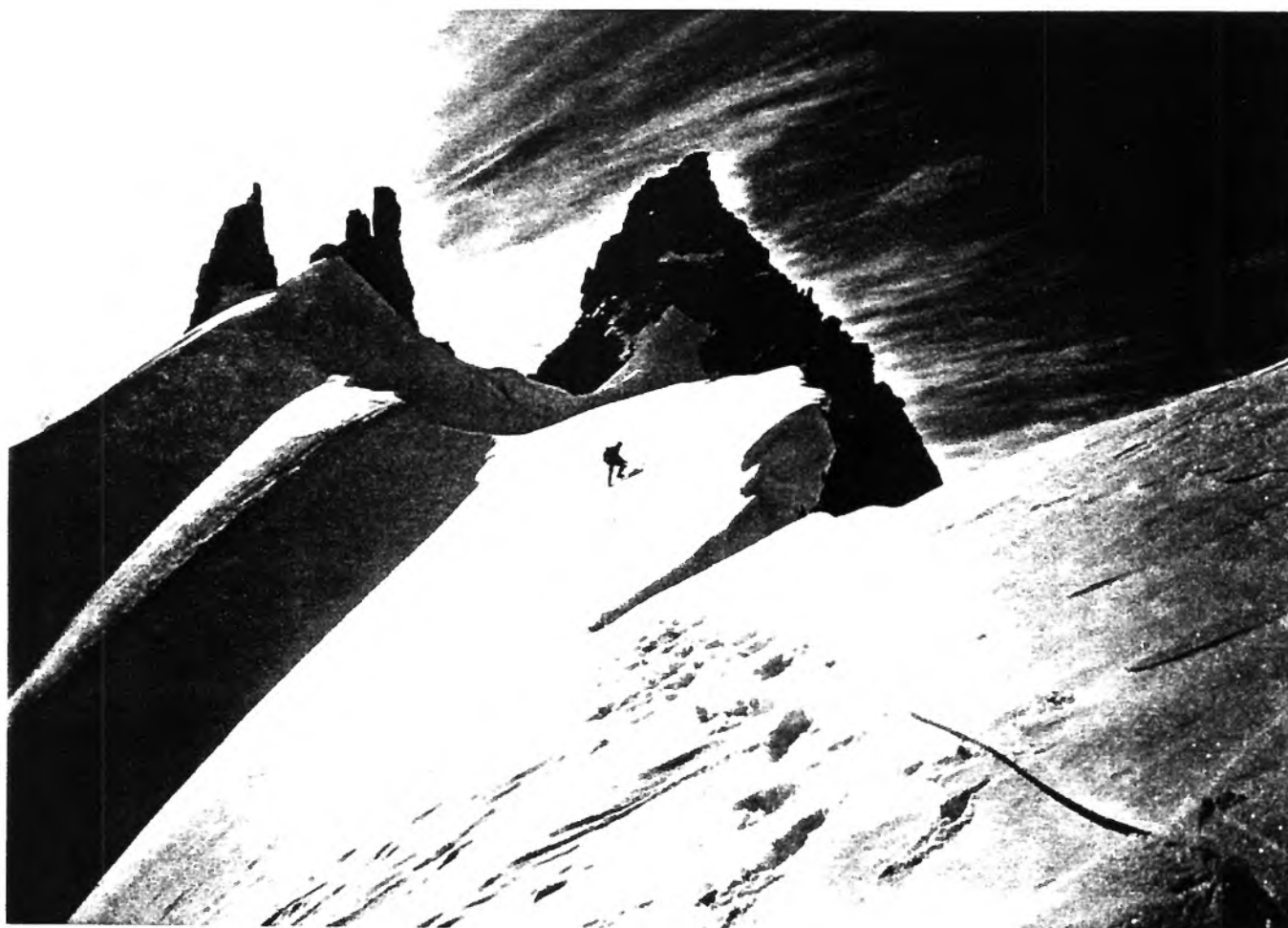


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# KANGERDLUGSSUAQ

The report of



**The British Kangerdlugssuaq Expedition**

1998

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**Contact address:** *Phil Bartlett, The Old Stables, Youlgrave, Derbyshire DE45 1UW, United Kingdom.*

**Front Cover:** *Phil Bartlett on the north ridge of Redekammen during the first ascent. The cornice through which he fell, to be solidly held by Wilkinson, is clearly visible. Photo: Wilkinson.*

**Rear Cover:** *The Redekammen massif photographed from the north-east during the first ascent of Fangetarnet ("The Prisoners' Tower.") The main summit of Redekammen is on the horizon right of centre. The subsidiary summit to the right of this was climbed by the British expedition under Stan Woolley in 1990. Figures above the breche on Fangetarnet are clearly visible in silhouette. Photo: Bartlett.*

## ACKNOWLEDGMENTS

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### **For financial assistance and services in kind:**

The British Mountaineering Council

The Mount Everest Foundation

The Gino Watkins Memorial Trust

The Oak Trust

Paradise Chambers, Sheffield

MGH Limited

Mr Edwin Booth

Mr Paul Walker

### **For advice and other assistance:**

Mr Lindsay Griffin

Mr Julian Freeman-Attwood

Dr Ian Campbell

Mr James Lowther

Mr Rob Ferguson

## PERSONNEL

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**Phil Bartlett** (leader). 42, College lecturer and writer. Many expeditions, including this area in 1990 and 1992, Pakistan four times, Baffin Island, India, Kirghizstan, northern Sikkim and elsewhere. Member, The Alpine Club, The Climbers' Club, The Oxford Alpine Club, The Arctic Club. Past-president, The Oxford University Mountaineering Club.

**Brian Davison.** 37, environmental chemist and one of Britain's leading expedition climbers, with experience in South America, south Georgia, Tibet, Pakistan, Kirghizstan and the Antarctic continent.

**Ken Findlay.** 40, Further Education College lecturer who has climbed three dozen of the Alps' 4000m peaks and has expedition experience in the Karakoram, Peru, and the Tien Shan.

**Helen Geddes.** 41, Scottish mountaineer and professional environmental manager, with expedition experience in Siberia, West Nepal and Dolpo (Nepalese/Tibetan border.) Convenor of The Cairngorms Campaign and ex-executive member, The Mountaineering Council of Scotland.

**John "Roc" Hudson.** 51, professional geologist with expedition experience in Antarctica, Africa, Peru, the Karakoram, Nepal, Chile, the Tien Shan, the Caucasus and elsewhere.

**Pete Nelson.** 42, social worker, six alpine seasons and expeditions to Siberia, Dolpo (Nepal), Tibet and Ladakh.

**Graham Robinson.** 41, barrister and keen ski mountaineer, with expedition experience in Siberia, Nepal and Tibet.

**Dave Wilkinson.** 51, University lecturer and one of Britain's leading expedition mountaineers, with worldwide experience including first ascents of Rimo III, Chong Kumdan I, Haramosh II and Bolocho peak in the Karakoram.

## SUMMARY REPORT

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**The British Kangerdlugssuaq Expedition 1998** was conceived as a development of earlier expeditions, specifically Stan Woolley's *Northern Group Greenland Expedition 1990* and Phil Bartlett's *British Mountaineering Expedition to East Greenland 1992*. All three aimed to explore and climb virgin peaks in, or on the approaches to, the Kangerdlugssuaq Basin, situated roughly midway between Angmagssalik and Scoresbysund at 68.5°N, 32.0°W on the East Greenland coast. ("Kangerdlugssuaq" means "Big Fjord" in Inuit, and there are other locations in Greenland with the same name.)

The previous expeditions had both been highly successful, and this one was no exception. The combination of logistically easy access, low altitude and enthusiasm enabled the team to climb more than 30 summits, all previously virgin, including Redekammen, a superb serrated *massif* and probably the best remaining virgin summit in the area, and Kangerdlugssuaq Tinde, the massive if technically straightforward mountain overlooking the upper reaches of the fjord. It also explored a considerable amount of virgin territory and noted a number of technical rock walls which will surely be of interest to future parties.

A complete itinerary, together with locations of the mountains climbed, is given elsewhere, but the timetable was roughly as follows.

The expedition flew from Britain to Iceland on Saturday 11th July 1998. There, as on previous occasions, a ski-equipped de Havilland turbo-prop Twin Otter aircraft together with two pilots was chartered out of Akureyri. This service was previously independent, is now a part of Air Iceland, but still in the hands of Sigurdur Adelsteinsson of Akureyri. By 8 pm on Sunday the whole expedition was in the field, having landed much as intended just north of the Redekammen massif at 68° 15' N, 33° 20' W. For the next week the expedition split into three parts. Bartlett and Wilkinson skied south across the Hutchinson to pt 2400 and laid siege to the main summit of Redekammen, which they climbed; Findlay, Geddes, Hudson, Robinson and Nelson skied west and north and climbed a number of peaks; Davison remained (supposedly) at base, from which, in spite of a damaged knee, he soloed some dozen summits.

Re-grouping at Base, the whole team sat out some bad weather before leaving in two groups for a circular tour north and east towards the coast. Details are given elsewhere but this tour proved highly successful, with new territory explored and several summits climbed, including Kangerdlugssuaq Tinde, the logical culmination of this part of the expedition. The final week, spent almost entirely at Base, was marked by a

continuous four day blizzard which deposited some two feet of snow, followed by the most settled weather of the entire expedition.

Altogether then, much as planned. But the following comments may be useful.

**Weather.** An exact assessment depends on one's precise location - the weather was noticeably worse the closer one was to the fjord - but Bartlett's summary is as follows. Out of thirty-five days in the field, 11th July - 15th August inclusive, only ten were fine all day with the appearance of a settled air mass (which includes four at the very end of the expedition immediately following four days of storm, when snow conditions were even worse than usual and the expedition was largely confined to barracks waiting for the plane.) Another six or so were half good - clearing midday perhaps, or clouding in in the afternoon. The rest were overcast if not precipitating, and mostly very warm. Most of the precipitation was rain.

The last week of the expedition seemed to bring a noticeable cooling of conditions, and with it slim chances of new snow consolidating. It is reasonable to speculate therefore whether under normal circumstances mid August does not mark the end of summer and realistic hopes of safe climbing. Precisely when safe climbing might *begin* is another matter. A visit in May or June would probably offer colder weather; it might also offer entirely new climbs in the form of ice couloirs and so on, climbs which later disappear.

The unsettled conditions and their possible connection with the pacific *El Nino* phenomenon were a matter of endless debate in idle moments; the expedition's very own professional atmospheric scientist, Brian Davison, gave them short shrift.

**Food.** A full report appears elsewhere. Because most supplies are sea-freighted to Iceland and food in Iceland itself is very expensive, very little fresh produce was taken. But because weight is not essentially a problem for a well organised party, it is possible to eat very well on an expedition of this kind - as indeed we did.

**Medical.** A report appears elsewhere. The chance of picking up infections and other minor ailments is much lower than on (say) a Himalayan expedition. Major injury is the main concern, and subsequent survival whilst awaiting rescue.

**Logistics.** The most efficient number of members for an expedition of this kind appears to be eight or nine; due to a late drop-out, this trip took eight. This requires two flights to get the whole expedition into the field, but ensures that the one flight back is full. (The flight out has to carry perhaps 400 kg less than the combined flights

in, as the food has been eaten and the fuel burnt; at the same time the plane's payload is greater - 1100 kg as opposed to 700 on the inward flights - because the plane itself has already used up half its fuel.) In summary, eight or nine people plus generous quantities of clothing, climbing equipment, skis, sledges and food and fuel for 5 weeks will fit snugly into this scheme.

**Communications.** It is mandatory to carry some sort of communication system. We had the simplest - a satellite emergency beacon. This made it impossible to advise our pilots of landing conditions, and forced them to rely purely on weather forecasts from the Icelandic meteo service, which contributed to our being picked up four days after our optimum departure date. A two-way radio or a satellite phone would have been a distinct help. Advice on all these matters, together with permission to operate and information on the Greenland Home Government's requirements, should be obtained from the Danish Polar Centre in Copenhagen.

Finally, the following comments: with the advent of ski landing (a development only of the last decade), East Greenland mountaineering has become highly accessible, yet it still offers a very wild, exploratory feel. The mountains are small, the glaciers largely flat; serac barriers appear to be less active than in the European Alps or much of the Himalaya, and the sheer quantity of snow lying on slopes is certainly less. Greenland is perhaps a less serious undertaking than a major Himalayan expedition. But such comparative assessments may be misleading; climbing there feels remote and exposed, and the consequences of even a minor accident could be very serious.

Phil Bartlett  
November 1998.

- References:** *The Alpine Journal* 1998 (Vol 98.)  
L R Wager *et al* "The Kangerdlugssuaq Region of East Greenland", *Geographical Journal* 90, November 1937.  
W.S. L Woolley *et al* Report, *Northern Group Greenland Expedition 1990*.  
P M R Bartlett *et al* Report, *British Mountaineering Expedition to East Greenland 1992*.

*An article on the present trip is likely to appear in the 1999 volume of The Alpine Journal.*

## EXPEDITION ITINERARY

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**Sat 11 July** Flight, Glasgow-Keflavik, transfer to Reykjavik airport for internal flight to Isafjördur. Sea freighted equipment is located and sorted out in airport hanger at Isafjördur ready for Twin Otter flights.

**Sun 12 July** Bartlett, Wilkinson, Geddes and Davison take first Twin Otter flight of approximately 2 hours and are dropped at 14:00 hours on the glacier to the north of Redekammen. Second flight containing Hudson, Nelson, Robinson and Findlay arrives at 19:00 hours and lands in worsening weather which deteriorates to snow a few hours later.

**Mon 13 July** Gentle snow fall all night and during the day. Base camp slowly sorted out.

**Tues 14 July** Fine weather. Whole team skis to a small nunatak (P1) approximately 3 km NW of the camp. This is not marked on the map. This is climbed by the whole party from the north via easy snow. Geddes skis to the top. Whole party then skis to a ridge to the north of a prominent peak north of BC and a small summit on the ridge is reached (P2). This is derided by some members of the party as a pimple or bump, and classified as a freckle by others. Davison and Bartlett climb the north ridge to the larger peak overlooking BC. Unstable snow on the ridge and 4 rock pitches on the summit tower lead to the top (2350m) (P3). Davison twists knee while skiing back to base camp.

**Wed 15 July** Weather unsettled, so a rest day with sledge packing in preparation for a 10 day trip.

**Thurs 16 July** Bartlett and Wilkinson set off in the afternoon to camp to the west of Redekammen (C1). Geddes, Hudson, Nelson, Robinson and Findlay leave a little later and head west to camp below a snowy peak (C3). Davison stays at BC with swollen knee.

**Fri 17 July** Geddes, Hudson, Nelson, Robinson and Findlay climb a snow peak via the east ridge (P4), Hudson and Findlay continuing along the connecting snow ridge to the western summit (P5) which is possibly higher. Geddes, Nelson and Robinson climb a small peak (P6) during the descent.

Wilkinson and Bartlett explore the approach to Redekammen but turn back in soft snow.

Overnight, Davison climbs two peaks on the north side of the Redekammen massive - a snow peak (P7) via the N ridge and a rock peak (P8) to its west via the adjoining ridge.



Unstable snow/ice conditions of ball bearings of ice encountered on slope. Very warm weather prevents freezing conditions developing until 3-4 am.

**Sat 18 July** Geddes, Hudson, Nelson, Robinson and Findlay attempt the easy angled north ridge of a peak to the east of the camp but turn back due to soft snow. Wilkinson and Bartlett travel west to camp below point 2400m (C2) (P9), and climb it via the exposed north ridge.

Overnight, Davison climbs the southernmost peak on the "saw tooth ridge" (P10) to the north of camp then skis further north to climb a snow peak from the next glacier (P11). Weather deteriorates from the north, and a sea mist extending up from the south obscures BC during the return journey. The small nunatak north of BC is located on a compass bearing and the outward ski tracks are picked up and followed to camp. Visibility in fog is down to 20m and locating the tent on a large glacier without the outward tracks to follow would have been extremely difficult.

Geddes, Hudson, Nelson, Robinson and Findlay move camp and head north with Geddes, Hudson, Nelson and Findlay climbing to the highest point east of the col (P12) via an easy snow slope. This is incorrectly marked on the map. Robinson sleeps on the sledge and awaits the others' return. Camp made a few km to the north (C4).

**Sun 19 July** Bartlett and Wilkinson climb the straightforward snow dome (P13) to the west of their camp and descend in the fog. Fog and low cloud prevented Davison moving from base camp.

**Mon 20 July** Overnight snow and low cloud persist all day.

**Tues 21 July** Initial cloud and light snow give way to a brighter day. Geddes, Hudson, Nelson, Robinson and Findlay move to camp south of rock peaks by the ice cap edge (C5). Geddes, Findlay and Nelson ski past col to the west to look down the glacier.

Bartlett and Wilkinson move to their previous camp by Redekammen. Snow conditions firm up during the day.

Overnight, Davison climbs the snow couloir between the two northernmost peaks (P14, P15) on the saw tooth ridge in rock boots, the southern one (P15) being the highest. Davison skis to the ridge at the head of the glacier and climbs a small snow peak (P16) and a rocky one (P17) after failing to get to an impressive rock tower at the east end of the ridge. He then skis further east and climbs a snow face and cornice to the highest point of the ridge (P18, c. 2000m) and traverses to another 2000m+ peak (P19) to the north before retracing his steps.

**Wed 22 July** Bartlett and Wilkinson climb Redekammen (P20, 2555m) via the north ridge in a 20 hour push. A TD mixed climb with serac danger in the lower section and an exposed cornice which Bartlett falls through, leading to a final rock finger of a summit.

Geddes, Hudson, Nelson, Robinson and Findlay climb snow fields and a rock ridge to reach the western peak in their group (P21.)

In the evening Davison heads down the glacier to the west of Redekammen but is stopped by a crevasse field after about 3 miles, just upstream of a nunatak dividing the glacier.

**Thurs 23 July** Weather deteriorates, with snow by 10 am preventing Davison leaving camp. Bartlett and Wilkinson descend Redekammen in the morning, before snow which turns to rain later in the day. Geddes, Hudson, Nelson, Robinson and Findlay try the eastern rock peak in their group via the south ridge but are turned back about 100m from the summit.

**Fri 24th July** Cloudy and unsettled. Wilkinson and Bartlett return to BC. Hudson, Nelson, Robinson and Findlay climb to the col between their two previously tried peaks. Heavy snow in the evening

**Sat 25 July** Geddes, Hudson, Nelson, Robinson and Findlay return to BC in cloudy conditions following Davison's old ski tracks from the nunatak to the north. Evening rain turns to snow and continues all night.

**Sun 26 July** Rain for most of the day. Some preparations started for next sledging journey.

**Mon 27 July** An overcast day. Bartlett, Wilkinson, Davison and Geddes leave BC in the afternoon and head north, to camp 6 km beyond a pass (C6) below pt 2100. Bartlett, Davison and Wilkinson climb pt 2100m (P22) that evening in worsening weather with rain and snow during the descent.

**Tues 28 July** Low cloud and rain for the entire day.

**Wed 29 July** Dry with low cloud in the morning. Bartlett, Wilkinson, Davison and Geddes head down the glacier to leave sledges below the middle of 3 nunataks and climb it (P23) via its rocky south ridge. Bartlett, Wilkinson, Davison and Geddes ski to basin on the north side of the southern nunatak. Davison, Bartlett and Wilkinson climb it via a long traverse on poor snow/ice to a snow col (P24). Geddes has a good ski down to the sledges and erects the tents (C7). Hudson, Nelson, Robinson and Findlay are seen on the glacier during the descent, and camp a mile short of C7 (C8).

**Thurs 30 July** Hudson, Nelson, Robinson and Findlay arrive in the morning and ski to the col between the nunataks. Findlay climbs the middle nunatak (P23). Camp is struck in the late afternoon with Davison and Geddes climbing the rock nunatak to the north via the south ridge (P25). Others sledge to the south of the nunatak through a heavily crevassed region to camp below Hovedvejs nunatak (C9). Davison and Geddes join

them a few hours later having taken sledges over the col between the two nunataks - a shorter route, avoiding the crevassing they had observed during the climb.

**Fri 31 July** Sledging to camp NW of Hovedvejs nunatak at a col between pt 2005m and a nunatak to its west (C10). Everyone bar Hudson climbs the nunatak (P26) that evening and Davison continues onto another nunatak (P27) a further 5 km to the north-west.

**Sat 1 Aug** Findlay, Robinson and Nelson return at 7 am as the rain starts, having taken a circuitous route in descent. Light rain for most of the day.

**Sun 2 Aug** Rain for most of the day, gradually improving towards evening.

**Mon 3 Aug** Fine weather. Davison, Bartlett, Wilkinson and Findlay set off for Kangerdlugssuaqs Tinde, skiing round to the west of point 1800m until dry glacier is reached. Davison ascends a narrow ice/snow gully and continues to the summit (P28, 2260m). Bartlett, Wilkinson and Findlay climb a wide gully leading to pt 2000m from the same glacial basin. Bartlett, Wilkinson and Findlay climb point 2000m (P29). Bartlett and Davison meet on the ridge between the two mountains and exchange information. Findlay and Wilkinson descend the gully and return to camp. Davison follows Bartlett's footprints up point 2000m and descends the wide gully. Bartlett follows Davison's footprints up Kangerdlugssuaqs Tinde. Both return to camp after 17 hours.

Geddes, Hudson, Nelson and Robinson climb the higher (c1800m) snow summit of Hovedvejs Nunatak (P30) via the east ridge.

**Tues 4 Aug** A rest day, with Findlay following Monday's route up Hovedvejs nunatak in the afternoon. Bartlett, Wilkinson, Geddes and Davison leave in the evening and head south down the Hovedvejs Glacier. Wilkinson and Bartlett camp after crevasses between Fangetårnet and point 1600m (C11). Geddes and Davison continue about 4 km further up the glacier (C12).

**Wed 5 Aug** Davison and Geddes ski to the col south of point 1700m. Davison continues up loose rock to the summit (P31). Bartlett and Wilkinson sledge haul about 2 km past the Geddes/Davison tent and camp (C13) before attempting the rock nunatak east of Fangetårnet. They are turned back about 100m from the summit by insufficient gear when they encounter a steep brèche. Findlay, Hudson, Nelson and Robinson sledge haul to the Wilkinson/Bartlett campsite.

**Thurs 6 Aug** Everyone attempts the south ridge of Fangetårnet which offers some exciting knife edge scrambling and traversing to a brèche where Hudson, Nelson, Geddes and Robinson turn back. The others continue to a snow summit (P32).

**Fri 7 Aug** Everyone sledge hauls through the pass north of point 1700m and a camp is made 3 km to its SW below a crevasse field (C14). Wilkinson and Bartlett continue on to

base camp. Davison climbs the twin rock peaks of the nunatak south of point 1700m (P33 and P34). Findlay climbs the southernmost of these (P33), and both climb the snow nunatak in the centre of the glacier (P35) before snow starts at midnight.

**Sat 8 Aug** Poor visibility and heavy snow all day.

**Sun 9 Aug** Poor visibility and further snow all day. Improving weather at 20:00 hours precipitates a move, with C14 packed by 23:00 hours. Very sticky snow ensures slow progress with BC being reached at 04:00 hours, 10 minutes before the next blizzard starts.

**Mon 10 Aug** Low cloud and snow all day.

**Tues 11 Aug** Low cloud and snow for most of the day with an improvement in the late evening.

**Wed 12 Aug** Clear skies and sun. With the plane scheduled to arrive, everything is packed and a runway laid out. The remainder of the home brew is drunk. The plane doesn't arrive.

**Thurs 13 Aug** Another sunny day with some cloud and a cold wind from the ice cap.

**Fri 14 Aug** Similar to yesterday in weather and the absence of a plane. In the evening Geddes and Nelson ski to the nunatak (P1) to the north of the camp, Findlay and Bartlett climb the middle snow peak (P7) on the north side of Redekammen. Davison and Wilkinson climb the rock tower to its east (P36), returning to base camp at 7am. Davison collects a soil sample *en route* for later chemical analysis.

**Sat 15 Aug** Another fine day. The plane arrives at 14:30 hours and camp is packed in 1 hour. Arrive in Akureyri, Iceland at 18:30 hours. The plane hanger is used to dry and repack equipment for sea freighting to the UK. Scheduled internal flight from Akureyri to Reykjavik airport at 22:40 hours. Transfer to Keflavik.

**Sun 16 Aug** Keflavik to Glasgow flight leaves at 7:20 hours arriving 10:30 local time. Home within 24 hours of leaving Greenland.

## MAPS

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Six sheets of maps follow, the first five showing camps and peaks climbed, cross-referenced with the Expedition itinerary.

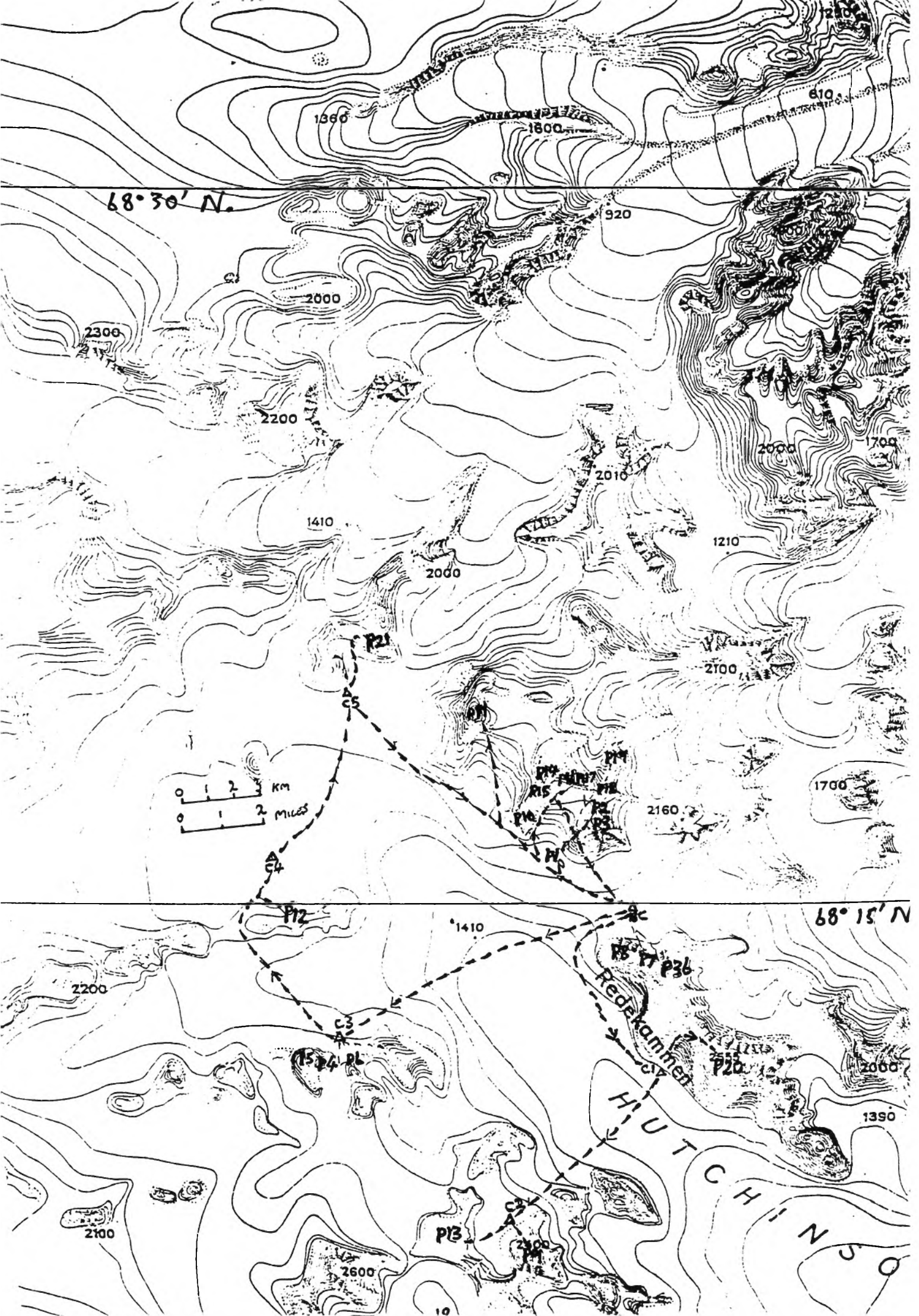
The first two are from the 1:250 000 series maps (sheets 68 0. 3 and 68 0. 4) published by the Geodaetisk Institut in Copenhagen and readily available from normal suppliers.

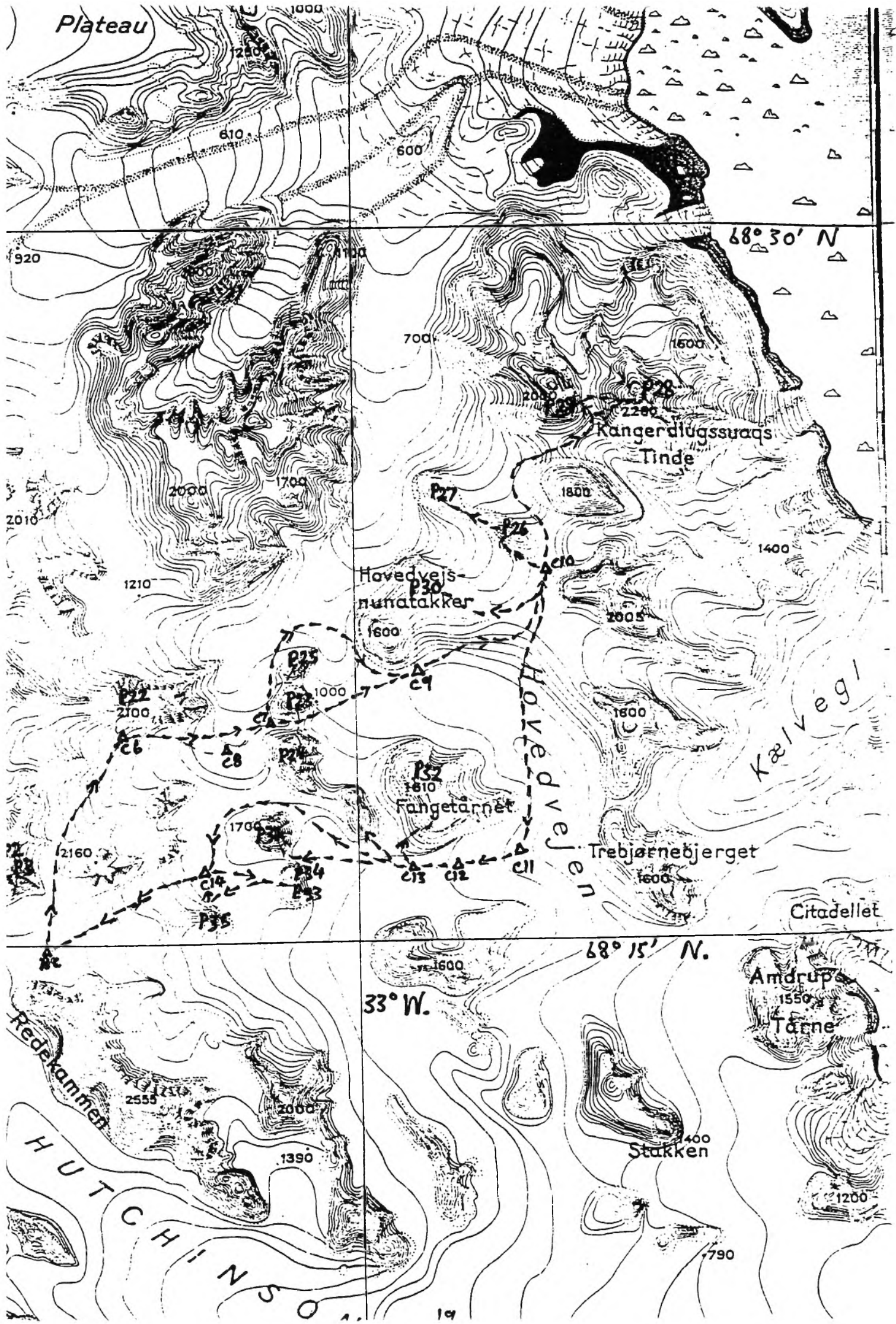
Air Navigation Charts (A.N.C.s) are also readily available at a scale of 1:1 000 000.

The following three sheets (on a larger scale), are hand drawn by the expedition and based on vertical air photographs. In detail they should be more accurate than the published maps. For example: the 1:250 000 sheet suggests the existence of a straightforward snow basin and col pushing up between Kangerdlugssuaqs Tinde and pt 2000m to its west (peaks P28 and P29.) In fact no such snow col exists; the basin is backed by a rock wall, and serious climbing is involved to reach the col at its head. This is accurately displayed on the hand-drawn map.

The original photographs are available from the Danish Geodetic Survey at Rentermestervej 8, DK-2400 Copenhagen.

Finally, sheet six, we include an outline geological map.





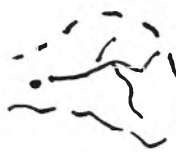


Sketch map of the topography.  
Interpretation from air photographs.

Ridges,  
 exposed  
 rock,  
 summits



Crevasse  
 Zones



Estimated boundary  
 between mountains  
 & glaciers

68° 00'





68° 30'

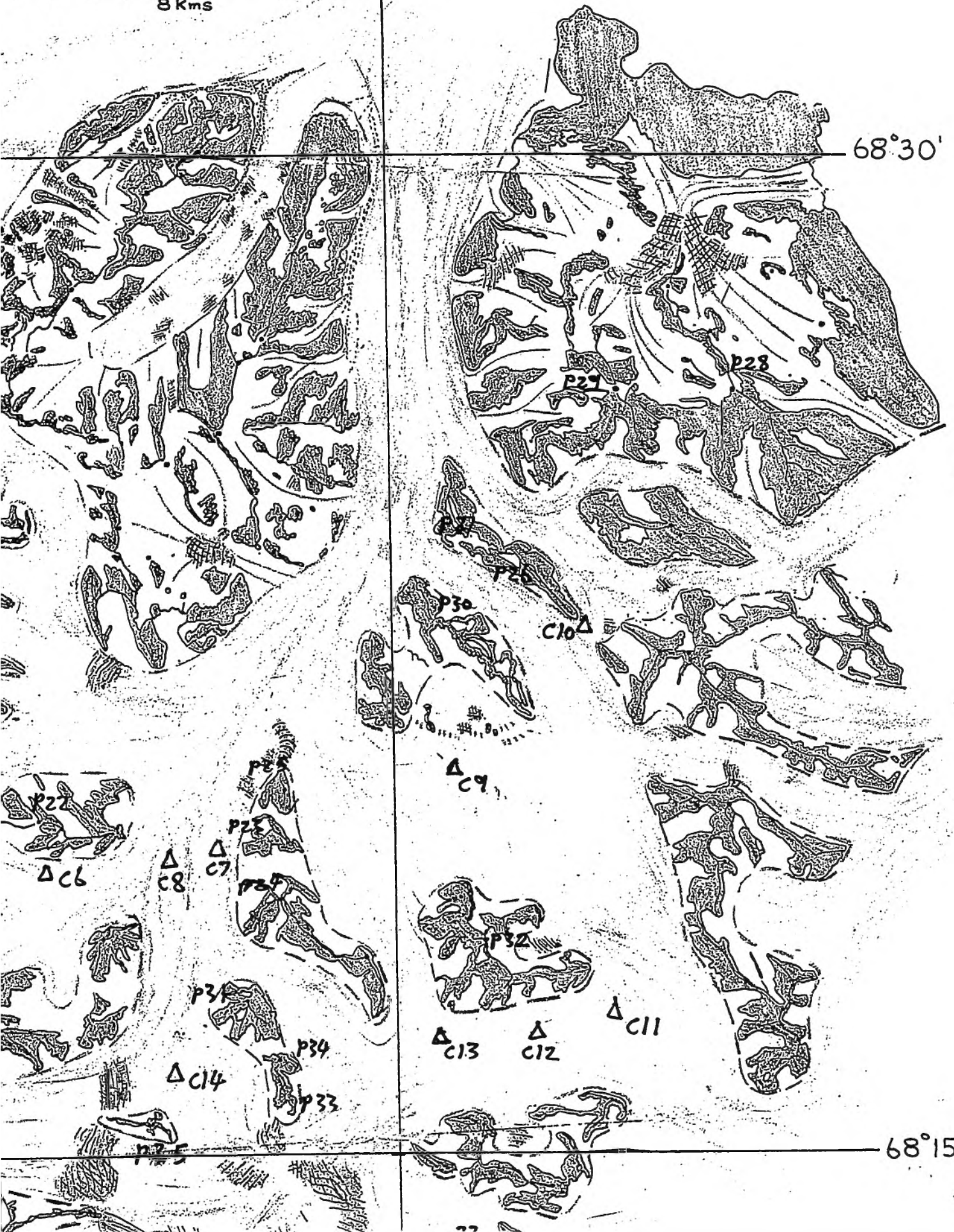


NORTH

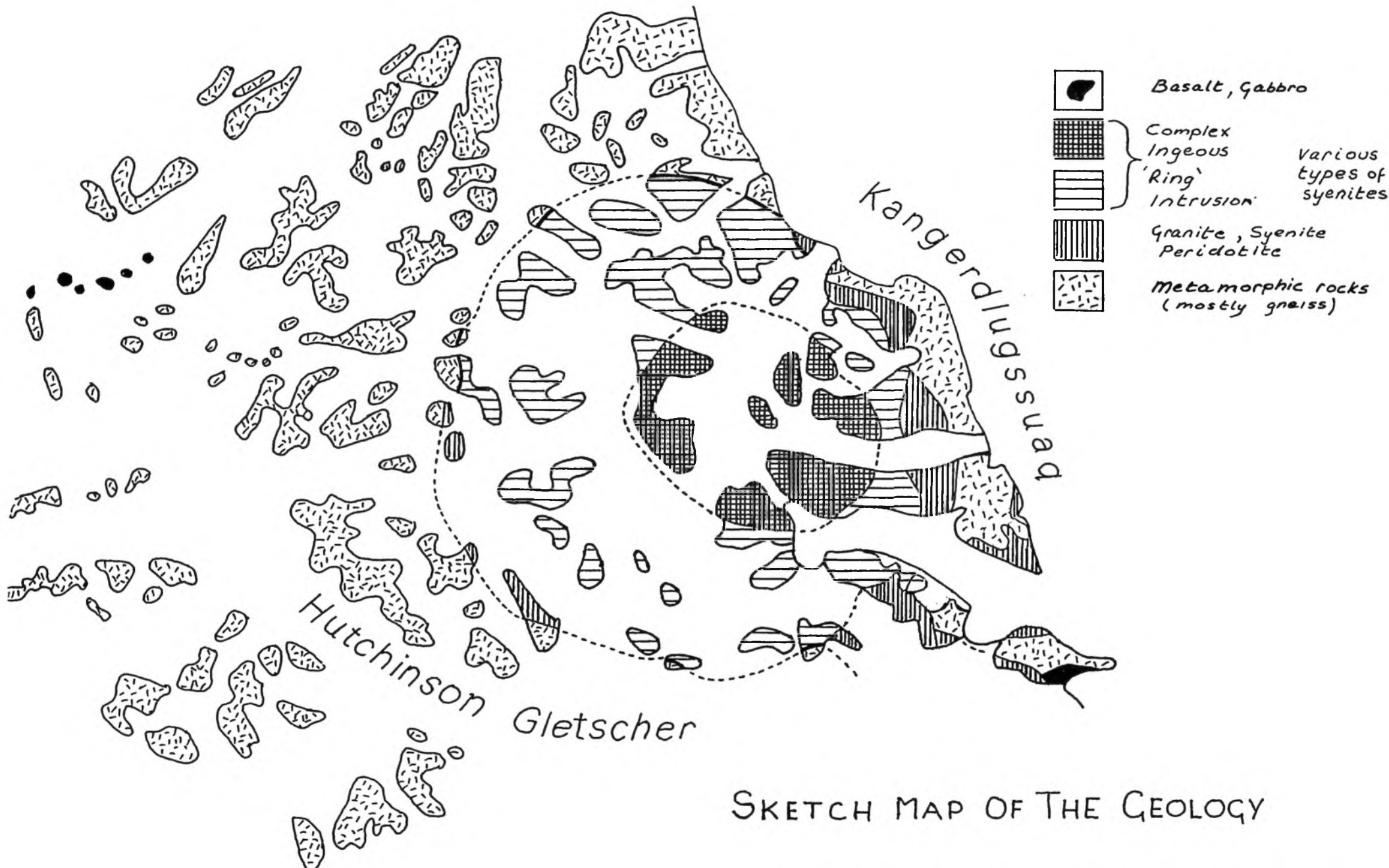
5 miles  
8 kms

33° 00'

68° 30'



68° 15'



SKETCH MAP OF THE GEOLOGY

Taken from Geologisk Kort over Grønland  
Sheet Kangerdlugssuaq, 1:500000

## BUDGET

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The finances of the expedition were much as expected, with personal contributions slightly above £2000 per head. We received considerable help from charitable and other sources, and payment in kind from a major supermarket and a shipping agent; all of this was tremendously helpful. The expedition was able to borrow a TRON emergency beacon, firearms, and most ammunition. It would be very difficult indeed to run any comparably ambitious trip more cheaply. All figures in £ Sterling.

<b>Income.</b>	British Mountaineering Council	1550	
	Gino Watkins Memorial Fund	1000	
	Mount Everest Foundation	800	
	The Oak Trust	500	
	Paradise Cyhambpers, Sheffield	500	
	Deposit of ninth man	500	
	Members contributions 8x~2064	16515	<b>TOTAL: 21365</b>
<b>Expenditure.</b>	Charter flights (2x4950+1x3960)	13860	
	Flights Glasgow-Keklavik (8x300)	2400	
	Flights Reykjavik-Akureyri (8x75)	600	
	Customs clearance (2x100)	200	
	Cash in Iceland (in)	101	
	Cash in Iceland (out)	200	
	Sea freight (subsidised)	800	
	Food (subsidised)	599	
	Radio permit	57	
	Distress flares	95	
	Containers/packaging	57	
	Cooking/camping equipment	127	
	Transfer freight to docks	66	
	Collect freight from docks	58	
	Shot gun cartridges	25	
	High velocity rifle licence	50	
	EPI Gas cannisters	140	
	Sledge transportation to and from docks	50	
	Sledge hire (8 sledges)	470	
	Report	40	
	Insurance for 8 people	984	
	Tent damage	100	
	Publicity/fundraising/postage	39	
	Team meetings prior to expedition	90	
	Telephone	40	
	Extra food and paraffin fuel	117	<b>TOTAL: 21365</b>

## FOOD REPORT

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An army marches on its stomach, and so does a mountaineering expedition!

### **Calories and Quantities.**

Wilkinson comments thus: I have always used this rule of thumb - one kilogram of food per man per day. This has two good points: experience has shown it to be plenty for most people, and it makes the arithmetic nice and simple. Food on an expedition should produce a balanced diet, but plenty of calories is the main requirement. A person leading a sedentary life has a daily requirement of about 1500 Calories (Kilocalories). For high energy activities like mountaineering you need more than double this, so 3500-4000 should be the target. Most packaged food on sale in Britain now comes with detailed dietary information, including calorie content. In planning the food for this trip, I underwent a strange transformation into a calorie-watching slimomaniac *in reverse*, seeking out the food with the *highest* calorie count.

Pure carbohydrates such as sugar and starch have about 4000 Cals per kg. Dry starchy staples such as pasta and rice have rather less than this due to other constituents, mainly fibre. Pure fat/oil is much more calorific, over twice as much, but fat is harder to digest, and as all food must be converted to glucose prior to use by the muscles, I'm not myself entirely clear whether the extra calories in fats are actually available for muscular energy rather than mere body heating. Some foods such as biscuits and chocolate are mainly carbohydrate, but have sufficient fat in them to increase their calorie count above that of pure carbohydrate. Some items of food we took have considerably less than 4000Cals per kg, e.g. tinned meat/fish, or dried fruit, but were worth taking for the sake of other dietary requirements and for variety. I did a fairly detailed count, and the overall calorie content of our food came to almost exactly 4000Cals per kg, and thus 4000Cals per day. The food was planned for nine people for 35 days, making 315 man days and thus 315 kg. Details of these plans, amounting almost exactly to 315kg, are summarised in the table on the following page.

One member was still worried there would not be enough to eat, so at the last minute we packed an extra 25kg of emergency staples (pasta, biscuits, porridge.) Then someone else dropped out of the trip. The result was that we had food and to spare.

There was no evidence that we ate more than one would on a Himalayan trip, despite the lower altitude. Winter in the polar regions is a different matter, but in July/August when temperatures are relatively mild, extra food intake to combat cold is not an issue.

### **Variety.**

Psychological aspects of food are almost as important as the physiological. Some expeditions survive on a diet of porridge, mars bars and dried meat and veg. But food should be fun to eat, and that means plenty of variety. The food for this trip was planned with that in mind.

<b>Greenland Food List</b>	net weight (grams) per item	No. of items	Total net weight kg.	
Vesta meals, various flavours.	200(approx.)	72	13.6	Large portion for 1 person. Includes rice/pasta.
<b>Tinned meat</b> corned beef, stewed steak, chunky chicken.			13.44	
<b>Tinned fish</b> , tuna, etc.			9.5	
<b>Salami</b> , peperami, etc.			2.43	
<b>Lentils</b>	250	14	3.5	
<b>Cheese</b> Spreads + unprocessed Cheddar			8.4	
Grated parmesan cheese	250	9	2.25	
Tomato paste	tubes 200	10	2	
Rice (Basmati)	1000	11	11	
Pasta	500	27	13.5	
Cous-cous (quick cook)			1	
Instant egg noodles	250	16	4	
Dried Mashed Potato			9	
<b>Dried Veg.</b>				
Onions	40	25	1	
Peppers	40	10	0.4	
Mushrooms	20	10	0.2	
Instant soups. Various veg. + non-veg.	20 ( $\frac{1}{3}$ pint)	180	4	
Other dried soup (5 min. simmer)	70 ( $1\frac{1}{2}$ pint)	50	3.5	
Wholemeal flour (+ yeast)			4	
<b>Sweet Biscuits</b> Choc. dig., ginger, etc			15	
<b>Savoury/Plain Biscuits</b> Various crackers + oatcakes, etc.			30	
<b>Cake</b> Fruit cake, etc.			11	
<b>Jams &amp; spreads</b> Honey, p'nut b'ter, etc.			8	
<b>Chocolate</b> Various Mars & similar + old-fashioned slab-type bars			28	
Boiled sweets			2	
Marzipan	250	9	2.25	
Chewy Cereal bars	200 (6 pack)	20	4	
<b>Dried fruit</b> Raisins, Apricots, etc.			9	
Nuts (salted & unsalted)	200	12	4.5	
<b>Drinks</b>				
Tea bags	500 gm. (160 bags)	10	5	
Instant coffee, cocoa, horlicks, etc.			5	
Dried milk ("5-pints" type)	285	70	19.95	
White Sugar	1 kg	16	16	
Brown Sugar (non-sticky type)	500	10	5	
<b>Cereals</b> (Comflakes, Wheetabix, etc)			8	
Meusli			4	
Porridge			10	
<b>Sunflower spread.</b> "Golden Churn" was used as it has the most robust tubs.	500	22	11	
<b>Puddings/desserts</b> Jelly, custard, "Angel delight" (butterscotch)			7	
<b>Stock cubes</b> beef, chicken, veg.		48 cubes		
Salt + condiments.			1	

Total weight of food in this table: 312 kg.

## MEDICAL

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Assembling a medical kit for an expedition to Greenland is to some extent a much simpler matter than preparing to visit, say, the Himalaya, in that there is no problem of altitude. Mountains no higher than 2,500 metres may present a number of dangers; altitude sickness is not one of them. Similarly, a direct approach by aircraft avoids the familiar Himalayan dangers of dirty water and contaminated food and the resulting intestinal problems. Operating on the ice-cap and away from the coast insect life is almost non-existent. Travel arrangements will almost certainly involve an overnight stay in Iceland, where insects can be a problem, but poverty and alcohol poisoning from the nightlife of Reykjavik are more likely dangers.

However, the team may split into several small groups making multi-day trips, so there is little sense in having one large medical kit at Base Camp. In addition, the nature of travel on skis and pulling sledges means that individuals can become spread out over large distances.

Our expedition approached these problems by taking three self-contained and broadly similar medical kits, and working on the assumption that three groups would be the most likely division. In addition members each carried their own small medical kit, containing - crucially - a blister kit and other basics.

None of the team was medically qualified, though several had First Aid training. Size and weight were important, and consequently we took nothing that we did not feel confident to use or which we would be likely to leave at Base as too heavy.

The three medical kits each contained temgesic as the major painkiller, to be taken with buccastem to prevent attendant nausea. Temgesic is now a controlled drug but in practice there seems to be little problem in small quantities forming part of an organised medical kit. Co-proxamol was present for moderate pain, with aspirin or paracetamol for mild pain. Ibuprofen and voltarol were available as anti-inflammatories and for rheumatic pain.

Each kit contained two courses of anti-biotics, primarily flucloxacillin and amoxicillin given that no member of the team was sensitive to penicillin. For possible snow blindness amethocaine and chloramphenicol were provided, together with eye patches. Sleeping tablets in the form of zimovane were taken, given the potential difficulties of sleeping with constant daylight. Loperamide was provided for diarrhoea, with dioralyte tablets, although given the lack of available water individual packs of wet wipes were useful in respect of basic hygiene and prevention of infection. Senna tablets were available for constipation.

In the event the team suffered from only minor ailments - mainly blisters - and no drugs were used.

*“A desert landscape, the mountains rising from the icecap like islands from a sea. Hugely wild and barren, a rare place where the land can still be experienced in its pristine state.*

*An undiscovered country....*

