. This involved a portage of about 100 metres. Descending from Slangen one must continue down the rock ridge until the snow slope becomes very steep before crossing the rock ridge. It is easy to be tempted to try and cross the ridge too far up.

The ski across Slangen, past the serpentine rock intrusions is delightful, with great views down to 16 September Glacier when one reaches the final pass. We stopped here for a rest, and examined the surface of the big glacier for our food dump.

With binoculars we could just make out a tiny black dot shimmering on the glacier about eight kilometres away - our dump. We skied down onto 16 September Glacier, the vistas opening out as we moved quickly over the frozen surface. There are no crevasse problems on this part of the glacier, and we were able to enjoy wonderful skiing down to our food dump which we finally reached at about 08.00 hrs.

On 19th July we spent the day unpacking the equipment and food that had been airdropped: Most of the food had survived without any problem, though a few items of food packaging had shattered or burst on impact. However, double wrapping all the food items in strong poly bags had prevented any serious contamination of other items.

During this first day at the airdrop we reconnoitred the area to establish if it would make a suitable landing site for the Twin Otter scheduled to pick us up.

The middle of 16 September Glacier has very few crevasses and is an excellent landing site if the snow surface is firm. Though the glacier undulates very gently, the gradient is sufficiently shallow to allow a Twin Otter to land and take off and it makes a good landing site.

### **1.3.6 ROUTES FROM THE AIRDROP**

The following night we planned to explore routes through the Rodebjerg massif to link up with Habets Glacier. In 1986 and 1990, Lewis and Greg had skied south from Conniats Bjerg to 16 September Glacier around the west side of Rodebjerg late in the season and had found the route heavily crevassed. Only one small gangway had remained allowing access between the two glacier systems. Since this is an important route up towards the Conniats Bjerg and beyond to Lauper Bjerg and north towards Mt. Forel, the condition of the glaciers is important to the success of any expedition hoping to gain access to these mountains.

On 20 July, we set off towards Rodebjerg by ski with light packs, hoping to carry out a ski tour through the massif and back to the air drop base camp.

Skiing conditions were appalling. The air temperature was very warm; the glacier surface was very slushy with large amounts of standing water. It was clear that we would make very slow progress.

Within a couple of hours of leaving the tent a storm began to blow up over Tupilak, and a thick mist began to develop. Visibility became very bad, and we decided to abandon the tour, returning to the base camp from the Rodebjerg icefall.

Though the icefall appeared to be crevassed from the bottom, we could not be sure whether it was passable.

The weather continued to deteriorate over the following 12 hours featuring warm air temperatures and low cloud. However, we decided to head further east onto Habets Glacier, and check the suitability of this route around the east side of the Rodebjerg massif to connect with the Conniat pass.

It was becoming clear to us that routes in from Karale Glacier through *Deep Freeze* etc have deteriorated and become less suitable access routes from the coast. Over the past seven years it had changed from being an easy route to one that needs considerable effort and caution.

We spent the afternoon of 21 July packing pulks with six days of supplies and stowing our other equipment and food securely, before heading east down 16 September Glacier to the junction with Habets Glacier. This is an easy ski with no crevasse problems.

We continued through the night up Habets Glacier, finally making camp beneath Henry Leon Bjerg. It was clear that the route to Conniat Bjerg is very easy through this part of the glacier system and so long as access up onto the Knud Rasmussen Glacier is possible then travel to the Conniat Pass is trouble free.

Our next objective was to explore access routes into the mountains between Knud Rasmussen Glacier and the coast and assess the potential of this region for ski touring as it is a region which has very rarely been visited as most expeditions have headed for the higher mountains to the west and north.

The following morning we skied southeast towards Pt. 1222m to establish whether access is possible from Kangertivatsiaq through Sangmilik. This proved impossible as there is a major icefall southeast of this small nunatak. We skied south to the nunatak southwest of Pt. 1222m - where again a large icefall exists. Though we spent about two hours climbing around this feature, and up the nunatak, it was clear that no route was possible through this pass to the coast.

Views to the sea from our vantage points also showed notable retreat on the two glaciers which join together and flow into Sangmilik at the mouth of Kangertivatsiaq. So much so in fact that they are no longer joined in a single ice front but flow into Sangmilik independently around a large nunatak.

We continued south to Pt. 1400m on the eastern side of Knud Rasmussen Glacier, setting up camp on the south side of Pt. 1400m overlooking the glacier that falls away to the sea to the east.



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This wonderful spot provides fantastic views down to the coast into Depotfjord and to the Knud Rasmussen Glacier. We climbed the surrounding minor peaks to gain better views of the glacier surfaces. Access up the glacier from Depotfjord appeared to be good, though again the glaciers have retreated considerably since the most recent maps of the area were produced.

The following evening we undertook a long ski tour down towards Depotfjord, passing south of Pt. 1500m and Pt. 1244m. The glacier surface was excellent, affording fast skiing. We turned west, passing Pt. 1244m, and headed "downhill" onto the wide expanses of Knud Rasmussen Glacier.

Though the surface of the glacier at the edge of Knud Rasmussen Glacier was very poor (heavy sastrugi) we managed to slowly work our way round back to the campsite at Pt. 1400m, having confirmed the glacier surfaces in the region.

We climbed up to the pass south of Pt. 1400m from the east side. Our conclusions were that skiing up from the sea from Depotfjord is quite feasible. Viewed from the glacier, access seemed best on the north side of Depotfjord, however this would need to be confirmed from the sea.

Certainly the small glaciers west of Depotfjord are all of good quality for skiing. The peaks in this region are all quite low, and the rock is of very mixed quality. Though we managed to climb some minor nunataks overlooking the glaciers, this region has value as an access route rather than as a region for exceptional climbing. However, it affords attractive relief from the much larger landscape around Knud Rasmussen and 16 September Glaciers.

On 25 July we headed west back to our base camp. The Twin Otter was due to pick us up the following day, and we were keen to be in place well before. The ski back offered fantastic views over 16 September Glacier. The weather was perfect - blue skies and cold air temperatures, and the skiing surface was excellent.

A long ski across Greenland's wide glaciers in the early hours of the morning, with the sun rising over the mountain to the northeast, is one of life's great experiences.

We returned to the base camp, and started to pack our equipment into boxes and pulks and move it half a mile further east to a part of the glacier that was slightly shallower and was a better landing site than that near the drop zone. Having assembled our equipment, and marked out a landing strip with skis and pulks, we waited for the plane.

On 26 July, at about 14.00 hours a two-seater Piper Chieftain suddenly flew about 200 feet above our tent. We had been found.

The aircraft made about eight passes along the "runway" we had marked out, dropping supply boxes for a Spanish expedition that was due to pass across 16 September Glacier in mid-August. A number of boxes burst, including one which exploded, showering its contents across the glacier. The boxes were very loosely packed; an object lesson in how not to pack boxes for an airdrop.



We retrieved the boxes quickly, and then waited for the Twin Otter which we now felt sure would arrive quickly. The Piper Chieftain pilot had dropped a note saying that he was in radio contact with the larger plane.

One hour later the Twin Otter arrived executing a perfect slow landing next to our tent. Within minutes we were aboard, and after a rather bumpy takeoff we flew slowly to Kulusuk airstrip, retracing our route in from the coast, passing over the point at which we had landed at Tuno two weeks before.

We had returned from the virgin grounds.

#### 1.4. FOOD RATIONS

Our food was prepacked in the UK into 2 day (6 man-day) ration packs. Each of these was double wrapped in thick polythene sacks and taped up to form a convenient size that would fit into either rucsacs or pulks.

Because we were airdropping most of the food we also packed a few luxury items as extras. Even glass 1/4 bottles of whisky liberally surrounded by bubble wrap survived the airdrop intact!!

The basic ration for travelling was made up as follows:

##### Daily Man Ration

	<u>Weight (grms)</u>	<u>Kcals*</u>
Oats	83	365
Dried Milk	52	253
Sugar	83	325
Margarine	83	622
Tea	8	0
Biscuits	100	226
Chocolate	100	450
Mars Bar	65	294
Snickers Bar	61	311
Fish/Cheese	67	111
Peanuts	100	600
Soup	15	45
Dehydrated Meat	86	428
Rice/Pasta	75	257
Hot Chocolate	15	50
<b>Totals</b>	<b>993</b>	<b>4337</b>

\*Energy values taken from manufacturer's data on food wrappings.

We found the quantity of food and the energy value of this ration more than sufficient for our short trip. The weather was generally very good to us and the ambient temperature quite warm throughout. Parties who may go earlier in the season when temperatures can easily be 15 degrees colder or parties who are in the field for considerably longer periods than the APUSEQ 93 team may find it barely adequate during the latter stages of such journeys!

We consumed a total of 7 litres of stove fuel in 16 days (0.44l per day) using 2 Coleman stoves. This was using water for approx 1/3 of the time and snow for the remainder.

## 1.5. FINANCE

The expedition finances were made up as follows:

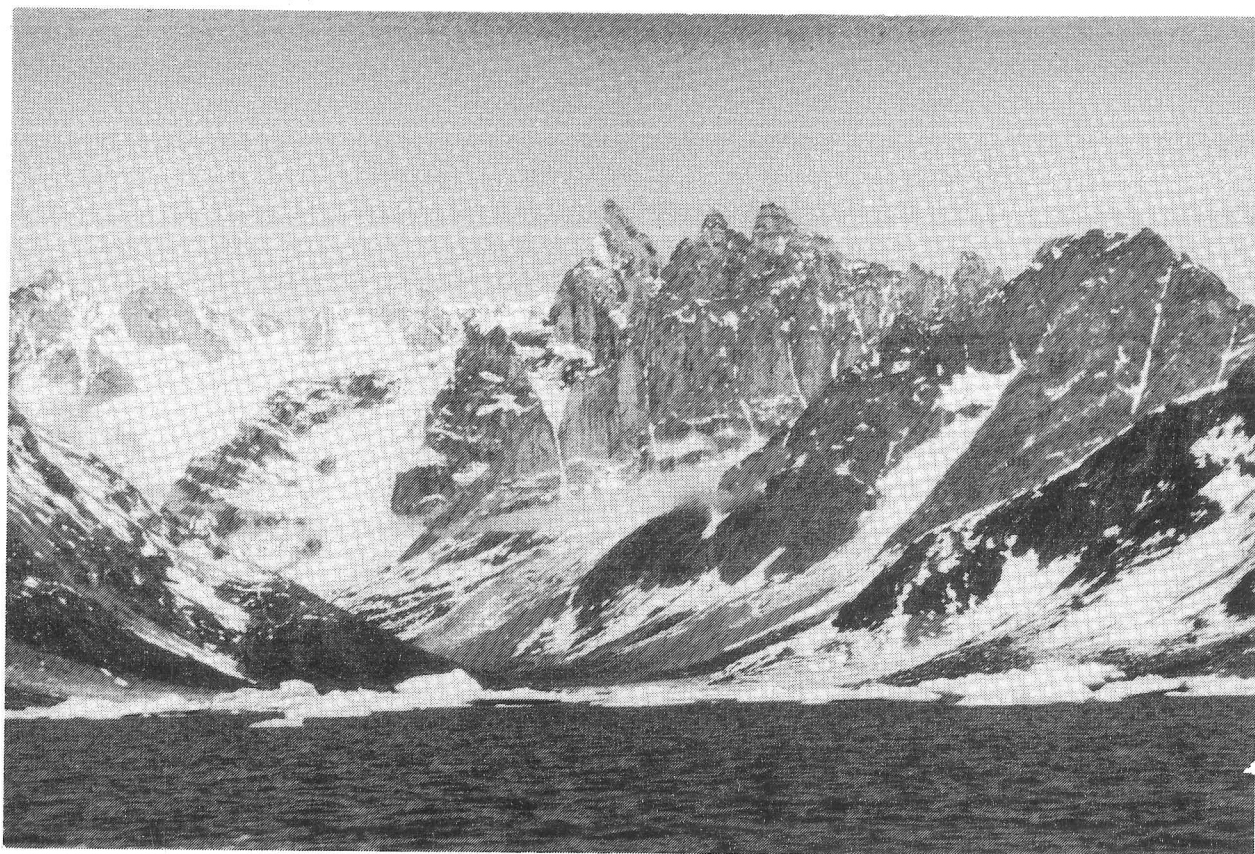
<u>Income</u>	£
Gino Watkins Memorial Fund	900.00
Members Contributions	3495.00
<b>Total Income</b>	<b>4395.00</b>

<u>Expenditure</u>	
Travel	2569.85
Freight	544.67
Food/Field Expenses	603.84
Insurance	511.00
Other Expenses	162.00
<b>Total Expenditure</b>	<b>4391.36</b>

## 1.6. ACKNOWLEDGEMENTS

We are indebted to the many people who gave their help, assistance and support with mounting APUSEQ 93. We therefore wish to acknowledge in particular the following for their contributions to making APUSEQ 93 such a success:

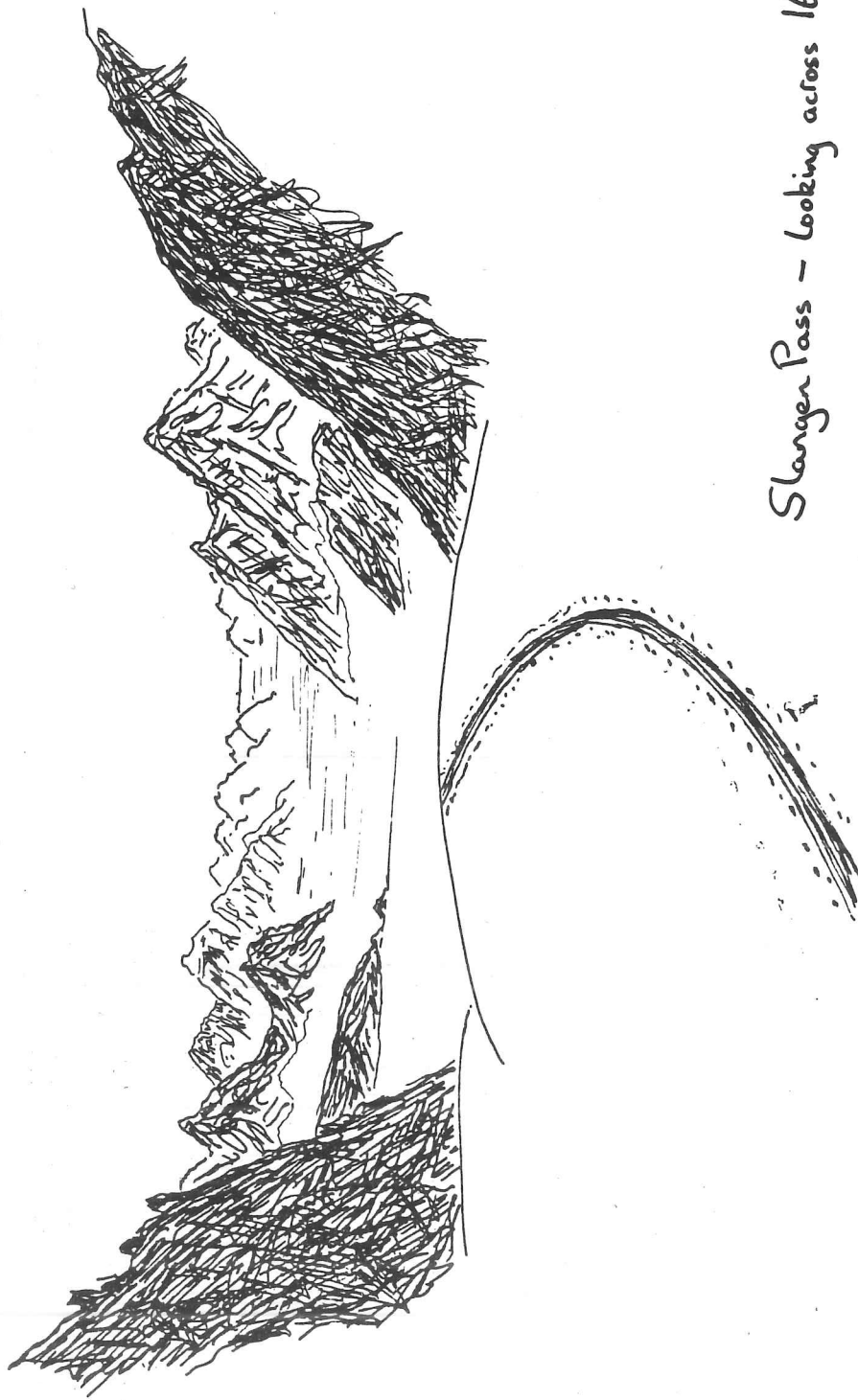
Paul Walker	Tangent Expeditions
Bengt Rodin	Mountain Adventure
Thorvardur Gudlargsson	Icelandair
Haraldur Orn Haraldsson	Reykjavik
Olafur Orn Haraldsson	Reykjavik
Chris Thomas	Premier Beverages
Peter and Debu Winther	Ammassalik
John Christensen	Ammassalik
Henrik and Ruth Nielsen	Ammassalik
Bo Thalund	Ammassalik
Robert Peroni	
Stan Woolley	
David Mordaunt	
Dolfi Rotovnik	Danish Mountain Club
Gino Waktins Memorial Fund	
Roger Daynes	Snowsled Ltd
Richard Olivier	Snowsled Ltd
Jim Lowther	



The impressive peaks of Tasilaq Fjord



The vista of peaks unfolded as we passed through Slangen  
onto 16 September Glacier



Slanger Pass - looking across 16<sup>th</sup> Sept. glacier





## SECTION TWO - GUIDANCE NOTES FOR FUTURE EXPEDITIONS

The whole of the mountainous region of East Greenland stretching from Ammassalik northwards to the Stauning Alps and beyond offer the adventurer unlimited scope for walking, scrambling, mountaineering and wilderness skiing.

The key factors which limit the scope of one's objectives are likely to be:

- Available time
- Available funds
- Experience within the group

Despite the seeming ease with which East Greenland can now be reached many parties encounter problems as soon as they arrive at Kulusuk. Greenland is notoriously unpredictable as far as local conditions and associated logistics are concerned.

However, with comprehensive planning and a bit of luck it is possible to achieve a great deal in a very short time. We know of one Swedish expedition which flew by skiplane to the Watkins Mountains in 1988 which stayed in Greenland for only 8 days climbing Gunnbjornsfjeld (Greenland's highest peak) and two other high peaks before flying out again.

This is an example of how the use of aircraft by small expeditions has changed things considerably in recent years. The planning of airdrops and the use of ski planes for entry and exit to areas above the snowline allow well organised parties to achieve a considerable amount of travel even if the group has limited time at its disposal.

There are numerous examples of other expeditions who through no fault of their own have been hampered by various logistical and climatic setbacks and not achieved any of their principal objectives - but that's Greenland for you!

The sections on the following pages are intended to provide some useful information to assist others in the planning of expeditions to this remote and beautiful region of the Arctic.

*" We who have been have gone again, and advise you to go.  
You will not be disappointed."*

**CHARLES PILKINGTON**



## 2.1. GETTING TO EAST GREENLAND - ROUTES TO RECOGNISED RUNWAYS

### 2.1.1 KULUSUK ISLAND

The principal aircraft entry point for the Ammassalik district of East Greenland is the airstrip on Kulusuk island. This was originally built in the early 1960's to service the American radar station on the island and was operated by the US Airforce. Since the end of the Cold War and the scaling down of US activity in Greenland the radar installation has been dismantled and the airstrip is now under Danish/Greenlandic management and is called Kulusuk International Airport!

Kulusuk is serviced by scheduled flights from Iceland operated by Greenlandair and Icelandair.

APUSEQ 93 flew the scheduled Greenlandair Dash 7 service from Keflavik to Kulusuk. The 1993 return fare was 3560Dkr. Operators running scheduled flights to East Greenland do change from year to year and the most recent operators have been Greenlandair, Icelandair and Odin Air. For Greenlandair, tickets are booked direct with Greenlandair in Nuuk but are distributed through their UK handling service, SAS. It was an easy operation booking tickets with Greenlandair by phone and fax to Nuuk. However, it took 2 weeks of almost constant calling to get Greenlandair to release the tickets to SAS in London.

In addition to these scheduled flights it is also possible to fly into Kulusuk on smaller aircraft ex Reykjavik which expeditions can charter direct with the operating companies. This may possibly be cheaper for groups wanting to bring in equipment/stores with them by air rather than paying standard airfreight or excess baggage charges on Greenlandair or Icelandair.

Charter companies which will consider flights to Kulusuk are:

Flugfelag Nordurlands hf  
Akureyri Airport  
Box 400  
602 Akureyri  
Iceland

Odin Air/Helgi Jonsson  
Reykjavik Airport  
Iceland

Tel: 354-6-12101  
Fax 354-6-12106

Tel: 354-1-10880

A connecting helicopter service for travel between Kulusuk International Airport and Ammassalik settlement is operated by Greenlandair. One way fare in 1993 was 390Dkr. A baggage allowance of 20kgs only is permitted so extra expedition equipment goes as excess baggage - not cheap! This Greenlandair chopper is a Bell 212 which can take 9 passengers.

### **2.1.2 CONSTABLE POINT**

Considerably further north is a fully maintained airstrip at Constable Point which is situated on the northern side of the huge inlet of Scoresby Sound just outside the National Park. This airstrip services the principal settlement in this area called Ittoqqortoormiit (formerly known as Scoresbysund).

Scheduled flights operate to Constable Point from Iceland operated by Greenlandair. Alternatively charter your own plane direct (eg with Flugfelag Nordurlends above). Charter costs of a Piper Chieftan £1375 and Twin Otter £2800 return from Akureyri in 1993.

Connection between Constable Point airstrip and Ittoqqortoormiit settlement is by Greenlandair chopper.

### **2.1.3 MESTERS VIG**

The only other serviceable runway which is available on the east coast is at Mesters Vig. This station is no longer manned and no scheduled flights are available. However, many expeditions and tour groups use this airstrip and charter companies will fly parties to Mesters Vig which is the principal access point to the stunning mountains of the Stauning Alps.

## **2.2. ONWARD TRAVEL FROM KULUSUK AIRPORT (AMMASSALIK DISTRICT)**

On arrival at Kulusuk, depending on time of year and local conditions, an expedition can move from Kulusuk island to the mountains via 3 different modes of transport (or a combination of them).

To arrange this leg of a journey in advance from the UK can be difficult. However, the municipal authorities in Ammassalik have worked hard in recent years to provide better "tourist" facilities for visitors. There is now a very good Tourist Office in Ammassalik which will strive hard to set up boat travel in advance in summer and will be a very good initial point of contact to arrange dog sledge transport in winter.

Contact: Kristine Lyngbo, Ammassalik Tourist Office, Box 120, 3913 Ammassalik, East Greenland. Tel +299 18176. Fax +299 18077 (Kristine speaks good English!).

### **2.2.1 HELICOPTER CHARTER**

The Bell 212 helicopter operated by Greenlandair can be chartered to move expeditions into the mountains. Greenlandair have no problems flying the chopper above the snowline and will land on glaciers and the Inland Ice to set down or pick up expedition teams.

Charter rates are very high and are calculated from Ammassalik as the start point. So, if arriving at Kulusuk it is likely that the group (and its equipment) will need to get itself to Ammassalik in the first instance. The charter cost per hour in 1993 was 20,100Dkr!!

If expeditions plan to charter the Greenlandair chopper it is advisable to sort out all the details with Greenlandair in advance before leaving the UK. On arrival in Ammassalik contact should be made with the Greenlandair station manager immediately to reconfirm all charter details.

It is not unknown for the chopper to become "unavailable" for charter at short notice for a few days due to the need for maintenance or its diversion to other duties so keep checking any arrangements which have been agreed.

### **2.2.2 BOAT TRAVEL**

Generally the ice in the fjords does not break up until the beginning of July each year. So, if relying on boat travel around the fjords this is the earliest you should plan to be active. If you have only a very short period of time to spend in the region go slightly later (end of July) to ensure you don't waste all your holiday sitting around waiting for the ice to clear.

Virtually all the local Inuit hunters have open boats, usually fibreglass, between 3 metres and 5 metres in length powered by 2 stroke outboard motors of about 40 hp.

Smaller parties (4 persons or less) can usually arrange to charter such a boat quite easily, particularly at the larger settlements. However, a large party with a lot of bulky equipment will need a diesel engine boat with a cabin. Arranging these in advance is possible but experience has proved this to be somewhat unreliable. There are various locally agreed hourly rates for different sized boats and length of trips. The locals know the value of their boats and consequently expect what appears to be an expensive fee. Typical charter rates for small boats in 1993 were about 2000DKr per hour. The hirer will also be expected to pay for the return journey of the empty boat. The final cost will also include a charge for the litres of fuel for both the outward and return trips.

It is probably best to hire the small open boats on arrival at Kulusuk. If there are no Inuit hanging around the airport then the settlement of Kap Dan is only a 5 minute walk away. Go and barter by the jetty. It is 24 hour daylight in summer and there are always people around.

The larger diesel engine boats capable of carrying larger groups and more equipment are generally only to be found in Ammassalik. There are basically two choices for arranging charter of these vessels:

- i) Do it in advance through the Tourist Office and wait on the jetty at Kap Dan for it to turn up (or telephone over to Ammassalik on arrival at Kulusuk).
- ii) On arrival at Kulusuk leave your gear at the airport and either all/one of the team go across to Ammassalik (chopper or open boat) to arrange the boat hire upon arrival. Note that this option could take several days before a boat/skipper is found and a satisfactory deal is arranged.

### 2.2.3 DOGSLEDGE

During Winter and Spring most of the fjords are frozen over and the Inuit move around by dogsledge. Consequently it is feasible to hire dog teams and Greenlandic drivers to move people and stores to the mountains. However, the Inuit traditionally do not venture into the mountains themselves because they have no reason to go there for hunting etc. If a major journey by dogsledge deep into the mountains is to be undertaken it would most likely necessitate a recce visit out to Ammassalik earlier in the year to set it up in advance.

However, if access through the frozen fjords to the fronts of particular glaciers is required then it is likely that this can be arranged on arrival or sounded out in advance through Kristine Lyngbo at the Ammassalik Tourist Office. As with boat travel, the Inuit know their value for dogsledge hire and it is likely to cost more than the charter of open boats in summer due to the uniqueness of dogsledge travel.

For parties attempting a crossing of the Inland Ice from the Ammassalik district in recent years several expeditions have choppered from Ammassalik to Isortoq settlement and then travelled from Isortoq by dogsledge onto the margin of the Inland Ice.

It would take an exceptional winter freeze for the Ammassalik Fjord to freeze over allowing dogsledge travel from Kulusuk directly over to Ammassalik settlement or for the Sermilik Fjord to freeze over sufficiently to allow easy travel from the western side of Ammassalik island over to the mainland to gain access to the Inland Ice.

### 2.3. ROUTES TO ROUGH LANDING STRIPS & SKI PLANE LANDINGS

It is possible to charter aircraft to land in places other than maintained runways by landing on skis above the snow line or on wheels at suitable areas close to the coast.

The most suitable aircraft for such flights is the Twin Otter and by far the best charter company operating such activities is Flugfelag Nordurlands based at Akureyri Airport. The APUSEQ 93 team have used Flugfelag Nordurlands on many occasions and have made several flights by ski equipped Twin Otter with them.

Bearing in mind the very high cost of helicopter charter already described and the possibility of poor sea ice conditions preventing a party travelling to their start point at the coast, it is well worth investigating the cost of flying direct from Iceland on ski equipped Twin Otter with all supplies and making a ski landing direct in the mountains.

Apart from the cost effectiveness of such a transport route, there is the time factor which can make it attractive.

It allows a party to potentially achieve more in a given time by simplifying the inbound/outbound transport logistics. If landing on skis the chances are you can put the plane down very close to your mountaineering objective and thus avoid a boat journey up the coast from the nearest maintained airstrip and also avoid a ski tour in from the coast to the mountain.

Ski equipped Twin Otters have landed in the heart of the Watkins Mountains only a day's ski from Gunnbjornsfjeld and on the edge of the Inland Ice beneath Mont Forel as well as in the middle of the Caledonian Alps north of Ammassalik when picking up the Apuseq '93 team.

Related to the time factor is the ability for ski landings to open up new opportunities for adventure travel and exploration. Mountain ranges which had remained unvisited because they required several weeks of sledging to get to can now be reached direct from Iceland in a matter of hours.

If any group has plans which require a landing "in the bush" either above the snow line or in summer close to the coast where there is no maintained airstrip then send details in to Sigurdur Adelsteinsson at Flugfelag Nordurlands and he will very quickly give you a response as to the feasibility of a landing in the chosen spot.

Probably the most frequently used rough 'strip in recent years is the gravel outwash plain at Sodalen close to Mikkis Fjord to the east of Kangerdlugssuaq .

Over the last 10 years this gravel 'strip has serviced an intensive mineral exploration programme in the region being undertaken by Platinova Resources and many expeditions have also been flown into the region utilising the same facility. Sodalen gives excellent access to the spectacular Lemon Mountains and the slightly more distant Watkins Mountains (including Greenland's highest peak).

## 2.4 ROUTES FROM THE COAST TO THE MOUNTAINS (CALEDONIAN ALPS)

In the Ammassalik district the "big" mountains and glacier systems are to be found to the north of Kuummiit settlement reaching as far northwards as Mount Forel and the margin of the Inland Ice and stretching northeast in a wide belt for hundreds of kilometres up the coast.

To gain access to these mountains from a point within easy reach of Ammassalik expeditions have, in the past, used a number of routes from the coast up onto the glacier systems.

As ice conditions change over the years the suitability of these different routes has varied.

The Apuseq 93 team have direct experience of using the first two of the access routes described below - both of which converge on the same icefall which needs to be crossed to penetrate deeper inland to the bigger peaks.

The second two routes described in this section have been used more frequently in recent years by a number of groups but it is believed that little has been documented about the routes or their suitability. The Apuseq 93 team have drawn on information gathered from expeditions which have used these routes in the last 3 years to describe both the routes themselves and to comment on their suitability for access to the mountains of the Caledonian Alps.

The 4 routes described below and the other landmarks and features described in this section refer to MAP 2.

### 2.4.1 WOLF GULLY

*Wolf Gully* is the access route from the Tasilap Kua valley (directly north of Kuummiit settlement) which leads up onto the snowfields which then drain down onto the upper section of the Karale Glacier.

This route was used by many expeditions in the 1960's and 1970's and this fact is well documented in many previous expedition reports.

The Tasilap Kua valley is a wide U shaped glaciated valley surrounded on both sides by impressive rocky peaks. The first few kilometres of the valley floor are relatively flat but with a large network of braided streams draining to the fjord.

Access is easily gained to the east side of the valley from the fjord and this side of the valley features idyllic Alpine meadows strewn with large boulders which makes an ideal base camp area.

Access by boat into Tasilaq fjord is easy although it cannot be guaranteed that winter ice will have cleared from the fjord until early to mid July. Access is better by small craft to ensure that parties and stores can be landed as far up the fjord as possible thus avoiding excessive load carrying along the fjord edge.



### Route Description

About 4 kilometres from the head of the Tasilaq fjord on the east side of Tasilap Kua valley a small glacier drains to valley floor to the north of a small rocky peak marked Pt. 1306m. The route up *Wolf Gully* follows a clearly worn path up the northernmost lateral moraine of this glacier to a region of rocky slabs.

Early in the summer season when snow cover is still quite good a route can be followed across easy snow slopes from the top of the moraines around most of the rocks onto the glacier above making this route quite straightforward.

However, late in the season, when a lot of the snow has gone, the top section of this route can be quite dangerous. At the top of the descent steep ice slopes and some crevasses are exposed which require great care - especially with heavy loads.

The only alternative to these ice slopes is to traverse steep smooth rock slabs which are equally difficult.

It is a sad testimony to the popularity of this route that there is a considerable amount of expedition debris scattered around the top of this route which all becomes exposed at the end of summer when most of the snow has melted away.

The small glacier running parallel to the Tasilap Kua valley behind the peaks of Trillingerne etc is quite straightforward and is followed to the upper regions of the Karale Glacier.

The Karale Glacier should be crossed as high up as possible to ensure maximum snow cover on this relatively low lying glacier.

Onward travel from the Karale Glacier can only be over col A marked on MAP 2.

Col A is the pass referred to as *Deep Freeze* in the text of the Apuseq 93 and our previous reports.

This icefall was used by many of the expeditions in the 60's and 70's and was used by Apuseq 93 members in 1986 and 1990. By 1990 it was noted as being more difficult to cross and we certainly found during Apuseq 93 that *Deep Freeze* was a difficult route to follow - now being very steep.

An alternative onward route from Karale Glacier was evaluated by Apuseq 93 over Col B (see MAP 2). This route was thought to have been used by a Swedish group in 1990 who possibly crossed it from east to west on ski without pulks.

Apuseq 93 determined that it was not possible to cross with pulks approaching from the west. There was evidence of recent large snowbridge collapse at the top which prevented a crossing.

## Recommendations

Whilst it is still possible to cross the *Deep Freeze* pass, the difficulty which this gives together with the danger of descending *Wolf Gully* in late summer stack up against this route as being a good one.

It does have the advantage, however, of being accessible on foot from Kuummiit settlement either by following the edge of the fjord all the way (long and difficult) or by following the route shown on MAP 2 which is relatively straightforward. Thereby allowing a team member to go to the settlement to arrange boat travel etc to pick up people at the end of an expedition or in case of emergency.

### **2.4.2 TUNO GLACIER**

*Tuno Glacier* is the next possible access route closest to Kuummiit settlement.

It is possible that this route has been used in the past but little, if any, documented evidence exists.

It was a primary objective, therefore, for Apuseq 93 to try this route into the mountains and assess its suitability as a summer access route.

Access by boat to *Tuno* is straightforward via Ammassalik Fjord and suitable landing by small boats can be made just to the east of the glacial outwash plain at Tuno inlet.

#### Route Description

The snout of *Tuno Glacier* now lies about 5 kilometres from the sea. Access is up a wide glacial outwash plain that is crossed by numerous streams and one deep meltwater river.

Access is possible on either side of the valley, though we found the east side relatively safe and straightforward.

The final kilometre up to the eastern side of the glacier snout is very strenuous, moving over loose moraine and boulder fields.

Access onto the ice of the glacier is very easy. In early July 93 the snout was dry ice and after about 2 kilometres we came to a snow covered surface suitable for skiing and with little crevasse danger.

The route from *Tuno* into the mountains follows straightforward snow covered glaciers which then merge into the southern flanks of the bigger Karale Glacier.

The route onward through Karale Glacier has a complex but easily navigable crevasse system before the flatter upper snowfields are reached.

Onward travel then necessitates crossing *Deep Freeze* as outlined in the previous route description.

### Recommendations

Via this route it is quicker and easier to get supplies up onto skiable snow than via *Wolf Gully*. However, it is then a longer distance to travel to reach the upper snowfields of the Karale Glacier and the *Deep Freeze* pass, and *Deep Freeze* still has to be crossed to gain access deeper inland.

### 2.4.3 ACCESS GLACIER

This route travels up an unnamed glacier to the east of the Rytterknoegten massif and curves round to join up with the snowfields draining from the spectacular Slangen pass.

It is believed that there is no documented evidence of this route being used prior to the late 1980's or early 1990's.

It has been used since 1990 with great success by commercial expeditions organised by Mountain Adventure (Sweden - Bengt Rodin) and Tangent Expeditions (Paul Walker).

The snout of Karale Glacier has retreated some 7 or 8 kilometres from the position shown on the Geodaetisk. Institute 1:250,000 map.

This has resulted in the crescent shaped *Access Glacier* now flowing down to the open water in the Sermiligap Qingertiva into which flow the larger ice masses of Karale Glacier and Knud Rasmussen Glacier.

Access by boat through to the head of the fjord can be difficult early in the summer if ice break up is late or if currents and wind have not allowed debris breaking off the large glacier fronts to disperse.

However, it is no worse than any of the other routes described here as regards timing for boat access.

### Route Description

A relatively flat area just to the west of the glacier snout serves as a good landing point for parties being dropped by boat.

The route inland begins by following the lateral moraine on the west side of this glacier for a few kilometres before these moraines fade out and the route follows the dry ice of the lower glacier for about one or two kilometres.

*Access Glacier* has a sufficiently steep angle to hold snow well throughout the summer. As a result, after only one or two kilometres on dry ice the snowline is reached and travel with ski and pulk is easily possible with little hindrance from crevasses.

The route follows the glacier leftwards in its sweep round through 90 degrees until one is travelling roughly westward, towards the slopes draining from the Slangen pass.

### Recommendations

Despite the distance of boat travel from the main settlements to *Access Glacier* being a little longer than the two routes previously described this is probably the best route into the mountains of all those described in this report.

Access up onto skiable snow is straightforward and the route leads quite easily round to the wonderful Slangen pass which provides access onward to the bigger mountains.

A key advantage of this route over those previously described is that it does not require a crossing of the *Deep Freeze* pass.

## **2.4.4 KNUD RASMUSSEN GLACIER**

The Knud Rasmussen Glacier is a very large, low lying ice stream which flows down into the right hand branch of the Y shaped fjord of Sermiligap Qingertiva to the north of Sermiligap settlement.

From the map it appears an obvious choice as a "highway" to the mountains of the interior and as such it has been used by many expeditions over a considerable period of time.

Access by boat to this glacier is the same as for *Access Glacier* previously described.

### Route Description

Access onto the glacier is from the eastern bank of the right hand branch of the fjord about 2km from the snout of the glacier.

A walk of a few kilometres over boulder strewn terrain leads to the edge of the ice and the glacier can easily be gained. In very early summer the snowline can often be gained after a kilometre or so of walking on glacier ice.

However, because the glacier is low lying and has a very shallow gradient the snowline recedes very quickly up the glacier once summer arrives. This means that it is quite likely that skiing is not possible for many kilometres resulting in a difficult trek over crevassed dry ice.

Certainly at the end of an expedition, if it is planned to exit the mountains on foot via the Knud Rasmussen Glacier then a very long (and probably wet due to meltwater) walk will be the result.

### Reccomendations

This route is not reccomended as a general summer access route for expeditions because of the low lying nature of the glacier and the probability of a lot of crevassed dry ice and meltwater.

However in spring or very early summer when snow cover is good then the Knud Rasmussen Glacier would probably make a quite suitable route. However access by boat would not be possible at this time and so parties would need to be dropped by chartered helicopter beyond the glacier snout.

## **2.5. LOGISTICS ABOVE THE SNOWLINE**

### **2.5.1 USE OF SKIS**

Many British parties visiting the mountains of East Greenland come with mountaineering expertise but perhaps limited experience of travelling long distances across snow covered ground in an efficient manner.

The Scandinavians are generally excellent with the use of Nordic skis and the French, Italian etc. groups who visit this region are often proficient in the Alpine techniques of ski mountaineering.

The Brits, however, are often less well acquainted with the wonders of mountain ski touring or the more modern types of sledges available.

In this report it is not appropriate to go into detail with regard to different types of ski or ski techniques. However, parties should strongly consider the use of skis for moving about.

In Greenland in summer there is virtual 24 hour daylight and most climbing and travelling is undertaken during the "night" when temperatures are coldest and snow conditions the best. However, often temperatures may only fall a few degrees below zero at night (especially near the coast at the height of summer) and consequently a hard travelling surface cannot be relied upon. Skis will greatly aid a party in getting from A to B efficiently and quickly with obvious safety advantages in crevassed terrain.

If an expedition plan involves moving a considerable distance over snow then Nordic skis with loose heel bindings are probably the most appropriate.

If the plan involves shorter journeys radiating out from a fixed camp principally to climb peaks then Alpine touring skis are perhaps better.

### **2.5.2 TYPES OF SLED**

If a party is spending a long time above the snowline any distance inland from the coast with no means of resupply from outside then it is unlikely that all food, equipment and fuel can be backpacked without relaying loads or staying at static camps rather than moving on a continuous journey transporting everything with the team.

Consequently the use of sleds to "manhaul" equipment and supplies may be considered which can allow loads to be pulled in relative comfort which are several times heavier than those which are "backpackable".



There are generally two types of sled which are likely to be most appropriate to travel in East Greenland; the traditional wooden "Nansen" style sled and the Scandinavian pulk.

- i) Nansen type sleds are usually made of wood consisting of a loading platform mounted on runners. The runners are now usually shod in high density polyethylene. The whole structure is usually lashed together with cord and hide as it is essential for the whole sled to be flexible.

These sleds can flex considerably when moving over uneven terrain and the lines used for lashing the load to the sled should be checked regularly and re-tightened when necessary.

A Nansen style sled is longer than the largest pulk and can carry a heavier load - up to about 500 kilos. In some circumstances this may be an advantage but in soft snow it is likely that the Nansen sled will be very difficult to pull and manoeuvre and the ground pressure exerted on the snow through the runners can be high - leading to increased problems in crevassed terrain.

It is necessary for more than one person to haul a Nansen and attachment to the sled is via hauling ropes of differing lengths. With this configuration everyone must pull together - which takes practice and patience !!

In the event of one of the team falling into a crevasse whilst attached to the Nansen, overturning the sled is often an effective first means of belay and the haul rope will probably act as an effective safety rope when the fall occurs.

- ii) Pulk type sleds are Scandinavian in origin and are usually made of fibreglass. They are basically a "tray" with runners made of high density polyethylene on the underside.

The runners are designed to keep most of the bottom surface of the pulk off the snow in hard conditions but are not very deep allowing the pulk to "bottom out" in softer conditions thereby spreading the load over a larger area in soft snow making it more manageable than a Nansen sled.

The fibreglass "tray" has shaped sides to which is usually attached a weatherproof cover with sufficient volume to protect the largest load likely to be carried.

The load should be securely tied down into the pulk. This is usually achieved using lashing cords attached to D rings rivetted into the pulk shell or else using strong elasticated ties which are sewn low down onto the weatherproof cover and are strongly attached to the cover.

The hauler wears a harness and a rigid hauling shaft connects the front of the pulk to the harness allowing the hauler to control the pulk. Sometimes the pulk is hauled with just a rope although this does not allow any control of the pulk when descending or traversing a slope.

If using skis when hauling a pulk it is important that the haul shaft or rope is of sufficient length to prevent the tail of the ski catching the front of the pulk on each stride.

Pulks are made in varying sizes up to about 2 metres in length with this largest size capable of carrying loads up to 125 kilos.

When a party is travelling with pulks an important factor in comparison to the Nansen is that the party can easily become separated over quite a distance during a relative short period of time depending on an individual's pace.

It is essential therefore in crevassed areas or bad weather that the party remains close together and in touch. If travelling in crevassed terrain it is important that the group devises a suitable rope safety system and are competent in using it.

In the event of a crevasse fall the hauler must always be securely attached to the safety rope and must be able to separate himself from the pulk whilst the pulk is still held from above and is not hanging from the hauler's harness.

### **2.5.3 AIRDROPS**

Depending on a team's operational plan it may be advantageous to use airdrops to position supplies at certain locations and thus avoid the need to haul or backpack everything right from the outset.

The Apuseq 93 team have used airdrops on several occasions with great success and some general guidelines would be:

- package supplies suitably so that everything survives the impact.
- pick the "drop zone" carefully to ensure it is a suitable area.
- ensure that visual contact is maintained throughout the drop either by having a team member on board the plane as the airdrop is made or by having the team on the ground in the drop zone as the airdrop is carried out.

There will be several factors which determine the height from which the drop is made (and the speed of the aircraft at the time). These include the layout of the terrain, prevailing weather conditions, skill and experience of the pilot etc.

Obviously the higher the drop and the faster the aircraft speed then the greater the impact and the further the items are likely to bounce and travel across the ground on impact.

The ideal circumstances are to have the expedition team on the ground to receive the drop and to be in radio contact with the pilot making the drop.

In the Watkins Mountains in 1988 we landed a 4 man climbing team and 2 man film crew by ski equipped Twin Otter. With the weight of the film equipment we had no room for food supplies so these were airdropped by Piper Chieftain aircraft just after the Twin Otter had landed.

The Twin Otter remained on the ground with us to await the airdrop. The Twin Otter pilot was in radio contact with the Piper Chieftain and after the first run was able to instruct the Piper Chieftain to come in much lower and much slower to ensure the 20 or so boxes fell within a much tighter drop zone.

On a long flat glacier it is very easy for a pilot to make a successful drop but with the boxes spread out over a zone 2km wide and 5km long - quite an area to search if you arrive in poor weather !!

If you do not have a team on the ground to receive the drop then make sure that one of the team is on the plane when the drop is made. He can then note the area of spread over which the boxes have fallen, can relate the drop zone to the relative position of key ground features such as moraines, ridges etc.

In addition make sure the pilot takes GPS readings as the plane makes repeated runs over the drop zone to get a fix on Latitude and Longitude.

Maps of these areas can be quite deceptive when trying to identify good areas for potential drops. Large white expanses on the map do not necessarily indicate nice open snow plateaus but may well be a chaotic junction of several glaciers seamed with huge crevasses.

Where possible cross check maps with aerial photos and corroborate data with reports and personal accounts from previous parties who may have visited the region.

#### **2.5.4 PACKAGING FOR AIRDROPS**

How you package up your supplies may be the key to either a successful or disastrous airdrop.

The outer packaging of the final container will take the heaviest impact on landing and is the key to avoiding everything bursting out on impact and blowing to the 4 corners of the wind before you can gather it up.

If making a drop from a relatively small aircraft then there will be a maximum dimension of outer case that will fit through the door - check the dimensions with the pilot !

The Apuseq 93 team have used multiple walled corrugated cases very successfully on a number of airdrops. These are typically triple walled corrugated boxes with an additional "liner" of similar material to increase the wall thickness.

A number of "spacers" of similar material are then used at the top, bottom and in the centre of the box to provide some torsional rigidity helping prevent the box from twisting.

Once the box is packed it is sealed up well with plastic packing tape.

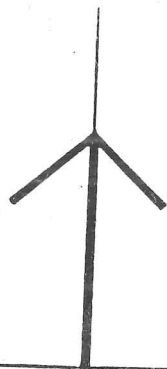
To ensure maximum strength on impact, however, the boxes must then be secured with 4 to 5 tensioned steel or nylon bands. It is these bands that really do provide a huge amount of strength to the finished container on impact with the ground.

This type of steel or nylon banding is very commonly used throughout the packaging industry.

Supplies within the box should be packed appropriately for the operational plan of the expedition. For pulk tours we have usually pre-packed all food supplies into "man-day" ration packs in the UK and put these finished ration packs directly into the airdrop containers.

It should be noted that however well packaged the outer cases are the impact forces in an airdrop are huge and food containers within the outer case may well burst.

Tubes of honey, tubs of butter, margarine etc have all burst in the past so it is as well to allow for a 10 - 15% wastage rate and to ensure all items are well wrapped individually in strong poly bags to minimise cross contamination from burst items.



INLAND

ICE

67°N

▲ MONT FOREL

66°N

KUNGMUT

SERMILIGAQ

ANGMAGSSALIK

KULUSUK

# THE ANGMAGSSALIK AREA OF EAST GREENLAND

0

100 km

