LGMC
EAST GREENLAND EXPEDITION 1969
GENERAL REPORT

D. FORDHAM AND MEMBERS OF THE EXPEDITION

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LONDON GRADUATE MOUNTAINEERING CLUB

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GENERAL REPORT

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(iii)
MEMBERS

DEREK FORDHAM
Leader, 29, Architect

MICHAEL TUSON
Deputy Leader, 36, Lecturer in Estate Management

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26, Lecturer in Engineering

ARTHUR CLARKE
35, Structural Engineer

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45, Photographer

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17, Schoolboy

DON ROSCOE
35, Mountaineering Instructor
This report describes the activities of an expedition from London to the Kristians Glacier region of Kong Christian den Ix's land, East Greenland, during the summer of 1969. The report has been written by the members of the expedition in the hope that others planning similar undertakings may benefit from our experiences, and is dedicated to the numerous individuals, firms, and organisations whose generous support and advice made our venture possible and to whom we offer our sincere thanks.

D. Fordham
May 1970

1 INTRODUCTION

The London Graduate Mountaineering Club East Greenland Expedition of 1969 was planned around a large depot of food left on the Kristians Glacier by a British Army expedition in 1968. This fact coupled with the results of the LGMC 1968 expedition enabled plans to be made to man haul a sledge inland to this food dump, from where a mountaineering and limited scientific programme could be carried out. The return journey to the coast was planned to traverse completely unexplored territory, making use in the final stages of the explorations of the LGMC 1968 expedition.

By the spring of 1969 plans were complete and the seven members of the expedition, all experienced mountaineers, were preparing to spend six weeks exploring and mountaineering in the Kristians Glacier region, 85 km. north of the Arctic Circle on the east coast of Greenland. In addition it was planned to carry out a limited amount of survey and botanical work in the area, but conditions were such that part of this programme had regrettfully to be abandoned. Although valuable assistance was given by members of university departments, it was not sponsored nor sanctioned by the University. A list of benefactors and others who have helped to make the expedition possible is included in Section 7.
2 THE REGION

2.1 Description of Area

To the north of Angmagssalik, the administrative centre of East Greenland, the great mass of the inland ice is separated from the coast by a belt of mountains and glaciers approximately 90 km. wide and extending from lat. 65° 30' n to lat. 67° 15'. These mountain ranges are generally of Alpine appearance, but on a much wider scale, the glaciers reaching up to 100km. long and 10 km. wide. The peaks of the area rise to 3300m. 25 km. north of the Femstjernen, at Mt. Forel. The Kristians Glacier is of the sub-polar type and lies in a cleft 6 km. wide and 50 km. long, running east-west in lat. 66° 45'. At its western end it flows into the Femstjernen, a chaotic junction of 5 major glaciers, from where the ice flows south west to the Midgaard Glacier complex and south east down the Glacier de France to Kangerdlugssuatsiaq.

To the east the Kristians Glacier flows into a similar, but much larger junction known as the Sekstjernen. Into this gigantic basin from the north flow two enormous lobes of the inland ice, pressing through gaps in the impressively high and jagged peaks, all as yet unclimbed. The Sekstjernen discharges its ice south east down the K.J.V. Steenstrup's Bræ, its junction with this glacier marked by an extensive icefall. The glacier is flanked on the north by a range of jagged peaks reaching over 3000m. which form the last barrier between the mass of the inland ice and the valley glaciers of the coastal ranges.

To the south lie a range of nunatak peaks dividing the Kristians Glacier from the Champs Elysees Glacier. Kangerdlugssuatsiaq is a large fjord which extends north west deep into the coastal mountains between lat. 66° and 67° n, and lon. 35° and 38° w, 130 km. north of Angmagssalik. The fjord which is 36 km. long and averages 3 km. wide lies in a deep cleft surrounded by steep walls of rock which rise from the fjord in impresive rounded buttresses, separated on the south east shore by steep broken glaciers which flow directly into the fjord. The Glacier de France continues the cleft of the fjord north west from its head, up to the inland ice in the region of Mt. Forel and the Femstjernen. From the fjord head a tributary glacier (the Thank God Glacier) runs north east up to the interior, flanked on either side by ranges of impressive peaks whose steep walls of ice and rock support their jagged summits high above the secondary glaciers.

Apart from some isolated outcrops of flowers and vegetation around the Base Camp on the Kristians Glacier and some colourful patches on the south facing slopes behind the fjord camp, the vegetation in this region is extremely sparse.

The mountains are extensively glacierised: although signs of a considerable glacial recession are much in evidence, and around the fjord head rock walls, screes and glaciers, flow in most cases uninterruptedly into the water. Further east towards the coast where the mountains are lower and set back further from the shore, extensive areas of heath and bilberry have established themselves.

Wild life on the coast appears to be similarly sparse and limited to Arctic Foxes, Duck, Ptarmigan, Ravens, Snow Buntings and a few other birds. Further inland no signs of wild life were noticed other than fox droppings approximately 30 km. up the Glacier de France. Seals are present in Kangerdlugssuatsiaq in limited numbers. The nearest local inhabitants, the Greenlanders, live 85 km. to the south where a small settlement exists at Sermiligaaq.

2.2 History of Exploration

The history of exploration in this area is not as extensive as in the area immediately north of Angmagssalik. In the Spring of 1933 two members of Watkins Second Air Route Expedition sledged up Kangerdlugssuatsiaq aiming for Mt. Forel, unable to ascend the ice cliffs of the Glacier de France they turned north east up another glacier which, because of its relative ease of access, they named the 'Thank God' glacier. This glacier flows from a vast snow plain which before turning back they sighted and named 'Salisbury Plain'. (1)

In 1963 a Swiss expedition made numerous ascents in the area around the glacier de France, their most easterly being some nunatak peaks to the south of the Porquolpas Glacier (2). Imperial College used Kangerdlugssuatsiaq and the Glacier de France as a route to and from their Base Camp near de Quervain's Bjerg in 1967, from where they made several ascents in the ranges at the western end of the Kristians Glacier (3). Also in this year a Newcastle University expedition were based at Watkins' old hut at Tugilik (Lake Fjord) (4).

In 1968 a British Army Expedition which had been based on the Kristians Glacier made several ascents to the north and south of their base camp, most of them west of lon. 36° 10'w (5), and a Danish Alpine Club expedition thwarted in their attempt to reach the Watkins mountains, 350 km. further north, were landed near Watkins old base site (1) and made numerous ascents in the coastal region, pressing inland until within sight of the gigantic icefall which marks the southern edge of the Sekstjernen (6). Also in 1968 a party of Japanese sledged up the Knud Rasmussens Glacier, following a route used by the Royal Navy in 1966, and went on to climb Mt. Forel and traverse the inland ice, while a US expedition explored and climbed the peaks flanking and at the head of the Thank God Glacier (7).
2.3 Climate

The average Arctic summer with long periods of unbroken sunshine and little precipitation is very pleasant. The mean temperature during July and August, the hottest months, is about 6°C compared with -20°C in January and February, and normally a good deal of sunshine can be expected between June and mid-August. Inland from the coast the mean summer temperature drops considerably and on the Kristians Glacier at 2000m. at the end of July -16°C was recorded. On the coast most winter snow has melted by early July to expose such vegetation as exists to the short Arctic summer which would appear to be compressed into the months of July and August. Unfortunately the weather in East Greenland is marred by uncertainty and summers vary greatly in length and mildness from one year to another. The presence of large amounts of pack ice, swept down the east coast by the East Greenland current, strongly influence local weather and seriously impede shipping. The summer of 1969 in the Kristians Glacier region was poor, possibly due to the heaviest off shore pack ice for many years. A note on the weather experienced is included in Section 5.
3 PREPARATIONS

3.1 Organisation

Three factors concerning the activities of expeditions in 1968 have a direct bearing on the circumstances in which the route for the expedition would be made. First, a British Army Expedition visited the area covering the western half of the Kristians Glacier and the mountains to the north. The main supplies for this expedition were dropped by parachute onto the Kristians Glacier, and since there were two less members on the expedition than were anticipated and the airdrop was carried out without any losses, there was cached on the south side of the glacier in lat. 66° 46' n lon. 36° 15' w approximately 250 man days of food in the form of compost and assault rations.

Secondly, a Danish expedition had covered the K.J.V. Steenstrup's Sondre and Nordre Brae area up to lat. 66° 40' n lon. 35° 12' w and in endeavouring to get to the mountains to the north and east of the Nordre Brae had become involved in an enormous icefall and had been forced to turn back.

Lastly, the London Graduate Mountaineering Club Expedition of 1968 had, in the course of their attempts to climb Ingolfsjæld, covered the Torn God Glacier area. With these points in mind the plan was formed to travel via Copenhagen and Sondre Stromfjord to Kulusuk airstrip on the east coast of Greenland. From here the expedition would proceed by boat to Kungmiut and having collected the equipment, which had been forwarded by steamer some weeks earlier, continue round the coast to the mouth of the Glacier de France at the head of Kangerdlugssuatsiaq, an estimated two days. A day would be spent there sorting gear, and caching food and the rubber boat for emergencies and the return journey. The expedition would then sledge up the Glacier de France to the Fæstjernene and onto the Kristians Glacier to the food dump left by the Army (6 days). Adequate food would be taken for a return dash to the coast in the event of the food having become unusable during the winter. It was intended to spend a few days in the area of the dump climbing new peaks, setting up the base line for a survey of the area (the existing maps having been prepared exclusively from aerial photographs), and in collecting botanical specimens. After this the main base camp would be moved to the east to the area where six glaciers meet, (named the Sekstjernene by the Danish expedition). This would entail at least two full sledge journeys in order to transport adequate food.

The triangulation would be continued in this direction and the high mountains to the north east, which had not previously been visited by man, would be explored as much as was possible. It was hoped that twenty-one days would be available for this part of the programme and the expedition would then come out to the coast by a new route to the south, linking up with the area covered by the Danes.

The route would then lie across the Dom Glacier and the Steenstrup's Sondre Brae and enter the Torn God Glacier to the south of Pinderbjer, gaining the coast at the head of Kangerdlugssuatsiaq, this latter part being known to be quite practical and without serious difficulties. A local boat was to rendezvous with the expedition and transport it by sea to Kungmiut and Kulusuk.

The preparations made during the winter of 1968 were consolidated on hearing in early 1969 that the expedition had received the support of the Royal Geographical Society, and grants from the Mount Everest Foundation, Gino Watkins Memorial Fund, and Augustin Courtauld Trust. Permission to visit the chosen area was granted by the Danish Government shortly afterwards.

On May 30th, the expedition's equipment consisting of 50 items and weighing 750 kg, was shipped out of the West India Docks bound for Greenland via Copenhagen.

The expedition left for Copenhagen on the Harwich-Esbjerg route on July 7th, two members following by air on July 8th. In the event it proved impossible, due to exceptionally heavy pack ice to get round the coast by boat and the expedition was eventually obliged to make the journey inland up the Knud Rasmussens Glacier taking ten days rather than the six allowed for on the Glacier de France. Due to these initial delays the expedition was nine days late at the food dump on the Kristians Glacier.

3.2 Diary

Dec. 1968
Application to Danish Government to visit area.

Dec. 1968
Application for grant to Mount Everest Foundation.

April 4
Confirmation of support from RGS and MEF.

May 8
Permission to visit area granted by Danish Government.

May 30
Equipment leaves West India Docks.

July 7
Main party travel by boat to Copenhagen.

July 8
Derek and John by air to Copenhagen.

July 10
Fly from Copenhagen to Sondre Stromfjord and on to Kulusuk. Boat to Kungmiut.

July 11-13
Collecting equipment from Angmagssalik, investigating sea ice conditions and negotiating boat transport.

July 14
Boat to mouth of Knud Rasmussen's Glacier.
<table>
<thead>
<tr>
<th>Date</th>
<th>Camp</th>
<th>Height(m)</th>
<th>Distance(km)</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 14</td>
<td>1</td>
<td>S.L.</td>
<td>-</td>
<td>Kungmiut to Knud Rasmussen's Glacier</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>2</td>
<td>3</td>
<td>Back packing on to glacier</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>3</td>
<td>6</td>
<td>Knud Rasmussen's Glacier</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>4</td>
<td>5</td>
<td>Knud Rasmussen's Glacier</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>5</td>
<td>12</td>
<td>Head of Knud Rasmussen's Glacier Navy food dump</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>6</td>
<td>23</td>
<td>Haabets Glacier</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>7</td>
<td>15</td>
<td>Conniats Pass, 1680m. and icefall</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>8</td>
<td>18</td>
<td>Glacier de France</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>9</td>
<td>15</td>
<td>Approach to Femstjernen</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>10</td>
<td>8</td>
<td>Back packing, Femstjernen to Champs Elysees Glacier</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>11</td>
<td>18</td>
<td>Base Camp. Army food dump</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Distance covered on journey inland 123 km.</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>11</td>
<td>1718</td>
<td>Base Camp</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>11</td>
<td>1718</td>
<td>Ascent of 2 peaks of 2000m.</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>11</td>
<td>1718</td>
<td>Reconnaissance of peaks behind Base Camp. Party to Col de Woppers</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>12</td>
<td>1950</td>
<td>Party sledges east with food. Col de Woppers party returns</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Distance covered on eastern journey 60 km.</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>11</td>
<td>1718</td>
<td>Eastern party returns to Base Camp</td>
</tr>
<tr>
<td></td>
<td>31</td>
<td>11</td>
<td>1718</td>
<td>Blizzard at Base Camp</td>
</tr>
<tr>
<td>August 1</td>
<td>11</td>
<td>1718</td>
<td>-</td>
<td>Blizzard at Base Camp</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>11</td>
<td>1718</td>
<td>Blizzard at Base Camp</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>12a</td>
<td>1966</td>
<td>Kristians Glacier</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>13</td>
<td>1798</td>
<td>Kristians Glacier</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>14</td>
<td>1722</td>
<td>Kristians Glacier. Anniversary Nunatak climbed</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>15</td>
<td>1536</td>
<td>Sekstjernen</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>16</td>
<td>1472</td>
<td>Back packing on Sekstjernen</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>17</td>
<td>1259</td>
<td>Sekstjernen icefall negotiated</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>18</td>
<td>1211</td>
<td>Back packing on Steenstrups Nordre Brae</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>19</td>
<td>1111</td>
<td>Crossed Col, 1250m. onto Steenstrups Sondre Brae</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>20</td>
<td>1032</td>
<td>Crossed Col, 1150m. onto Thank God Glacier</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>21</td>
<td>644</td>
<td>Back packing on Thank God Glacier</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>22</td>
<td>586</td>
<td>Icefalls negotiated. Back packing onto moraine</td>
</tr>
</tbody>
</table>
### August 14
23  61  5  Back packing to Fjord Camp

**Distance covered on journey to coast 114 km.**

<table>
<thead>
<tr>
<th>Date</th>
<th>Miles</th>
<th>Days</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>23</td>
<td>61</td>
<td>- Awaiting boat at Fjord Camp</td>
</tr>
<tr>
<td>16</td>
<td>23</td>
<td>61</td>
<td>- Awaiting boat at Fjord Camp</td>
</tr>
</tbody>
</table>

**Overland Party**

<table>
<thead>
<tr>
<th>Date</th>
<th>Miles</th>
<th>Days</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>24</td>
<td>150</td>
<td>8 Glacier de France</td>
</tr>
<tr>
<td>18</td>
<td>25</td>
<td>1150</td>
<td>16 Failsafe Glacier</td>
</tr>
<tr>
<td>19</td>
<td>26</td>
<td>750</td>
<td>33 Haabets Glacier</td>
</tr>
<tr>
<td>20</td>
<td>1</td>
<td>S.L.</td>
<td>25 Sermiligaq Fjord</td>
</tr>
<tr>
<td>21</td>
<td>-</td>
<td>-</td>
<td>20 Rubber boat to Sermiligaq</td>
</tr>
</tbody>
</table>

**Distance covered by overland party 104 km.**

### Fjord Party

<table>
<thead>
<tr>
<th>Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Polar Bear sighted.</td>
</tr>
<tr>
<td>22</td>
<td>Polar Bear approached camp.</td>
</tr>
<tr>
<td>24</td>
<td>Danish Naval Air Command drop 100 kg. of food from Catalina flying boat.</td>
</tr>
<tr>
<td>26</td>
<td>Catalina drops radio.</td>
</tr>
<tr>
<td>26</td>
<td>Party picked up by helicopters from USC CG &quot;Westwind&quot;, and flown to Kulusuk. DF flies to Reykjavik.</td>
</tr>
<tr>
<td>26</td>
<td>JA and DR reach Angmagssalik from Sermiligaq.</td>
</tr>
<tr>
<td>29</td>
<td>JA and DR reach Kulusuk. DF reaches London.</td>
</tr>
<tr>
<td>30</td>
<td>JA, AC, DK and DR fly to Iceland.</td>
</tr>
<tr>
<td>31</td>
<td>JA, AC, DK and DR fly to London. DM and MT fly to Iceland.</td>
</tr>
<tr>
<td>Sept. 2</td>
<td>DM and MT fly to London.</td>
</tr>
</tbody>
</table>

### 4 THE EXPEDITION

#### 4.1 The Main Journey

It appears that it would be pleasantly simple to reach East Greenland. None of the discomforts of endless hours in a Landrover that bewail the Himalayan traveller, just sit back and fasten your safety belt while the airliner soars over London, Copenhagen, and West Greenland before touching down on the dirt airstrip at Kulusuk on the east coast. Trouble occurred early when at London airport I was nearly turned off the plane owing to a booking clerk’s mistake, and then at Copenhagen where the aircraft had apparently broken down. The resulting one day delay gave occasion for excellent entertainment by members of the Danish Alpine Club and sightseeing in the city.

Sondre Stromfjord in West Greenland was reached on 10th. July and soon we had transferred to a DC4 for the return trip across the icecap. Low cloud delayed our landing at Kulusuk and denied all but the briefest glimpse of mountain tops and pack ice. Within an hour we were in a small fishing boat proceeding to Kungmiut. Those of us still wearing sports jackets and city shoes, hardly felt correctly dressed for the four hour voyage dodging through ice floes.

Kungmiut is a small fishing settlement of 600 inhabitants, most of whom must have witnessed our arrival. We soon established a linguistic link through a Danish schoolteacher, Poul Gundlach and attempted to arrange further passage by chartered boat to our destination 160 km. away. Firstly, Michael I boated to Angmagssalik to pick up the expedition equipment which had only just arrived from Copenhagen, heavy pack ice extending 130 km. out to sea having seriously delayed the first boat of the season.

At the same time as we sorted our stores, we encountered difficulties in chartering a boat from Kungmiut as it appeared that coastal pack ice made the journey beyond Sermiligaq impossible. We did however, receive an assurance from the settlement headman that the ice would be clear by the time we wished to return from Kangerdlugssuaatsiq to Kungmiut after our sledging journey.

The possibility of not being able to reach the foot of the Glacier de France to commence the sledging had not been overlooked but the actuality caused dismay. The alternative route up the Knud Rasmussen and Haabets Glaciers was longer and would cost us four of our valuable climbing days, and in addition we had already lost three days collecting equipment and negotiating at Kungmiut. A favourable aspect of the revised route was that we would pass two small food dumps left by the previous year’s Army expedition.
We left Kungmiut on July 14th, and landed at the foot of the Knud Rasmussen's Glacier that evening. It was good to be away at last and even better when a day of back packing had brought all our sledge equipment through the moraine and onto the glacier. We left an inflatable boat, outboard motor and stores on the fjord edge for possible use in an emergency evacuation to the nearest habitation 20 km. away. The stainless steel sledge was loaded for the first time on July 16th. Boxes were lashed on, covered in plastic sheet and skis mounted on top. We carried our own personal gear but the sledge weighed about 340 kg. on that first day. Normally 6 men pulled and one steered from the rear but in difficult crevassed areas we occasionally released a party of two to reconnoitre a route. The man-haulers soon learnt the effects of the differing snow or ice surfaces. The dry glacier ice often had stones and dirt embedded in the surface, which rasped on the runners, ice hummocks were encountered almost designed to overturn the sledge or block its passage, rotten melting ice contained deep melt pools for wetting our feet and twisting ankles, soft snow caused the sledge to bury itself, powder snow often had a breakable crust on the surface which also tended to jam the runners. On occasions the snow surface was frozen solid enough to bear the weight of a man and a gentle pull was sufficient to start a pleasant smooth glide, this was why we chose to travel at night and take advantage of this hard frozen surface. Low on the Knud Rasmussen's Glacier, the dry glacier ice gradually melting whilst open crevasses many detours. Once on the snow, we still encountered problems with weak snow bridges on the crevasses with the result that it was not until July 15th that we reached the glacier head. We camped in a crevasse field and were pleased to locate the first food depot left by a number of previous expeditions. After noting the depot's contents and taking a few supplies on board we had excellent sledding up the Haabets Glacier. As we suspected we were never again to have such good conditions. By now we had established a regular routine of movement; 2½ hours from around 2100 to awake, breakfast and pack, then 3 hours of sledding stopping for 10 minutes each hour, a ½ hour stop for lunch and brew finishing with perhaps 3 hours sledding until the morning sun softened the snow preventing further progress. It was hard work and as each member was harnessed to the sledge, team-work was essential. We soon learnt not to forget little jobs at the stops - an untightened bootlace must remain so for another hour if it was forgotten.

On July 20th, we crossed the Conniks Pass (1680m. by aneroid) and started the descent towards the Glacier de France. The snow steepened and we delayed the sledge down slowly. Then an icefall brought four hours entertainment, forcing us to unload the sledge and ferry loads through a short maze of towering seracs and gaping crevasses. We finished the day in very soft snow but clear of the main difficulties. That night we continued down to meet the Glacier de France on the Arctic Circle at an elevation of 700m. The drop of 900m, brought us back to the region of rotten ice, wet boots and overturning sledges.

Seven days of the journey had passed and our thoughts turned to locating the second small food depot on the Glacier de France. We were rather surprised to find the depot ransacked by arctic foxes and only 4 small ½ oz. tins of cheese remaining from 16 man days of food. The glacier surface was rough and crevasses scarred for the following two nights and during the day we slept to the sounds of cracking ice, occasional stone-falls and avalanches from neighbouring peaks. Ahead lay further difficulties and we decided to slightly reduce our rations in case the journey should take longer than the 10 days allowed for. We skirted round the Femstjernen on the east, back packed loads over the moraine and broken glacier ice to reach the western end of the Kristians Glacier - cloudy and oppressive weather. The following day we strained at the sledge harnesses and gradually reached better snow. A piece of flapping material on the distant glacier soon revealed an abandoned Army parachute and a little food and cigarettes. Morale rose as we pulled up the glacier and at the end of a hard tenth day, we located the main food depot. Bolsterous shouts echoed round the deserted mountains as we pulled out tins of jam, coffee and stewed steak, cooking with one hand and eating with the other.

A rest day was spent sorting the copious rations and tidying the campsite. On July 26th, five of us arose early and skied off down the glacier leaving Michael and Derek to continue sorting the stores. We had as our objective two peaks 8 km. away, of about 2000m. The north face of one presented excellent snow slopes for ski or crampon work and we reached the summit at 6.30 a.m. David our youngest member placing the first stone of the cairn. A quick snack and we set off west along the ridge, picking a way over cornices and round loose rock gendarmes. The second peak was gained at 8.00 a.m. giving pleasant climbing. It was time to descend before the snow conditions worsened and within two hours we had regained the glacier and started the long walk back to the food depot. The sun was very hot during the day and due to the reflected heat from the glacier surface we suffered from the exhaustion known as glacier lassitude. It was a party of very tired men that arrived back at the depot to be greeted with steaming mugs of tea, but the early ascent of two peaks was ample reward in itself. The party in all had taken ten days and together with the initial delays we now only had twenty days left before the scheduled pick-up in Kangerdlugssuaq. There
were two courses of action open to us; to stay near the depot, make ascents of unclimbed peaks in a known area before returning down the Glacier de France, or alternatively, we could carry out the original plan to make a sledge journey across the Sekstjernet (a name adopted by the 1968 Danish Alpine Club Expedition) and back via the K.J.V. Steenstraens Nordre and Sondre Bruns through unknown territory. This journey would be further in distance but could still permit some climbing in ranges as yet unseen by man from the ground.

The latter course of action was decided on and accordingly on July 28th, Michael, Derek, David and I set off pulling a 180 kg. sledge-load of food to the eastern end of the Kristians Glacier 34 km. away. This would serve as a stopping off depot for the next and possibly difficult stage of the journey and also allowed Michael and David to carry out a reconnaissance from a nearby col. This depot was made after two days sledging and the returning party pulled the sledge 30 km. in 10 hours while Michael and David had also skied a further 15 km. on reconnaissance that day.

Meanwhile Dennis, Don and Arthur had been engaged on an attempt to reach Pt 3090m. via the Col de Woppers (named by the 1968 Army expedition). Unfortunately bad weather was encountered and the first attempt to gain the Col, 8 km. across the Kristians Glacier from the main depot, was foiled in near white out conditions. They returned to the top of the Col next day and could see their peak several kilometres away. Obviously their attempt planned as a quick lightweight sortie was not suited to this peak and they skied back to the main depot to await our arrival.

Now we were ready to depart on our return journey and we planned to spend several days climbing in the Sekstjernet region which we had seen to be an enormous glacier junction about 20 km. in diameter surrounded by high and very attractive mountain ranges, sufficient unclimbed peaks to keep several separate expeditions occupied simultaneously!

However we were to be disappointed for on July 31st, a blizzard swept our base camp and continued to lash the tents with violent gusts for three days. One tent was virtually torn in two and it was cold work to repair it. It was at such times, lying under straining canvas flapping with pistol shot vibrations, that we mused over the vital protection offered by fabric hardly a millimetre thick. We certainly mused no longer when a tear 3 feet long appeared and the snow poured in!

The storm abated sufficiently on August 2nd. to tempt us back to our harnesses that evening. Very heavy pulling brought us over the crest of the Kristians Glacier at 2000m. - a distance of 13 km. from base. Bad weather set in again and for several hours on August 4th. we navigated by compass in white out conditions, but despite
the heavy pulling and bad weather we managed the remaining 17 km. to our depot before camping. Another day of 13 km. and we were positioned to turn the corner of the Kristians Glacier on to the Sæstabjørnen. Visibility was still bad and we stopped early to await better weather for photographic purposes. The extra time was used to scale a small nunatak which we named Anniversary Nunatak since both Don and Arthur had recently celebrated their wedding anniversaries. Fortunately the weather did clear sufficiently for some photographs of this fascinating region to be taken, but perhaps the 3 km. slogging achieved the next day tells its own story. It had rained for some hours and when we met crevasses, the soft snow conditions became nearly impossible. We skied with heavy loads round the corner onto the Sæstabjørnen and camped in the flat light. During the next few days the weather remained cloudy, producing very soft snow conditions even at night, and during this period the sledge with its full load was almost immovable. We would back pack loads perhaps 3 km. and then return for a second trip. Every kilometre was gained at the cost of three and in four days we only managed to make 23 km. Even then we were exhausted as well as disappointed as our climbing time was absorbed in endless ferrying with 35 kg. on our backs. What a difference to the 23 km. gained in 5 hours on the Haabets glacier on the march in. We were now trying to maintain an average speed of 10 km. per day but it was only just being achieved and we had to put full effort into the sledge and forget about climbing. Our slogging programme had now been reluctantly abandoned but we were still continuing our botanical collections wherever possible.

On August 10th, we left the Nordre Brae and hauled up an uneaten load of 125 kg. of flat light and meat, until at 12 km. we were in a position to begin the descent onto the Sondre Brae. The sledge load had now been lightened and the equipment removed. We had carried away on our backs, making a total of up to 30 kg. each, but this now facilitated moving the sledge in the slushy snow, and by this method we managed to cover 12 km. in poor slogging conditions. We camped that morning only 36 km. from the fjord with 4 days in hand.

Dennis had wanted for several weeks to investigate the inside of a crevasse and here at Camp 19 there was a gaping, clefted hole of indeterminate depth. Several of us spent a couple of hours poking in and out, photographing the interior and recording crevasse rescue techniques and probing methods. Dennis was delighted and finally emerged from his speleological trip dripping wet but beaming through his sun spectacles. The following morning we worked our way through an area of minor crevassing to reach the incline to our final col at 1140 m. By lunch-time on August 11th, we could safely count on downhill slogging to the fjord. The name given to the glacier by Spencer Chapman during Watkins’ last expedition seemed appropriate enough to us at this juncture – the Thank God Glacier! We reached dry glacier and rotten ice by lunch on August 12th and finished sledge hauling. Now the loads were again on our backs and we staggered up 120 m. of loose moraine to camp. We were stepping off the glacier onto greenery for the first time in 30 days, and as if to mark the occasion the sun came out. On August 13th, we threaded a route down 8 km. of moraine and broken glacier to reach a final moraine within an hour of the pick-up point. Don and I returned and had an exciting time sliding 65 kg. of sledge and boxes through two small icefords to avoid the moraines. It was pouring with rain as we back packed the final stage down to the fjord edge on August 14th. We pondered over our venture camped beside a gurgling stream above the fjord. We had sledge hauled 297 km. and covered a further 130 km. in back packing and peak climbing. On one occasion we had sledged 23 km. (once unladen for 30 km.), on other days we had only made 3 km. (averaged 12.3 km. per day) on the march in and 9.5 km. per day on the return journey. About 100 km. of our journey had been through unexplored territory and now we certainly felt that it had been worthwhile. It seemed almost too simple to jump into a small boat and sail 160 km. back round the coast to the airstrip at Kuluuk. It was!

4.2 The Journey to Sermiligaaq

Friday August 15th, the day the boat should have arrived, was spent in drying and repairing kit, the non-arrival of the boat was put down to the previous day’s storm. When the boat had not appeared by Sunday morning things were looking more serious as we were down to 14 man days food plus some emergency rations of Complan and dried egg which were going through a few more days. We had started to cook on wood fires in order to conserve the little fuel which we had left.

After some discussion it was decided that John Ashburner and I should walk out to Sermiligaaq and find out what had gone wrong with the arrangements. We set out at 12 noon on the Sunday carrying loads of 25 kg. each which consisted of essentials for the journey and three man days food between us. Our aim was to cross the Glacier France and attempt to ascend an unexplored glacier on the far side which would lead us to the lower Haabets Glacier and a junction with our inward route. This first afternoon proved to be exhausting work across a steep, rocky hillside. Eventually we reached the Glacier de France and were faced with a broken moraine which we followed until forced into the ice fall be a wall of hummocks. The ice fall was a gigantic maze and our progress was measured by yards so at six o’clock, shortly after John had fallen into a melt pool up to his waist, we
decided to call a halt. It was obvious to us that if we
were to do all the arduous uphill work which lay ahead we
would have to eat as well as possible for the first two
days and rely on being able to keep going on the downhill
sections with minimal food. Our campsite that night
lacked nothing in atmosphere being situated on the top of
a huge serac, the only flat place we could find.
It had become clear that we could not cross this maze of
seracs to reach the glacier we wished to ascend and we
decided to carry on up the Glacier de France until we
could cross it and ascend the first favourable looking
 glacier which would take us to the Haabets Glacier.
We
had, before leaving, synchronised our watches and arranged
for the others to signal to us at set times to indicate
whether the boat had arrived or not and after receiving
negative signals we moved on again after a meal and five
hours sleep.
The final section of the ice fall was a nightmare of
tottering seracs, one of which fell into our path immedi-
ately we had passed, and in these conditions we covered
70m. in the first hour, eventually we managed to get back
onto the moraine which had reappeared, and the going
became a little easier. Another hour saw us onto dry ice
and reasonably flat going enabling us to cross the glacier.
The most practicable glacier which we could follow to the
Haabets Glacier proved to be 12 km. up the Glacier de
France and led to the head of the Haabets Glacier near
Comnias Bjerg, which we reached after six hours going.
The first 5 km. were difficult and very crevassed but then
it became easier and eventually gave way to a narrow
water where we put on ski for the last two hours eventually
making camp about 4 km. short of our inward route on the
Haabets Glacier. We named our glacier "Failsafe Glacier"
as it marked our point of no return. We had covered 15 km.
gaining about 1000m. of height during the day and were well
satisfied with our progress through the most difficult and
uncertain part of the route.
We awoke to a beautiful dawn and hard frozen snow, the
first we had seen for weeks, with 27 km. to go to reach
the Navy food dump on the Knud Rasmussen Glacier. We
made good progress on this snow and were quickly up to
the head of the glacier, passing through a belt of the
biggest crevasses yet seen, we estimated the distance
across the bridge of one to be over 90m. Luckily all
were firmly bridged and gave us no trouble. At the
junction with the Haabets Glacier we put on ski again and,
although the slopes were very gentle, were able to run
for quite long distances due to the hardness of the snow.
In this way we were able to cover 27 km. before lunch,
reaching the Navy food dump by mid afternoon. Here we
found rice, dried mixed vegetables, dried meat, sugar,
margarine and paraffin, presumably left by the Japanese.
Our food supply for the rest of the trip was now assured
and we were able to enjoy a hearty meal when we stopped
6 km. further on, having covered 33 km. during the day.
A few hours later we were back on the march, having
reached dry ice again. Now we were on familiar ground
and it was good to compare our rapid progress on foot
with the slow crawl up the Knud Rasmussen Glacier with
the sledge on our inward trip. In 2½ hours we had
covered the final 25 km. to the fjord where we found our
boat intact and, a ten-man day box of comrations rations.
We both felt a great sense of relief to be off the glacier
with our mission virtually accomplished and for the first
time were able to relax and enjoy our surroundings.
We had completed the 84 km. journey from Kangergssuaq
to the snout of the Knud Rasmussen Glacier in 75 hours
and had another 20 km. by boat to reach Sermiligaaq. This
we intended to do the following morning as it was now too
late to reach Sermiligaaq in time to get anything done that
evening.
The morning of Thursday, August 21st, saw us setting off
on our journey down the fjord. The outboard motor started
first time and we had a cold, beautiful and uneventful
trip down the fjord to the village, our only difficulty
coming when we found the settlement surrounded by tightly
packed ice floes which took some time to work through.
This gave us our first confirmation of our suspicions as
to why the boat had not arrived at Kangergssuaq, so as
soon as the radio station was open we tried to contact
Angmagssalik which we were able to do shortly after noon.
This is how we were told of the situation and informed us
that the chance of getting a boat through the ice to the
remainder of our party was remote and that food might have
to be parachuted in, so a further radio contact was arran-
ged for the following morning.
While in Sermiligaaq we were most hospitably looked after
by a group of Danish workmen who were engaged in building
new houses at the settlement. On hearing of our arrival
they had invited us to lunch, then tea, and then break-
fast the following day. Their food was really good and
we were well able to do it justice.
The following morning radio contact was again established
and it was decided to parachute in supplies. The author-
ities had certainly wasted no time and it was hoped that
the supply drop would take place about noon.
On our Saturday morning radio contact we learned that the
food drop had been successful, we failed to establish
radio contact on the Sunday but the following day were
informed that the party had been dropped a radio trans-
mitter and that they were all well but had been visited
by a polar bear during the night! A helicopter would
attempt to pick them up on Tuesday and as a ship was
going to Angmagssalik the following day we decided to go
on it.
On Tuesday morning we bade farewell to our Danish hosts
and sailed for Angmagssalik in the "Ulimaut" a small
coaster with a friendly Greenlanders. Ice conditions
were bad and the boat had to force its way out of Sermilikfjord through the bergs. We stopped at Kungmiut en route and were able to collect our surplus equipment and thank the local teachers for all their help. On arrival in Angmagssalik we contacted Inspector Ibsen of the Danish police who was extremely helpful and for whom we drew up a report of the expedition's activities explaining the situation which had led to the relief operation. During the next two days our kit was packed and handed into the warehouse for shipping back to the U.K. and we had the pleasure of dining with Karl Pivat, captain of the "Ulimaut", and his Danish wife. Now only two hours by boat from Kulusuk and the others it looked as if we had become stranded, as thick ice prevented the boat from getting across. Next morning however we tried again and after four exciting hours of forcing our way through floes in thick mist on the "Johann Pedersen" we arrived at Kulusuk to be greeted by the others. We stayed overnight at Kulusuk and next afternoon, were able to board a plane for Iceland with Dennis and Arthur. Michael and David having volunteered to stay another day as there were only four seats, and Derek having already flown on ahead. In three hours we were back in the civilized atmosphere of Reykjavik, where the following morning we boarded a plane for London and by evening were all united with our families. Already Greenland seemed unreal and remote but the memories of our journey, the people we met and their universal kindness will remain with us always.

4.3 The Fjord Party

After spending three days at the Fjord camp, during which time equipment was sorted and prepared for the boat journey, it became obvious that something had happened to prevent the boat coming, and accordingly it was decided to send a party of two 84 km. overland to the head of the Sermilikfjord where they would pick up the inflatable boat for the remainder of the journey to Sermilikfjord. From there they could contact Angmagssalik by radio and ascertain the situation while the remainder of the party would be ready to receive the boat, should it arrive, and also to recall the overland party should it arrive within a short while of their departure.

Immediately Don and John had left for Sermilikfjord on the 18th. August the other five members of the expedition made an inventory of the remaining food, which was of a varied nature and amounted to approximately 11 man days of full rations. It was decided to extend this for as long as possible as, at that stage although several possibilities were obvious, it was not certain what had prevented the boat arriving and consequently a time limit could not easily be placed on the duration of the stay at Kangerdlugssuaatq.
Late on the Sunday night, and the following morning, parties walked to the headland from where the Glacier de France could be seen, to exchange flares with the two on the glacier. These had been devised as a recall system in the event of the boat arriving after their departure.

For the next four days the life at this camp followed a regular pattern: as much time as possible was spent lying in sleeping bags in order to keep warm and conserve energy. During the more active hours most people spent a large part of the time looking for the boat across the ice choked waters of Kangarhlugssuassuaq or cooking minimal meals over a fire built from dwarf willow scrub, which fortunately grew in profusion on the stabilized moraine slopes adjacent to the camp.

Late on the evening of the 21st. a polar bear was sighted swimming slowly up the fjord, and since it climbed onto the moraine within 2 km. of the camp it was decided to keep a large fire burning and maintain a watch all night. This was a wise decision as at 05.00 the following morning the bear appeared walking down the moraine crest towards the camp. Fortunately a bare rock slope diverted it downwards, and with a few inquisitive sniffs the magnificent beast took to the water and swam off.

The excitement of the 22nd. August was not yet over however, for during the afternoon the sound of an aircraft was heard. A Catalina was seen flying up the main fjord and after a number of flares had been fired the pilot passed low over the camp before making a second run, on which he dropped two parachute loads, which landed within 3 km. of the camp, and contained 100 kg. of food. This was a marvellous demonstration of very skilful manoeuvring as the aircraft was flying under very low cloud and was obscured in on all sides by steep rugged mountains.

The food and parachutes were quickly recovered and a note in one of the boxes informed the party of the safe arrival of Don and John at Serilikag, it went on to say that the coast guard cutter "Westwind" would pick them up on the 26th. The following day was devoted to caching the equipment, including the sledge and skis which could not be taken in the helicopters, in a pile just above high water mark on the fjord edge.

During the morning of the 26th. August a helicopter piloted by LCDR E. Murnane appeared under cover of a DC4 which had flown from Sondre Stromfjord. The whole party signalled to both aircraft by heliograph and shortly after appearing the helicopter was hovering low over the camp to lift aboard the first three members of the expedition.

When the helicopter had departed Arthur and Derek cleared up the camp and made a cache of the remaining food and equipment. Shortly after this a small twin-engined aircraft flew over and on being heliographed made several low passes over the camp site before free dropping from 1000 feet a parcel containing chocolate, a bottle of whisky, and a note informing the recipients that in the aircraft were Derek's wife Jeni, and Peter Chambers, a "Daily Express" reporter. Arthur and Derek spent the remainder of the time awaiting the helicopter's return speculating, with mouths full of chocolate and whisky, on what sort of press coverage the expedition was receiving.

On being picked up later in the afternoon the remaining two were flown to Kulusuk to join the three who had been flown out earlier.

After confirming with the authorities, including the local police, had no objection Derek flew to Iceland to begin the organisation necessary at home, whilst John and Don joined the party at Kulusuk on the following day (See Section 4.2). By various routes the remainder of the expedition flew via Iceland to London reaching there by the 2nd. September.

The expedition was over.

4.4 A schoolboy's impression

It is impossible to compare climbing in Great Britain to an expedition. I find climbing a mental challenge; physical effort plays a small role in the pleasure I derive from exposed rock faces, and therefore it was fortunate that I also enjoyed the expedition. The sledging was plain hard work but it was easy to enjoy it in fantastic scenery when we were mere specks on glaciers six or seven miles wide, or when the sun went down behind mountains and left us in an eerie lunar landscape, or, best of all, when the sky turned from pink through myriads of shades to gold before sunrise. A little sledging or back-packing was small price to pay for the opportunity of seeing all these things. Even sitting a blizzard out in a tent or not having very much to eat were exciting new experiences. I am very grateful to the other members of the expedition who put up with my ignorance and inexperience to show me sights not often seen by other sixteen year olds, and so made this the most memorable 'holiday' that I have ever had.
5 GENERAL

5.1 Botanical Report G. Halliday. (University of Lancaster)

Since 1963 seven expeditions have made botanical collections from the mountain area lying inland from Sermilik, Sermeqiaq and Kangerdlussuaq fjords and extending north to Schweizerland and Mont Forel. These collections are from more than 50 sites varying in height from 370m. to 2400m. and at each site a collection was made of all the species of flowering plants and ferns which the collector judged to be present. Although there was no professional botanist on any of these expeditions, there are probably few species occurring in the area which have not yet been found and there is probably no mountain area in Greenland of comparable size which has been investigated so thoroughly.

The only botanical results published to date are of the 1963 Scottish East Greenland Expedition to the mountains lying south of the 16th. September Gletscher (Griffon 1964, 1965) and the reports of the 1966 Royal Navy Expedition to eastern Schweizerland (Halliday 1967) and the 1968 Army Expedition to the area around Kristians Gletscher (Halliday 1969). However, it is hoped to publish shortly a full account of the nunatak flora incorporating the botanical results of all the expeditions.

The present expedition made collections, chiefly of vascular plants, from the following five sites:

A. Loose, northwest-facing cliff overlooking Kristians Gletscher, 1700m. 66°46' n. 36°16' w. July 25th

B. South-facing scree slope near summit of Point 2000m. at west end of ridge between Kristians Gletscher and Champs Elysées Glacier. 2000m. 66°43' n. 36°24' w. July 26th

C. South-facing scree slope on ridge between Kristians Gletscher and Champs Elysées Gletscher. 2300m. 66°44' n. 36°17' w. July 27th

D. North-facing slope of loose rock near summit of nunatak on the west side of B.L.V. Steenstrup. Nordre Brøg near its head. 2000m. 66°47' n. 35°25' w. August 5th.

E. South-facing stabilised moraine interspersed with streams below Pusuggsvit at head of Kangerdlusuaq. 150m. 66°27' n. 35°47' w. August 15th.

Site E differs from the others in being near sea-level and will therefore be considered separately. The head of Kangerdlussuaq has previously been visited by at least four people who have made botanical notes or collections: Chapman (1930), Bøggsvad (1933), Angerer (1960) and Swainson (1967). The latter two collected from above the east side of the Glacier de France near its snout; the other two probably visited the valley below Pusuggsvit near the present expedition's Site E. As a result of their researches it was known that the head of this fjord has a very rich flora with several species which here reach their northern limit in East Greenland. From the fjord, the well-vegetated slopes below Pusuggsvit are particularly conspicuous and it was for this reason that the present expedition was asked to collect in this area. Unfortunately part of the collection had to be abandoned but the following 13 species were brought back:

Angelica archangelica
Bartsia alpina
Carex bigelowii
Cerastium arcticum
Chamaenerion latifolium
Erepsophyllum hermagrophidium
Equisetum arvense

Of these, Equisetum arvense is now to the area bringing the total for the head of the fjord to 66 species. This horsetail, although abundant in many parts of Greenland, is surprisingly uncommon in the Angmagssalik area. The Angelica archangelica is here at its northern limit in East Greenland. Although in The Flora of Greenland Taraxacum rhoeoidea is stated to occur only in south-east Greenland at 65° n, this means little as our knowledge of the Greenland dandelions and their distributions is still very limited. The species recorded or collected at the four inland nunatak sites are listed below. They are all flowering plants unless otherwise stated.

Alectoria pubescens (lichen) C
Carex nardina A
Dicranoweisia crispula (moss) D
Papaver radicatum A (BC not collected)
Polytrichum alpinum (moss) AB
Usnea sulphuracea (lichen) C

As one would expect, these nunatak species are mostly wide-ranging arctic and montane species more than half of which occur on mountains in the British Isles. A feature of the nunatak flora over the whole of the area is the abundance of such species as Papaver radicatum (arctic poppy) which, at least in this part of Greenland, appears to require an arctic continental climate with relatively dry summers and it is therefore decisive for the coast. The most interesting species from these four sites, and one which is in the same category as the poppy, is Melandrium affine. This is known south
of Scoresby Sund only from nunataks behind Kangerdlugssuaq and, further south, from Kristians Gletscher Site A and nearby near the head of Porquoi Pas Gletscher. It was first found at Site A by the Army Expedition in 1965. The only flowering plant found at Site A by the present expedition and missed by the Army Expedition is Saxifraga oppositifolia.

There is a marked reduction in the number of flowering plants found at Site A (1700m, 7 species), Site B (2000m, 4 species) and Site C (2300m, 2 species). It seems likely that in the nunatak area 2300m is the upper limit for flowering plants and here, as elsewhere, the arctic poppy is usually one of the last species to disappear.

References


5.2 Equipment

General.

During the planning stages it was found that most of the equipment needed was owned by one or other members of the expedition. This, whilst of considerable advantage from the financial angle, has the disadvantage that a miscellany of items necessitates innumerable spares and prevents cannibalisation in the event of failure or loss of parts. Ideally one would buy complete sets of all the necessary items at the expense of the expedition. The above comments apply particularly to skis, stoves and tents.

The figure shown in the accounts for purchase of equipment is increased by the cost of replacing items abandoned at Kangerdlugssuaq.

Sledge.

The welded stainless steel sledge specially made for the expedition by Accles and Pollock was extremely satisfactory and did not suffer from the disintegration problems which seem inherent with wooden Nansen type sledges on long journeys where rough going may constitute a large part of the total.

On occasions the sledge, which weighed 22.5 kg., was carrying approximately 360 kg. of equipment and was hauled by the seven members of the expedition in fan formation, each attached separately to the bows of the sledge.

For the future it is thought that the optimum man-hauling system would be for the expedition to be divided into three man-units, each pulling a smaller and lighter sledge, which carries a three man tent and all their provisions and equipment.

Sledge Harnesses.

These were manufactured from nylon webbing 4" wide with quick release buckles on the belt. They originally had crossed shoulder straps but these proved to be too short, and were modified accordingly.

Tents.

On the inland journey two old pattern Black's Mountain, one new pattern and one new Ventile Meade without flysheet were taken. The new Mountain is some improvement on the old type but would be better if the snow valance was on the flysheet. Threading the poles through the sleeves can be exasperating, especially in bad weather and is impossible if the tent has been pinned out, as the A piece is integral with the top section of the pole.

One of the old pattern Mountains had seen better days and did not stand up to the blizzard at base camp where it was abandoned. The Meade was not very satisfactory, it leaked and the side flaps came partially adrift in the same blizzard. A black polythene flysheet was used in the
later stages and this proved satisfactory during calm weather with the added advantage of making the tent dark for daylight sleeping.

Stoves.
1 pint paraffin Optimus stoves were used, one model 111 and two OOL. The latter have the disadvantage of needing to be assembled before use and the consequent possibility of losing parts, but they are lighter. The model 111 is more robust but tends to heat underneath more rapidly at the back and tips over when on snow if not supported. A supply of spirit lasted the journey, after this was exhausted and the stoves were lit with paraffin they became more temperamental.

Ropes.
We used 2 x 150 ft. Kermantel and 1 x 300 ft. Viking No. 2. These proved sufficient for our purposes. In addition we had 300 ft. of prestretched Terylene, 1" circ., for pulley-hauling the sledge on steep sections. This item was left at Kungmiut when the weight problem became crucial, and in fact would not have been used.

Slings and Karabiners etc.
Each member of the party carried two slings with karabiners and also had prussiking gear immediately available. A miscellany of ice pegs, rock pitons, hammers and a pair of jumars were kept to hand.

Mattresses.
The expedition was given a number of foam mattresses, these proved excellent for camping on snow but although very light were rather bulky. They were kept in large polythene bags to prevent them getting damp, and were cut in advance to fit the tents.

Skis.
We had a variety of skis - Norwegian, slalom, and short, and a miscellany of bindings of the cable type, it being essential for the heel to lift for ski mountaineering. The skis with plastic soles proved easier going than the painted ones which occasionally 'balled up' snow on the sole if no wax was used. There did not seem to be any great advantage of long over short skis, although the Norwegian type were considerably lighter. Skis were essential for sledge hauling and general uphill travel.

Boots.
Most climbing boots are adaptable to this type of skiing although more flexible boots are preferable. Sufficient welt is needed on the heel to engage the cable, and rat trap toe clips can be used.

Boat and Outboard.
We took an Avon Redshank 12 ft. inflatable boat and were loaned a Mercury outboard motor; these were to be used if it became necessary to evacuate a casualty. It was intended to leave them at the head of Kangerdlugssuatsiaq but as the expedition did not start inland from there they were left at the foot of the Knud Rasmussen's Glacier and proved useful in taking the overland party from there to Sermiligaaq.

Personal Gear.
All members provided their own gear, including ice axes, crampons, sleeping bags, duvets, and other equipment much the same as would be used on an alpine tour.

Radio.
A radio would have been useful and had it worked would have avoided the need to send two men on a difficult 104 km. journey to Sermiligaaq.

The expedition's decision not to take one was based largely on the fact that in 1967 and 1968 well equipped British expeditions visited similar areas of the east coast, each with very comprehensive radio equipment and skilled operators, and in neither case was it possible to make contact with Angmagssalik.

In 1969 a British expedition operating further north, in the Watkins mountains used a portable radio pack to contact Iceland direct, and this may well be the best system to adopt.

Firearms.
In view of the fact that no summer expedition to central east Greenland had ever, to the expedition's knowledge, reported sighting a polar bear it was decided not to take a rifle on the sledge journey. This decision could have had serious consequences when a polar bear approached the five men waiting at the fjord camp. The bear which at that time of the year could normally be expected to be wandering on the pack ice well out to sea and further north, had been able to reach the coast because of the unusually heavy offshore pack ice which was the very reason the five men were waiting at the fjord camp. A coincidence which future expeditions to this area might wish to bear in mind when considering the problem of firearms.

5.3 Food

Since the expedition was planning to pick up food at the Army dump on the Kristians Glacier, the main food requirement resolved itself into sufficient supplies for the journey in. This was originally planned to be Army Assault
rations backed up with an emergency supply of lightweight food, with a depot of Compo rations and other items at the head of Kangardlugssuatsiaq. Due to the revised route inland, the Assault rations for the journey were supplemented with sufficient Compo rations for the first two days on the Knud Rasmussen Glacier. On the return journey to the coast apart from two days on Compo, Assault rations were used throughout with additional supplements containing chocolate, mint cake, porridge, dried vegetables, and mashed potato powder. These helped to alleviate to some extent the feelings of permanent hunger experienced by some people on the journey inland. When the overland party left the fjord camp the remaining five members of the expedition had approximately 11 man days of full rations. The consumption of these was based on a hypothetical 10 day period and so the five were existing on approximately one man day of full rations per day. After the first couple of days the feeling of intense hunger diminished and fortunately after 5 days at the camp, the Danish Naval Air Command dropped 100 kg. of food and relieved the situation.

<table>
<thead>
<tr>
<th>Calories/man day</th>
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<tr>
<td>Assault ration</td>
</tr>
<tr>
<td>Supplement</td>
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<tr>
<td>Compo ration plus biscuit</td>
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5.4 Medical

Medical equipment for the expedition was based upon the knowledge that comprehensive medical supplies had been left in the dump at the Kristians Glacier by the 1968 Army expedition. It was therefore necessary only to carry in sufficient to deal with such emergencies as were likely to occur on route. The expedition was not marred by any illness or accident and the medical officer was not called upon to deal with anything more serious than piles, tooth fillings and blisters.

On leaving the Kristians Glacier a great deal of the original medical equipment, not having been used, was left behind for the use of further parties. A list of this equipment may be obtained from the leader of the expedition.

5.5 Mountaineering

Due to the change of route into the area visited, the time allotted to mountaineering was considerably reduced. This was further reduced by a period of bad weather when in the area, with the result that the expedition was unable to achieve all its aims in this respect.

the event a party climbing as two ropes succeeded in making the first ascent of the most westerly peak of the range dividing the Kristians Glacier and the Champs Elysees Glacier at point 2000m., and the next peak to the east of this on the same range, on July 26th. The ascent was made from the north on beautiful snow which gave excellent cramponing for most of the way. The rock encountered occasionally on the ridge between the two peaks was extremely rotten. On the route out the last but one nunatak peak on the eastern end of the same range, where it adjoins the Sektjernen, was climbed by a party of four to obtain a view of the route which it was hoped to follow through the Sektjernen. The climbing was not difficult and it was not found necessary to use a rope. As the ascent was made on August 5th, Don’s wedding anniversary, the summit was named Anniversary nunatak, the height being estimated at 2000m.

5.6 Photography

All members of the expedition carried one camera, a few people, two. Approximately 100 rolls of Kodachrome 2 film were used, with 20 high speed Ektachromes and a similar number of black and white films. The Weston master 5 meter with invercone was used to determine exposures. Within an hour of sunrise (about 01.30 hrs. in July) the light intensity had risen to give a reading of nearly 14 on the meter with the invercone pointed to the sun, and this remained fairly constant throughout the day. On a few occasions, readings of nearly 15 were obtained, generally under slightly hazy conditions and at altitudes in excess of 2000m. Very cold conditions leading to freezing of shutters and camera mechanisms were encountered only on two or three occasions. During the overcast weather of the return journey a more serious problem was that of keeping camera gear dry. Moreover, conditions the light was surprisingly bright and the invercone incident light method was considered by some to be essential to ensure correct exposure determination.

5.7 Maps

1:250,000 Danish Geodetic Institute, sheets 6501, 6601, 6602.
The Danish Geodetic Institute also publishes a series of sheets covering the immediate coastal strip to a scale of 1:50,000. All these maps are based on air survey with few ground
control points, they give a reasonable general picture of the area but are often inaccurate, particularly in detail and contouring.

5.8 Weather

As indicated in Section 2.3 the months of July and August in Greenland are noted for their sustained warmth and lack of precipitation, and the weather in early July during the first 8 days of the inland journey would seem to bear this out, in part at least. Out of the 30 days the expedition was travelling or inland 12 could be described as 'good' weather, 12 'poor' and 6, positively 'bad'. In addition, and contrary to the weather pattern to some extent regarded as normal for the area, extremely high winds, together with heavy snow, were encountered for 3 days at the base camp. In 1968 the poor summer was generally attributed to the strong local influence of the quantities of pack ice brought down the coast by the East Greenland current and this same pack ice, securely wedged against the coast by the easterly winds during the summer of 1969 was probably responsible to some extent for the poor weather experienced on the return journey, and certainly for the non-arrival of the expedition's boat. The lowest temperature we recorded on the Hypsograph was -16° C on the Kristians Glacier, although on the initial journey to the eastern end of the Kristians Glacier temperatures considerably lower than this were encountered.

5.9 Survey

It was originally planned to carry out a low order triangulation of the Kristians Glacier region, backed up by some plane tabling, and for this purpose the following equipment was loaned by the Royal Geographical Society: Kern DMM Theodolite with trough compass Kern tripod Plane table, modified to fit Kern tripod Allidade Aneroid Barometers, two Whirling Hypsograph Fibre glass tape, 100m.

Due to delays from pack ice, weather and travelling, totalling 11 days it was most regretfully decided to abandon this part of the expedition's programme. However, several photographic panoramas were obtained from different points of the unexplored Sekstjernen region, and these will be made available to future expeditions planning to visit the area.

Among the nunatak ranges to the north of the Sekstjernen lie several very high summits in the order of 3,000-3,300m., they are very prominent both from the ground and from oblique air photographs and although probably not as high as Ejnar Mikkelsens Fjeld, the highest unlimbed summit of the Watkins Mountains, they must rank among the highest peaks in Greenland and the Arctic.

5.10 Transport

Ice conditions permitting local boats, open and between 4 and 5 metres long can be hired for D.Kr. 30 an hour. This is a standard rate recently agreed by Den Kongelige Gronlandske Handel for expeditions. A reduced rate operates if the boat becomes stuck in the ice. Certain larger boats ply between the main settlements and subject to the captain's approval passages may be obtained on these at nominal rates.

5.11 The relief operation

The relief operation which became necessary at the conclusion of the expedition due to the coastal pack ice preventing the arrival of the expedition's boat was carried out jointly by the Danish Naval Air Command who from a Catalina flying boat skillfully dropped first two boxes of food and subsequently a radio onto a very difficult site, and helicopters from the USC&G "Westwind" who finally lifted out the members of the expedition. The expedition is extremely grateful to the members of the aircrews concerned and also to the Danish and American governments who made no charge on the expedition.

5.12 Equipment Depoted

Due to the limited payload of the helicopters a quantity of equipment was depoted near to the expedition's fjord camp at the head of Kangerdlugssuatsiaq. In addition a separate depot was made of the food remaining from the air drop, although most of this will not withstand the effects of wild life and weather. The location and details of the contents of these depots may be obtained from the leader of the expedition.
5.13 Conclusion

One of the main achievements of the expedition was the pioneering in reverse of a route from the head of Kangerdlugssuatsiaq to the vast, unexplored ranges of peaks to the north and east of the Sekstjernen. This route is surprisingly free from difficulty and has none of the major crevasse and moraine problems of the Glacier de France. A lightly laden party in good weather could reach the Sekstjernen in about 6 days where in order to support them for any length of time an airdrop would be required. In connection with this, considerable areas of level, well compacted, crevasse free firm snow, suitable for a small ski equipped aircraft to land on if necessary, were observed on the northern edge of the Sekstjernen and on the eastern end of the Kristians Glacier. It would be unwise to assume that Kangerdlugssuatsiaq will always be navigable to its head, and the Thank God Glacier section of the route described can be by-passed by continuing down the KJV Steenstrup Sondre Brae to the coast, as was done by the Danish Alpine Club expedition in 1968.

Assuming it is possible to penetrate the sea ice around Sermilikq this would present a reasonable alternative to using an ice blocked Kangerdlugssuatsiaq.

6 FINANCE

Income
Mount Everest Foundation 250 0 0
Augustine Courtault Trust 50 0 0
Gino Watkins Memorial Fund 10 0 0
Polar Postal History Society 2 12 10
Daily Express 178 11 0
B.B.C. 13 19 0
Personal Contributions, at 142. 10. 0 997 10 0
Total 1502 12 10

In addition to the above the following organisations financially assisted David Morgan with his personal contribution.
The British Schools and Universities Foundation Inc.
Gilbert Foyle Educational Trust
Greenwich Rotary Club
Minnesota Mining and Manufacturing Co. Ltd.

Expenditure
1. Fares London-Copenhagen-Kulusuk 1032 16 4
   Kulusuk-Reykjavik-London
2. Freight London-Angmagssalik return 92 17 7
3. Boat Charter 19 11 0
4. Food 75 3 6
5. Fuel (for outboard motor and cooking) 43 7 10
6. Equipment 130 16 4
7. Administration and Promotion 49 5 5
8. Hire of Survey instruments 8 2 0
9. Report (people and instruments) 55 0 0
10. Sundries 19 16 0

excess income over expenditure 1487 16 0

Total 1502 12 10

Notes on items of expenditure
1. Train and boat to Copenhagen for five, otherwise all air. Also includes part share for two of Swiss-Dutch expedition charter aircraft, Kulusuk - Reykjavik.
3. Considerable savings on this item resulted from being able to use rations left by the British Army
expedition in 1968.
6. Includes a sum to cover communal equipment abandoned at the head of Kangardlugssuatsiaq.

SUPPLEMENTARY ACCOUNTS

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Excess income over expenditure 7 15 4

This sum will be used to meet the distribution costs of the report.
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6. Includes a sum to cover communal equipment abandoned at the head of Kangerdlugssuatsiaq.

7. ACKNOWLEDGEMENTS

The expedition wishes to acknowledge the assistance given by many individuals and organisations, and without whose support our venture would not have been possible.

7.1 Exploration
Royal Geographical Society
Scott Polar Research Institute
Arctic Institute, Copenhagen
Geodetic Institute, Copenhagen
Ministry for Greenland

Acknowledgements are also due to the following individuals:-

Lt.C. Agnew Dr. G. Pert
J. Andersen D. Rotovnik
A. Blackshaw Dr. A. Stephenson
Dr. N. Dilly C. Sugden
Dr. P. Friend Dr. E. Williams
E. Hoff

7.2 General
The following organisations and individuals assisted in various stages of the planning and execution of the expedition:-

Royal Danish Air Force
Danish Naval Command
Royal Danish Embassy, London
Dan Kongolige Gronlandske Handel
Department of Transportation, U.S. Coast Guard
Department of the U.S. Navy
U.S. Army Map Office
British Embassy, Copenhagen
British Museum
S.A.S.
Icelandair
Gronlandsfly AS
Flugtjornustan Ltd.
United Shipping Co. Ltd.

A. Allen D. Hughes J. Noordijk
P. Carlsten P. Ibsen Lt.Gen. H.G. Pagh
D. Clarke J. Lennert Doreen Perry
F. Chambers J. Lok K. Pivat
P. Daley S. Maccio K. Floughman
Capt. H. Day R. Maratse R. Small
Jennifer Fordham Dr. K. Miller Soyak
P. Gundlach J. Muller
Dr. G. Halliday J. Nielsen
J. Holt R. New
R. Pedersen and the Danish personnel at Sermiligaaq.
the expedition is also extremely grateful to the aircrews
of the Royal Danish Air Force and the U.S. Coast Guard
Cutter "Westwind" who participated in the air lift at the
close of the expedition:-

Royal Danish Air Force
721 Squadron

Captain P.L. Christensen, Pilot-in-Command
Captain K.K. Jensen, Co-Pilot
Second Lieutenant G. Beider, Navigator
SSGT J. Hansen, Radiotelegrapher
SSGT J. Christensen, Radiotelegrapher
MSGT J. Lauritzen, Flightengineer
SGT J.H. Bach, Assistant engineer

U.S. Coast Guard Cutter "Westwind"

LCDR E.L. Murnane
ADI J.L. White
AM2 F.S. Gerhard
AT3 D.L. Williams

7.3. Equipment

The following firms donated or sold at much reduced
prices, equipment to the expedition:-

Accles and Pollock Ltd.
Avon Rubber Co. Ltd.
Beaufort (Air Sea) Equipment Ltd.
British Visqueen Ltd.
British Vita Co. Ltd.
Bryant and May Ltd.
E.A. Chamberlain Ltd.
Dohm Industrial Ltd.
John Fowler Associates Ltd.
J.B.S. Associates Ltd.
Korrimor Weathertite Products Ltd.
Kiekhaefer Mercury Corp.
 Kodak Ltd.
 R. Lawrie Ltd.
 Minnesota, Mining and Manufacturing Co. Ltd.
 Parke Davis and Co.
 Philips Electrical Ltd.
 Montres Rolex S.A.
 Polaroid (U.K.) Ltd.
 Schermuly Ltd.
 Survey and General Instrument Co. Ltd.
 Thames Case Ltd.
 Y.H.A. Sales Ltd.

7.4 Food

The following firms donated food intended for supplementary
use with the main sledging rations obtained from the
Ministry of Defence, Director General of Supplies:-

Charrington and Co. Ltd.
Courage, Barclay and Simonds Ltd.
Glaxo Laboratories Ltd.
Lipton Ltd.
J. Player and Sons
Tate and Lyle Refineries Ltd.
Watney Coombe Reid and Co. Ltd.
W.D. and H.O. Wills
The Wrigley Co. Ltd.

7.5. Medical

The following gave advice or equipment:-
Mr. G. Breen Turner
Dr. I. Jones
Dr. E. Williams
Minnesota Mining and Manufacturing Co. Ltd. Medical
Products Division.

Any enquiries concerning the expedition or this report
should be addressed to:-

D. Fordham
L.G.M.C. East Greenland Expedition 1969
31, Foreshore
Grove Street
Deptford
London S.E.8.
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