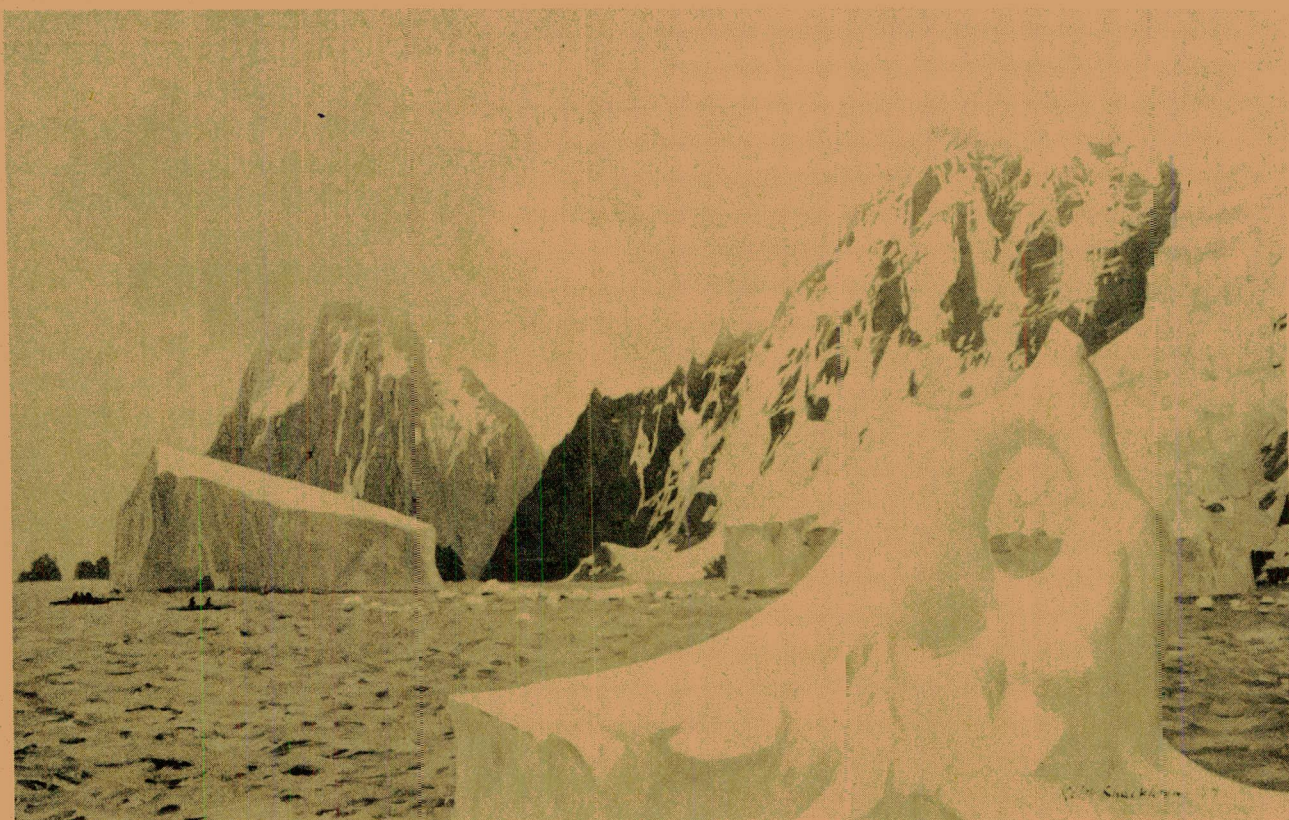
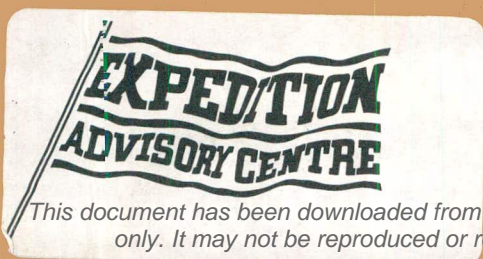


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JOINT SERVICES
EXPEDITION
TO THE
ELEPHANT ISLAND
GROUP
1976 - 1977



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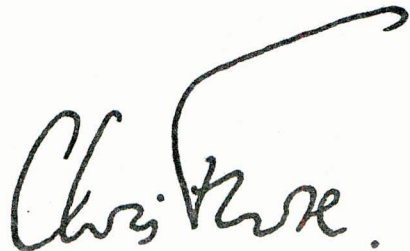
The cover painting is by Keith Shackleton, President of the Royal Society of Marine Artists, who was on MS Lindblad Explorer. It depicts the Gibbs Island Party canoeing out to the ship from Aspland Island on 8 January.

FOREWORD

This is the official report of the Joint Services Expedition which explored the islands of the Elephant Island Group in the Antarctic summer of 1976/77. It has been written before the team's return to Britain and will be followed, in due course, by papers in the scientific press, by articles in the popular press, and by a book.

I, and all my team, wish to thank the many individuals and organisations without whose generous and enthusiastic help we would not have been able to enjoy this, the time of our lives.

Our primary aim was a scientific exploration of the outlying islands of the group. Nevertheless, we were all attracted by the challenge of moving around these mountainous islands, and inspired by their brief but romantic history. We feel particularly proud to have been the first expedition to use canoes to explore the Antarctic. (Or were we the first? According to Rarotongan legend, in the seventh century Vi-te-Rangiora led a party in a number of canoes, sailing into a place of bitter cold "where the sea was covered with pia, a white powder, and things like great white rocks rose high into the sky".)



The Stables
Clearbrook
Devon

Leader

It is of no purpose to discuss the use of knowledge. Man wants to know, and when he ceases to do so he is no longer man.

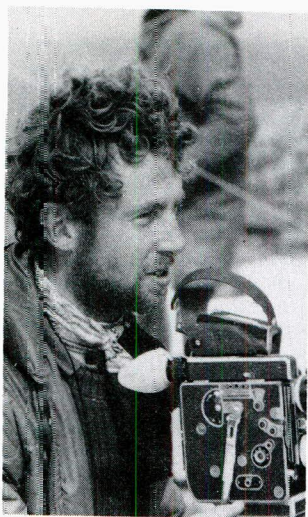
Fridtjof Nansen

The men were light-headed by now. Some, when they had landed, reeled about laughing uproariously. Others sat on the shingle and, like harmless lunatics, let it run through their fingers. It was the first land we had set foot on for 485 days.

Frank Worsley

It is impossible to describe accurately the violence of the atmosphere of Elephant Island: the screech of the wind and the driving storms, the cannon-like reports of the glaciers calving masses of ice as big as the dome of St Pauls.

Frank Worsley



Chris Brown. 24
"I am not wagging
my tail."



Andy Simkins. 24.
"I name this
'Simmo's Surmit'".



Tim Hallpike. 30
"I never travel
without my hydro-
graphic gear."

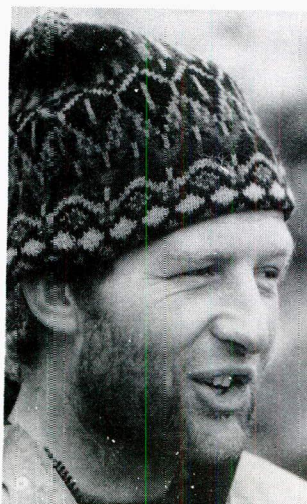


Jem Baylis. 30
"Right, you ****
sinners!"

GIBBS ISLAND PARTY



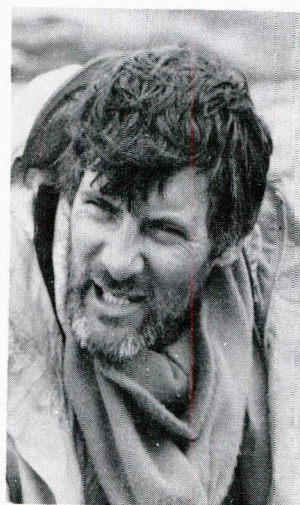
Chris Furse. 41
"It'll be good
for you".



Nick Martin. 29
"I'll just bumble
about a bit."



Frank Mogford. 30
"You want a whole
seal in formalin?"



Alan Milne. 36
"You can't have too
many oatmeal blocks."



Mike Wimpenny. 38
"Hullo Mrs Penguin;
how are you today?"



Dave Monteith. 25
"Who am dis man
Naismith?"

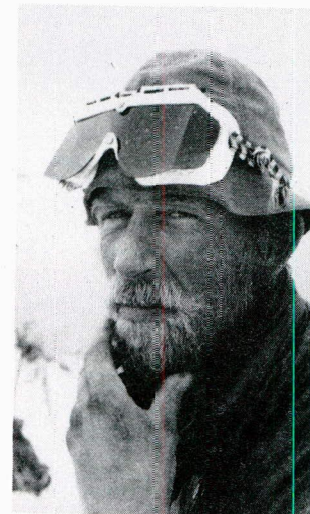


Len Hunt. 26
"Once I wouldn't even
climb the top deck
of a **** bus"



Chris Hurrar. 28
"Sar'nt Majer, the
men are too happy!"

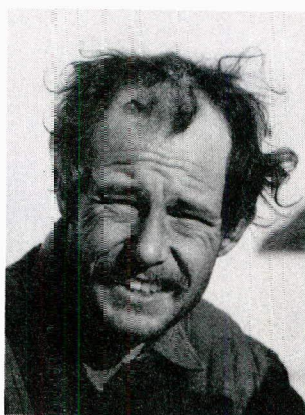
CLARENCE ISLAND PARTY



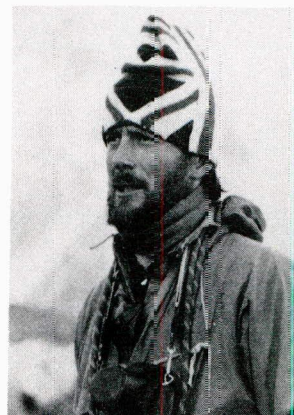
John Highton. 41
"We'll just doddle
up here."



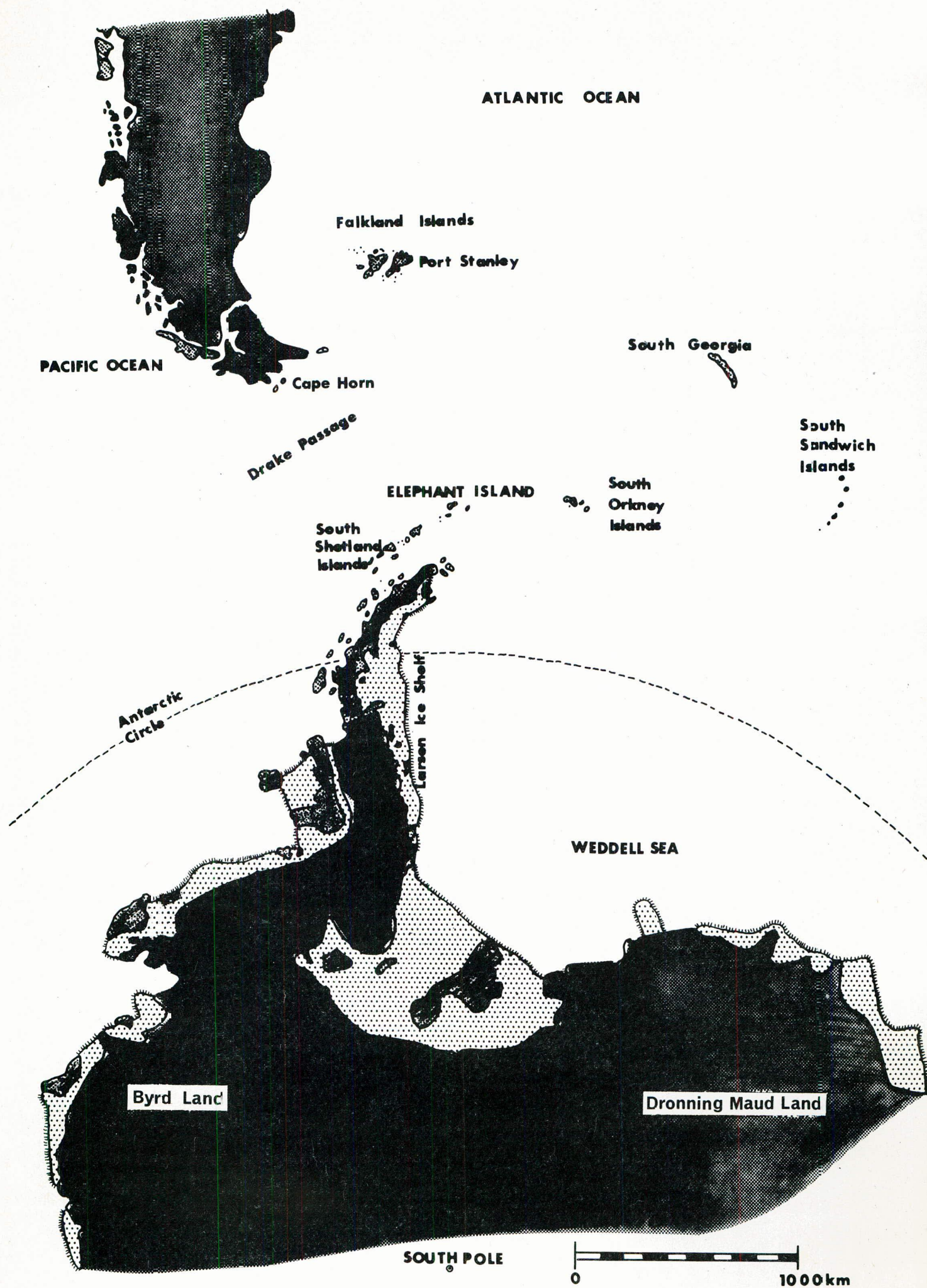
Gordon Turnkull. 28
"The Great Air
Marshall in the
skies will protect
me."



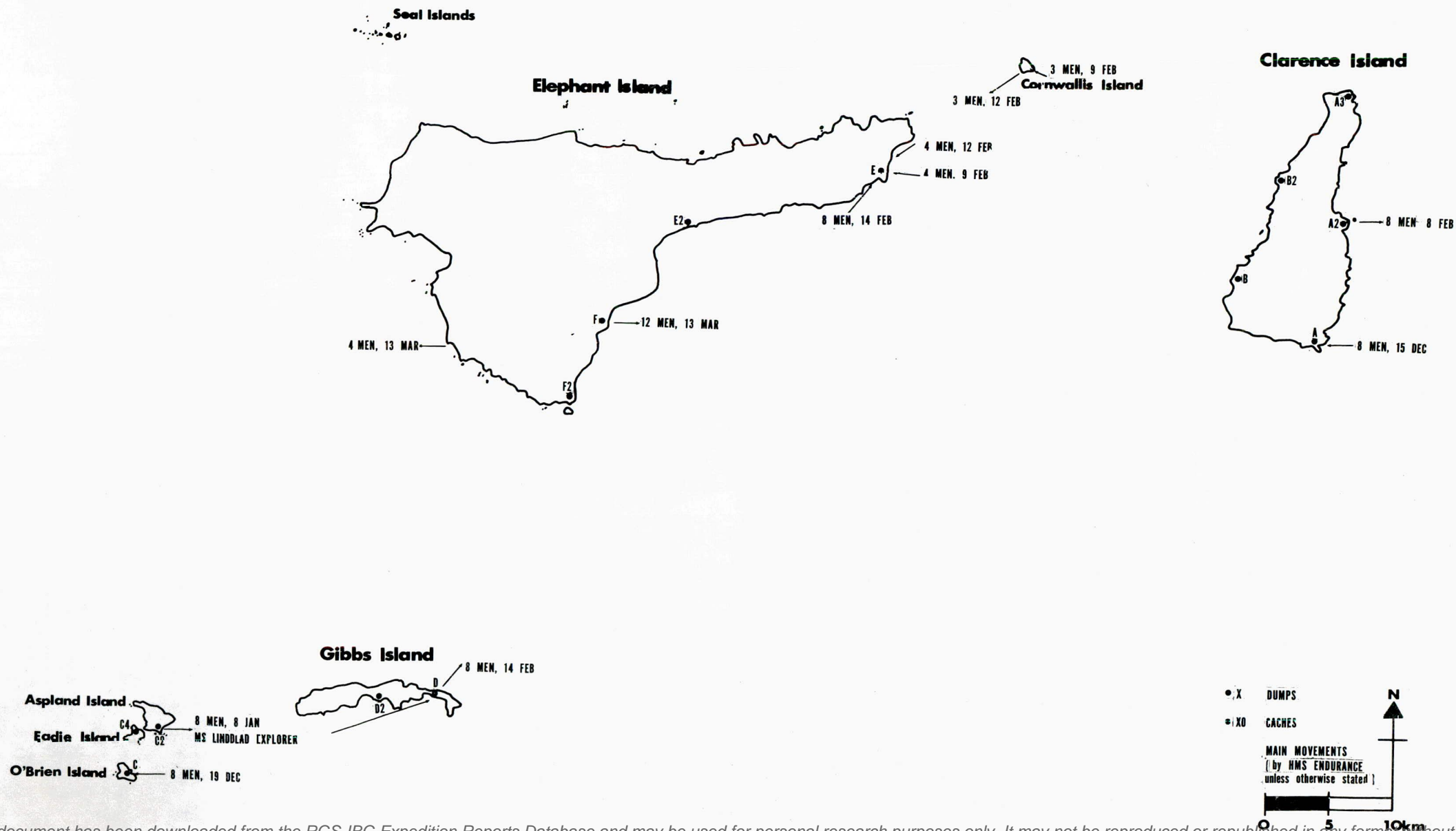
John Chuter. 28
"It's a drying wind;
it's the rain that's
wet."



Nigel Davies. 32
"It's good 'ere,
ain't it?"



THE ELEPHANT ISLAND GROUP



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JOINT SERVICES EXPEDITION TO THE ELEPHANT ISLAND GROUP 1976/77

PATRON

Sir Vivian Fuchs FRS

MEMBERS

Commander J R Furse FRGS, MBOU, RN Gibbs	Leader, Ornithology
Commander J E Highton RN Clarence	Deputy Leader, Equipment
Captain J P Baylis B Sc, RAEC Gibbs	Botany, Reports
WO2 E Bright RGJ	Reserve
Lieutenant C L Brown B Sc, RN Gibbs	Geology, Purser
Captain J W Chuter B Sc, REME Clarence	Terrestrial Zoology, Communications
Lieutenant N J A Davies RN Clarence	Canoes
Lieutenant T R Hallpike RN Gibbs	Oceanography
Lance Corporal L S Hunt RCT Clarence	Seals, Whales, Hut Repairs
Captain C J Hurran B Sc RE Clarence	Survey, Cartography
Lieutenant N J L Martin B Sc, RN Gibbs	History, Quartermaster, Postmaster
Surgeon Lieutenant Commander A H Milne MB, Gibbs	ChB, MRCP, RN Doctor, Parasitology
Flight Lieutenant F L Mogford RAF Gibbs	Ichthyology, Still Photography
Flight Lieutenant D J Monteith BA, RAF Clarence	Cinefilm Director, Geomorphology
Lieutenant A J N Simkins RA Gibbs	Meteorology, Mountaineering
Flight Lieutenant G J Turnbull B Sc, MB, ChB, RAF Clarence	Fish Foods, Plankton, Doctor
Lieutenant M G Wimpenny B Sc, RM Clarence	Geology

ADMINISTRATIVE COMMITTEE

Chairman: Director of Naval PT and Sport	Captain C C Loxton RN
Members: Deputy Director of Naval PT and Sport	Commander C P O Burne RN Commander H D Y Faulkner RN Commander J R Furse RN

PREPARATIONS
by Commander J R Furse RN

On 15 April 1916 Sir Ernest Shackleton made the first recorded landing on Elephant Island at Cape Valentine, then, while 22 men wintered at Point Wild, he sailed in the "James Caird" to South Georgia for help. However, the first exploration of Elephant had to wait until Commander Burley RN's 14 man Joint Services Expedition of 1970/71 and, even then, the other islands of the group remained unexplored.

In 1973 I put my proposal to take a Joint Services Expedition south to Dr Laws, the Director of the British Antarctic Survey, and he approved in principle my plans to extend the scientific exploration of this self-contained island group. The agreed aims are listed with the specialist reports.

By the end of 1973 I had permission from the Director of Naval Officer Appointments and the plan had been discussed with the Hydrographer of the Navy. Through 1974 the status of the expedition was consolidated, with approval by C in C Fleet and the FCO. Then, in August the Joint Services Expedition Trust endorsed the expedition and in September, to my delight Sir Vivian Fuchs agreed to be Patron.

I applied for a photographic reconnaissance to be carried out by HMS Endurance in 1975/76 and in May learned that she could do this, but that this would be her last season thereby denying us transport south. Highton and I therefore launched "Operation Early Bird" to gather our stores a year early to be flown in by HMS Endurance in 1975/76, with the team travelling by other means the following season. In July we heard that Endurance would continue to run in 1976/77 and we reverted to more realistic plans. In August the expedition was selected by the Joint Services Expedition Trust for sponsorship.

I decided to use canoes for moving round the islands and this had been reflected in the call for volunteers in DCIs in January 1975. Over 100 applications reached me and in September 1975 12 applicants from each service were interviewed at the RGS by the Selection Committee chaired by Surgeon Captain D G Dagleish, MVO, OBE, RN. 12 were selected and 8 reserves were nominated.

Shortly afterwards I learned that HMS Endurance was not, after all going to run on. It was then too late to restart "Operation Early Bird" so I began canvassing alternative shipping and acted on a crucial piece of good advice from Dr John Heap: "Don't let the team know how slim are their chances of going south".

The team first met briefly in October at Capel Curig where 9 team members and 6 reserves were briefed, each being given complete responsibility for both a scientific discipline and an expeditionary function (see team list): now 12 men were at work where 2 had been before.

Through November I explored possible fallback plans. The JSET were reconsidering sponsorship; 2 of the team were warned that they might be sacrificed and I submitted a plan for a 10 man team, doubling the budget to £22,000 and assuming a civilian ship's assistance. Also in November, the expedition was formally approved by the Royal Geographical Society.

Our first sponsor had been, most appropriately, the Travelling Scholarship Trust of Sir James Caird, Shackleton's sponsor. On 12 December the "James K Caird" was launched by Mrs Grant at Dundee, our canoe being 1½ ft shorter than Shackleton's historic "James Caird". Over the following year we received support from many other people and organisations (see separate list).

In January 1976 the expedition exhibited a pair of canoes at the Earls Court Boat Show, although by then it was clear to me that we could not get them south. Then JSET confirmed their decision to sponsor the expedition; this and the generous response of Lars Eric Lindblad, operating the cruise ship "MS Lindblad Explorer", almost convinced me that a 10 man expedition was feasible. Nevertheless, January was a nadir in my morale, with one of the team members and two reserves withdrawing. Then, on the evening of 30 January a telephone message reached my desk at Yarrow's in Glasgow from a friend in Whitehall: "Endurance is running on for 1976/77". The official decision came much later but from then on I knew we could succeed.

In February 6 team members and 6 reserves attended a course on winter mountaineering and survival at JSMT, Scotland. We also hauled 2 canoes up the Cairngorms and tobogganed them down again, proving their worth as sledges. After this 3 reserves were promoted, making a 14 man team plus 3 reserves.

In May HMS Endurance returned, having carried out a successful photographic reconnaissance of the islands. The oblique photography showed beaches even scarcer and poorer for our canoes than expected so plans were amended to suit. Early in June the ship's programme was approved and, her helicopters having been changed from Whirlwinds to Wasps, the Ship's Flight flew to the Joint Air Transport Establishment for clearance to fly our canoes. The ship kindly agreed to allow a 16 man team, Highton, Martin and the stores organisations taking this increase in their stride.

In June 1976 Bright had to withdraw for service reasons. This was a bitter blow to us both and a loss to the team, one redeeming feature being that I could now promote all the remaining reserves. Bright and 15 team members met in June for 2 weeks sea canoeing at JSMT, Wales, Tywyn. This was invaluable; none of us was expert and several were novices. We had intended to take 2 single eskimo kayaks south but, after several sea trips in the Tasmans, all agreed that we should use Tasmans exclusively.

From March stores accumulated and were packed by PSTO (N) in HM Dockyard, Portsmouth, while the rations arranged by DGST (N) were packed at the RN Victualling Depot, Woolston. These vital tasks were completed by the dedication of all concerned overcoming delivery problems and lack of packing space. In September 17,160 kg of food and equipment in 520 boxes were successfully stored in HMS Endurance.

In October the team spent a week in the Lakes for final briefing and crevasse rescue practice, the last evening of the meet being the first time all 16 team members had been together. On 20 October HMS Endurance sailed from Portsmouth with Hallpike and all our stores on board. On 6 November Martin flew out to Rio to act as advance party in finalising arrangements in South America.

Most Joint Services Expeditions have had some RAF transport but from the outset it had been clear that we should expect none. Commercial air-fares constituted half our budget. For diplomatic reasons our port of embarkation in South America was not decided until the day before we flew so I had booked return flights to Rio, planning to travel to

On 19 November the team gave a farewell party in the wardroom of HMS Discovery. The few, but very distinguished, official guests included the Director of BAS, Dr Laws, the chairman of the JSET, Rear Admiral Hearn, the chairman of the Selection Committee, Captain Dalglish, and Malcolm Burley, who had started it all. Their good wishes on the eve of our departure seemed a fitting climax to 3 years of preparation, in a most appropriate setting.



OUTWARD JOURNEY
by Commander J R Furse RN

The main party left Heathrow by Aerolineas flight on 20 November, landing at Rio de Janeiro the next morning after stops at Paris and Madrid. On arrival we were met by consular staff and later resident Britons entertained everyone until evening when we boarded the "Pluma" bus which was to take us to Buenos Aires. Fast driving with half hour stops at Sao Paulo, Curitiba, Florianapolis, Porto Alegre, Alegrete, Uruguiana, Paso de los Libres, Santa Fe and Rosario got us to our destination late on 23 November and here we were glad to be met by Martin. Our time here was spent as the guests of various families and their generous hospitality was greatly enjoyed and appreciated.

After joining HMS Endurance on 25 November we enjoyed a calm passage south so with the cheerful assistance of the ship's company much useful work on stores was completed in the hold.

Endurance anchored in Port Stanley on 30 November and that evening the team disembarked by canoe for a shakedown period camped in the area. Two nights were spent at Fairy Cove to permit liaison with Endurance, Stanley and Naval Party 8901 and we then moved to Sparrow Cove by canoe. On 3 December 2 canoes were portaged about 4 kilometres to Kidney Cove but bad weather prevented our paddling to Kidney Island and they were portaged back to Sparrow Cove the next day. On 5 December we moved camp to Stanley Common and this enabled us to spend much of the next 2 days moving the bigger boxes for 5 of the 6 dumps from the hold to the hangar.

On 8 December the islanders celebrated Battle Day with a ceremony which, this year, incorporated the granting of the freedom of Stanley to the Royal Marines. The march past completed, we took the canoes out to Endurance and secured them and all our other stores in readiness for departure south.

Drake Passage was obligingly calm and on 11 December we crossed the Antarctic Convergence and sighted our first iceberg. The next afternoon we sighted Elephant Island and that evening the ship passed south between Clarence and Cornwallis Islands before turning west along the length of Elephant as the cloud dispersed to reveal the stark beauty of the whole Pardo Ridge.

On 13 December, after recce flights for Highton and myself to fix sites in the preselected areas, the ship's Wasp helicopters began to fly stores in to the dumps and caches assisted in each case by 2 expedition members carrying emergency kit. Each day 3 blocks of flying were planned and, despite only one helicopter's being serviceable, by dint of courageous flying in low cloud and gusty winds and thanks to the skill and enthusiasm of all flight and ship personnel, rapid progress was made. F and e2 were landed that day; E, B, b2, a3 and a2 on 14 December; A and the Clarence Islanders on 15 December; D, C, d2, c2 and c4 (c3 not landed owing to bird-strike hazard) on 16 December; and the Gibbs Islanders finally established on O'Brien Island on 17 December.

On the satisfactory completion of this phase of the expedition HMS Endurance departed for South Georgia with friendly blasts on her siren - we had all arrived.

O'BRIEN ISLAND 17 DEC 76 - 3 JAN 77

by Cdr J R Furse RN

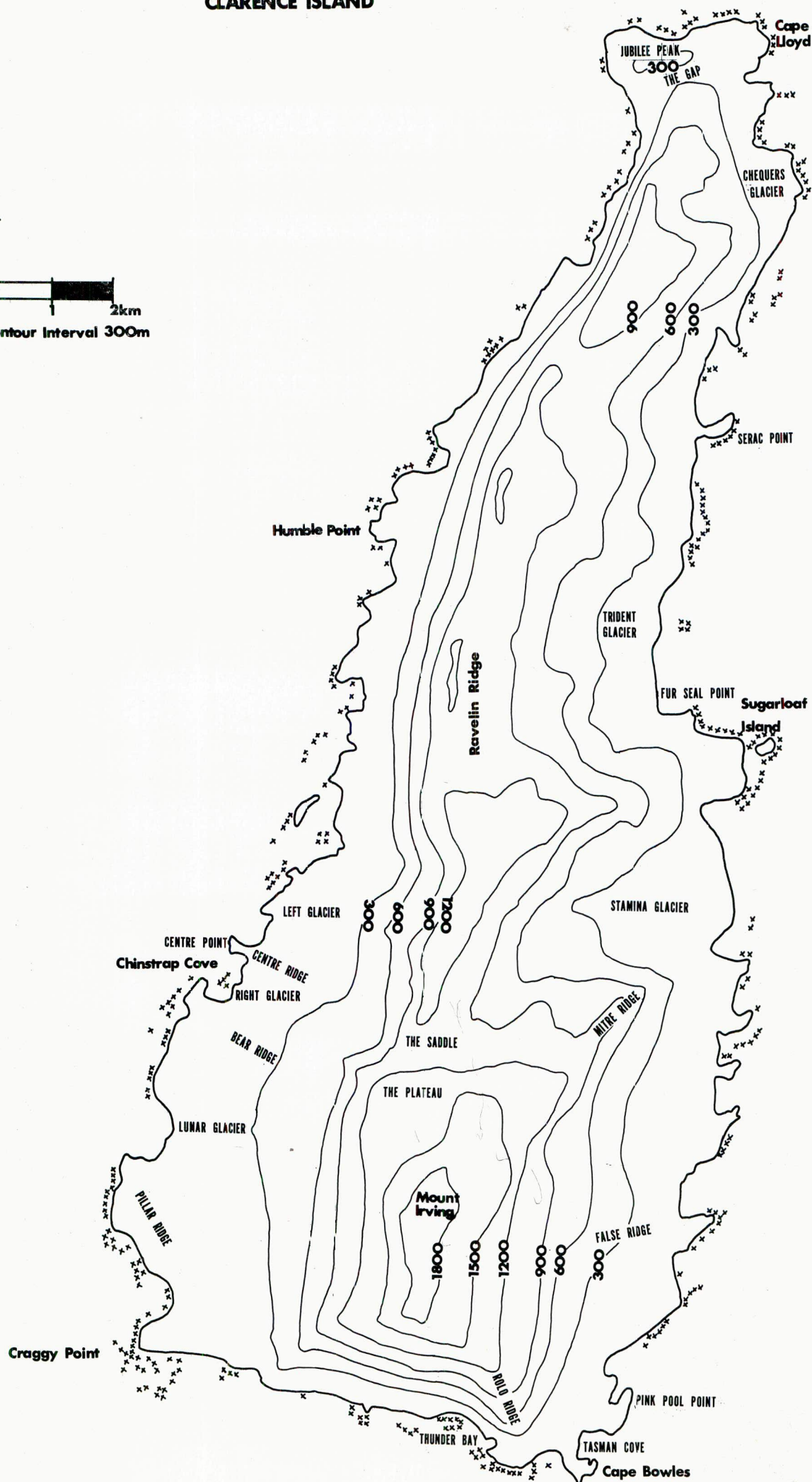
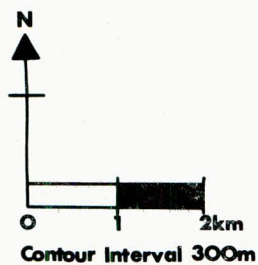
After landing at the dump, which was on a storm beach midway along the NE coast, we set our watches to GMT minus 2 hours then climbed 100m through a particularly squalid Chinstrap colony to the campsite in the corrie above. A high wind blew up while we were erecting the tents and one ridge pole was broken, but next day Martin repaired this and we got on with ferrying gear up from the dump.

Rapid movements of small bergs indicated currents of up to 7 knots between O'Brien and Eadie Islands, the resultant rips, apparently having a tidal rhythm, threatened our canoeing. Hallpike's studies of iceberg drift assumed vital importance. The other scientific work was also put in hand and I was very pleased with the way everyone both furthered their own work and assisted others.

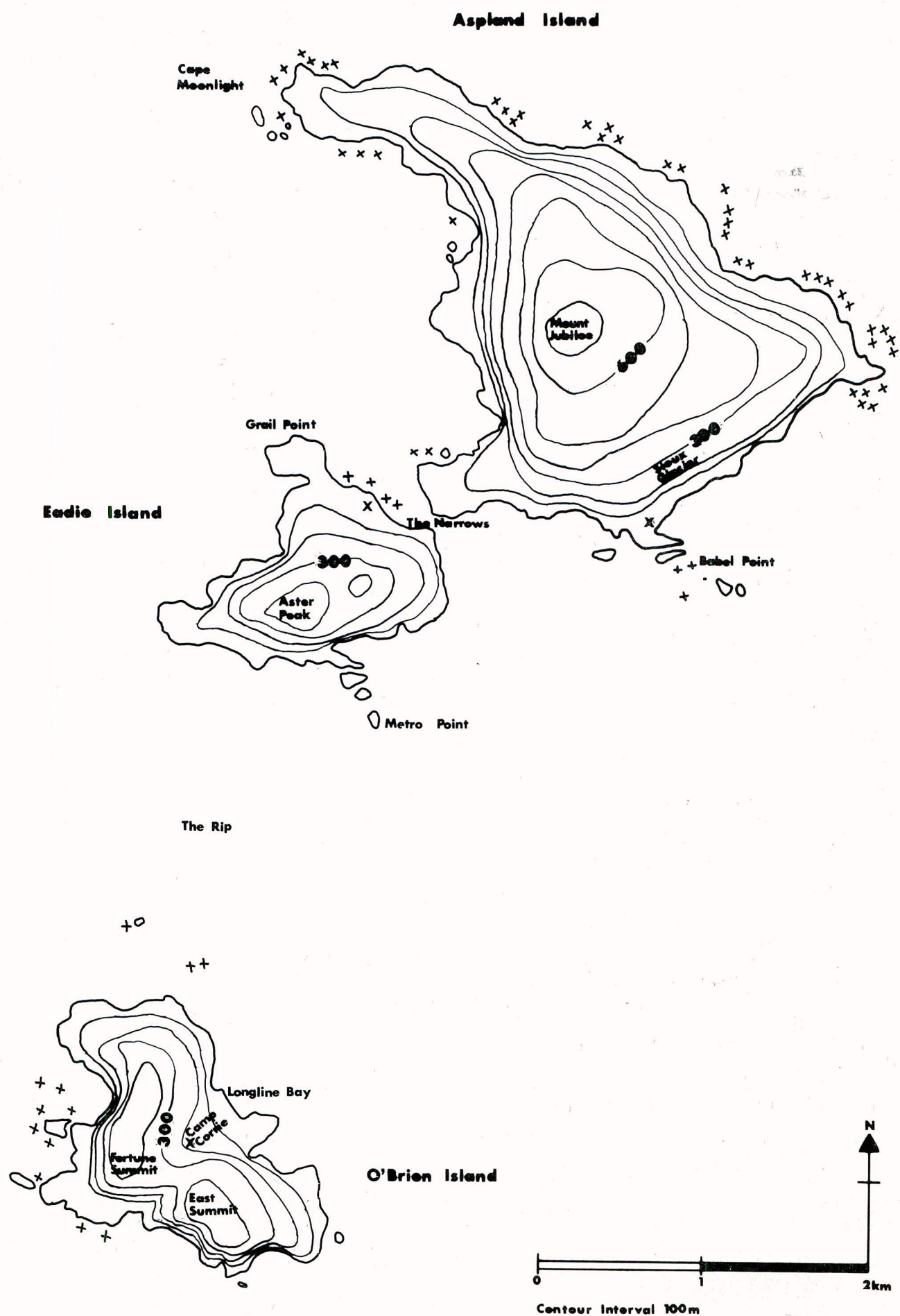
On 19 December Baylis and Simkins took advantage of clear weather to make the first ascent of Fortune Summit, the highest point on the map, and that evening we held our first Sunday prayers. Next day we took the canoes out for the first time, paddling a little way to the NW. Later Brown, Milne and Mogford set a long line of baited hooks from the raft while Hallpike and Martin tried to move NW along the shore but at one point Martin fell into the sea and a fixed rope had subsequently to be fixed at this point. By 21 December 12 fish had been caught and the scientific programme was progressing well, except that the lack of a spare tent prevented dissection for parasites and food samples, and that we had not yet managed to break out of the corrie to the rest of the island.

Christmas Day was a holiday and after Martin, resplendent in cotton wool beard (attached with jam) and festooned with jingling karabiners, had distributed cakes and other goodies we held a short carol service and spent the rest of the day building a Cresta Run for "polybagging" and holding sheepdog trials with some non-breeding penguins. Bad weather followed but we sorted stores and prepared canoes in readiness for a crossing to Aspland on 28 Dec. The tide rip dictated our departure time and unfavourable conditions at the critical time prevented our leaving for several days though further work on shore could, and did, proceed. In particular, iceberg observations were made, another attempt to reach the SE was repulsed, the first edition of the "Gibbs Party Gazette" was published, ice climbing on the corrie headwall was filmed and, on New Year's Day, Baylis and Simkins made a last determined effort to reach the east summit. This involved delicate climbing on near vertical brittle ice which was often detached from the underlying rock and rated grade III or IV. However, about 7m from the summit the way was barred by bulging ice mushrooms and deteriorating weather forced a retreat but not before determining that this peak may be 10m higher than Fortune Summit. Snow and high winds continued throughout the next day. Hogmanay, meantime, had been celebrated with a feast in Milne's and Mogford's tent, a bottle of Teacher's Highland Cream being much appreciated (this, with its brother on Clarence, was the only potable alcohol brought to the islands).

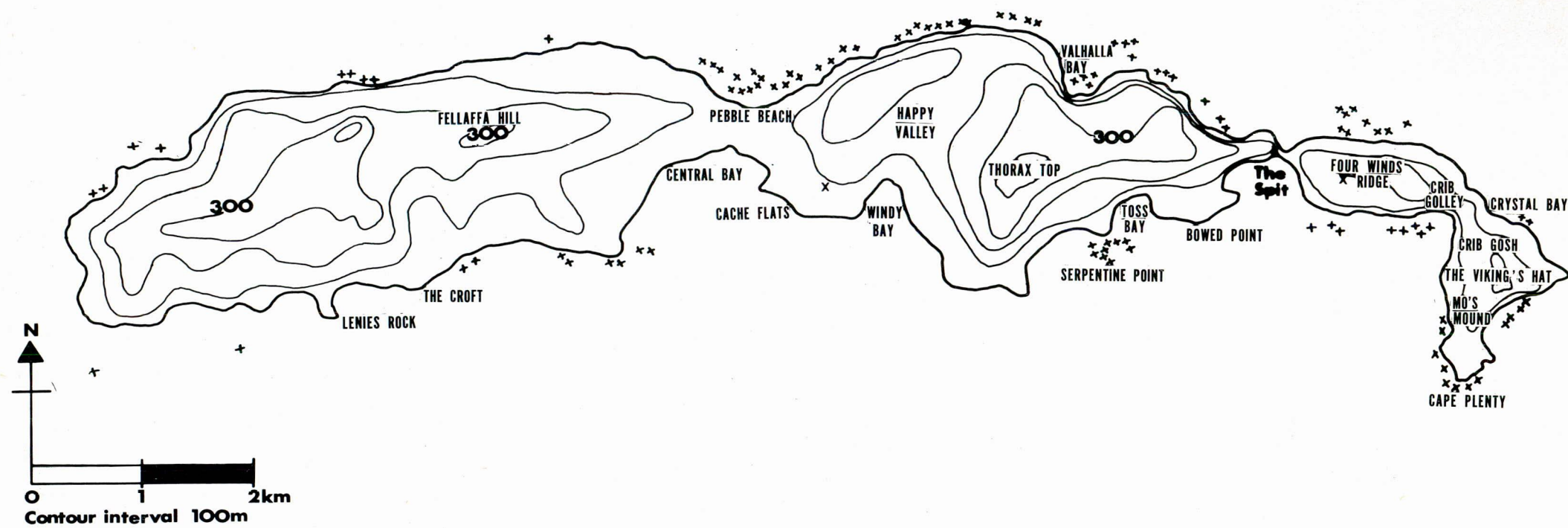
CLARENCE ISLAND



THE ASPLAND ISLAND GROUP



GIBBS ISLAND



Eventually, on 3 January we were blessed with suitable conditions for canoeing to Aspland. We set off in 2 heavily laden rafts (James K Caird/Scaf and B Baggins/Tarka) each with 3 crew, and Mischief with 2 paddles and an internal load. Despite skirting round an iceberg grounded off Eadie, the point to point distance of 4Km was covered in exactly one hour. The James K Caird was swamped while landing west of the spit on Aspland but was recovered and the crossing completed successfully. This and the longer coastal journey made by the Clarence party that same afternoon were probably the first canoe journeys in the Antarctic, and were certainly the first unsupported canoe passages there. They will not be the last.

Because the time left before 8 January was now too short for the consecutive exploration of Eadie and Aspland Islands we had arranged to split into 2 four-man parties on landing and this we now did, Baylis' party of Simkins, Milne and Martin remained on Aspland while Brown, Hallpike, Mogford and I made ready to leave for Eadie that evening in Tarka/B Baggins.

EADIE ISLAND 3-5 JANUARY 77

On leaving Aspland we motored through the 20m wide narrows between the 2 islands against the flood stream and landed on Eadie on the only beach found last season by HMS Endurance. After pitching one tent on the only available space we explored clockwise round the shore until halted by the main icefall in the SE.

Next day Mogford led the party on the first ascent of the summit of Eadie Island by the gully running straight up from the camp site. On the way down we explored the NW ridge and shore but were unable in the available time to reach the food cached on Grail Point.

On 5 January, after Brown had made a very interesting geological collection, we launched the raft to reconnoitre the NW cape of Aspland, but were driven back by a rising south-westerly and swell. We therefore shot the narrows on the flood and brought Tarka/B Baggins through an exciting gap in the rocks to land on Aspland on the west side of the spit at Babel Point.

ASPLAND ISLAND 3-8 JANUARY 77

After portaging the canoes and kit from the landing beach Baylis' climbing party pitched tents by the unexpectedly spacious beach between the spit and the main glacier to eastward. Early next morning they set out over the glacier snout and above the coastal cliffs to gain the E ridge. Baylis and Simkins led Milne and Martin respectively on separate ropes up a steep ice slope, taking 3 hours to reach the snow bowl above Sioux Glacier. By 1600 hours they had reached the shoulder below the heavily mushroomed summit ridge then Milne was attacked by cramp again and could go no further. To keep an experienced climber on each rope Baylis stayed with him while the other pair made an attempt on the summit. After some difficult climbing in thick cloud and high winds Simkins made the first ascent, but, having long overstayed their estimated time they then had to return, denying Martin his true reward for some courageous seconding. Reunited again after nearly 3 hours the four descended the ridge, reaching the beach at 2200 hours and finally getting back to the tents at 0100 hours next morning having been caught by the tide. They were exhausted after a hard 17 hours and a very well earned success.

5 January was spent recuperating, helping pitch the Eadie party's tents and building a snow wall to protect the tents from the rising SW wind. That evening Simkins made radio contact with the Clarence Islanders for the first time, with excellent 2-way communication. The following 2 days were spent exploring as much of the island as possible with most of the party getting around the shore beyond the narrows to a cliff where even the use of waders proved fruitless. In addition, Mogford and I visited the E point and examined the N coast from the E ridge. On the afternoon of 7 Jan 2 Chilean Naval helicopters fitted with floats paid us a totally unexpected visit; they were very friendly but had little time so our reception committee did not learn the name of their ship.

Radio links with the MS Lindblad Explorer, through Chuter on Clarence began at 1000 hours on 8 Jan and were maintained at hourly intervals thereafter. On learning that she would not arrive until 1730 hours, when a northward tide rip would be running off Aspland, I asked that we should be transported to Gibbs on board, and her Captain generously agreed. She hove-to a mile offshore and we canoed out to her. In the rising seas the crews of the heavily loaded rafts got very wet and it took over an hour to get all the kit and canoes on board but we were eventually successful and bade farewell to Aspland.

GIBBS ISLAND 8 JAN - 14 FEB 1977

'Lindblad Explorer' was sheer fantasy; overwhelming hospitality, popping flashbulbs and filthy explorers in wetsuits dining from immaculate table linen. Two hours later reality returned when the ship's zodiacs landed our kit and we canoed ashore to Gibbs Spit, while the "other world" steamed away to the south. After securing the canoes we climbed to the crest of Narrow Isle where we established camp at 200m and finally turned in, well satisfied, in the small hours. The crux of this half of the expedition had been successfully completed.

9 January was spent quietly ferrying food and fuel up to the camp via a disgustingly dirty penguin ladder which was subject to frequent, spectacular stonefalls but which we had to use daily throughout our stay. Next day a blizzard confined us to the tents, but on 11 Jan Mogford seized a half chance to set both trammel nets in the bay south of the Spit and these subsequently yielded 2 dozen fish of 3 different species. The Spit, though it was the best fishing beach the island had to offer, was far from ideal, being a 100m long, narrow strip of shingle joining Narrow Isle to the rest of the island and forming a dumper beach on each side. Any wind created a steep swell on one side and surf on the other as it funnelled through the gap and this severely handicapped the fishing programme. This, in turn, tied us down to waiting for rare opportunities and so restricted our exploration of the island.

Narrow Isle, east of the Spit, consists mainly of scree, loose rock and a few snowfields, reaching 300m at only one point; it's attraction as a campsite lay only in its proximity to sites of scientific interest. West of the Spit a glaciated ridge of between 300 and 400m runs westwards with only one low point at Central Bay. The north coast consists mostly of unstable scree slopes with a few vertical cliffs and icefalls while along the south coast there are



Eadic Island. By canoeing through the Narrows on the right to the only landing place access was gained to these snow slopes from which a gully led to the summit.



O'Brien Island. From the summit ridge the tents are visible 100m above the beach on the snow. In the distance Gibbs Island glistens in the sun.



First Antarctic canoe journey. Halfway from O'Brien "Mischief" paddles past a grounded iceberg beyond which is Aspland Island (734m), our destination.



Campsite on Aspland: a wall of snowblocks protects the tents from the wind. The summit route leads over the glacier beyond.

a few bluffs interspersed with glaciers. Our aims here were almost entirely scientific and by 13 Jan the various programmes were well under way.

Storm force winds on 14 Jan confined us to the tents and sent surf right across the Spit at high tide, sweeping away Hallpike's tide gauge. The poor weather continued with thaw conditions (+7⁰C) and more rain with the result that some of the tents were left poised on 3' snow plinths whilst others sat in melt pools. On 17 Jan the sea was still too rough for canoeing but Mogford managed to catch more fish from the shore and Hallpike, having set his spare tide gauge to work, waded out to recover the old one whilst Milne secured him with a rope from the shore as though fishing for the local leopard seal with human bait. Martin and Simkins, meantime, confirmed that there was a route to the southern tip of Narrow Isle but could not follow it right round as they did not have waders.

Though the scientific work was falling behind schedule as a result of the bad weather, enough had been done to confirm that Gibbs was of great interest from several standpoints so I decided to transfer to Elephant Island in February with HMS Endurance rather than on 26 January with "Lindblad Explorer". We heard on the radio at this stage that HMS Endurance would pick us up from Elephant one week later than originally planned and this was most welcome in the light of the new Gibbs transfer date.

Not until 20 Jan did Mogford, Milne and Simkins snatch another opportunity for fishing, their first in 8 days, and this was celebrated with a "summit brew" at which everyone tried fried penguin taken from one of the birds killed as part of the scientific programme: like roast sirloin of beef was the general opinion. The next day Baylis, Martin and I took a tent over to the food cache at Central Bay to explore the island's west end. The journey, over soft wet snow and mostly in whiteout conditions took 5 hours. Our first day at the cache was spent studying the large snow-free area around Central Bay but the following day was washed out by rain and snow though the storm offshore largely passed us by. On 24 Jan we set out on the ridge walk to the island's western extremity but after reaching the first top at nearly 400m decided to carry out penguin counts at 2 nearer points because of bad visibility, sleet and rising wind. Soon afterwards, while descending together on hard ice Baylis fell, pulling off Martin who slid some 40m, colliding with me en route. As well as being shocked Martin was bleeding quite badly from cuts on his face and elsewhere. Baylis applied efficient first aid to these and to the hole in my wrist where Martin's crampon had buried itself and we returned to the tent. The following day we struck camp, left the tent at the cache for the next party and returned to base camp for treatment by Milne.

Meanwhile the 5 at base camp, led by Milne had had a hectic 5 days. On 21 Jan they had brought in a catch of 45 fish and had then spent a less successful day filming. Next day, 23 Jan, winds which were off the scale of our 60 knot anemometer and which were estimated at 80 knots (hurricane Force 12) struck the camp. That night Simkins looked down on the Spit and saw that the surf was washing right across it, carrying with it stores and work tent. With Milne, Hallpike and Mogford he hurried down and, after ensuring that the canoes were secure, all 4 donned waders and with arms linked waded through chest-high surf to the stores, most of which they salvaged and dragged up to the rockfall amongst the penguins. This

desperate work took over 3 hours so it wasn't until 0100 hours that, with the storm unabated the 4 recrossed the Spit and returned to camp. During this storm a 3m long steel beam from a wreck disappeared completely from the Spit yet the tide gauge continued to function and some kit even got washed back onto the beach the following day. The next evening a message was received from our patron wishing us better canoeing weather - unfortunately without any noticeable result.

On the morning of our return from the cache Milne fell on loose scree and put out a cartilage, locking his knee. The other 4 carried and sledged him back to the camp where, after tending to Martin and myself, he administered to himself. Fortunately, the knee relaxed overnight but the injury confined him to the immediate area around the camp for 2 weeks. On 26 Jan force 12 winds struck the camp again and Simkins heard on the radio that Lindblad intended going direct to King George Island because of the bad weather so my pre-arranged lecture to the tourists aboard her never materialised. After this storm Baylis repaired damage to several of the tents which were now showing distinct signs of wear, particularly along the flysheet ridges. Also, the stores were now retrieved from the rockfall, sorted, and lashed down on the most secure part of the storm beach. That evening a large trawler or whale catcher passed about 4 Km south of Gibbs heading east.

Fine weather dawned on 28 Jan so Martin, Hallpike and Simkins journeyed to the cache, returning the same evening with 30 man-days rations and some kerosene to last us until Endurance's arrival. (Since 18 Jan, every fifth day no rations had been issued, each tent using up any accumulated surplus; this proved no hardship because the food was of very high standard and the arrangement was continued until rations were exhausted on 11 Feb). On the way over, their altimeters indicated that the highest point on this part of the island was some 100m higher than the map showed.

Our Arctic Pyramid tents, which had been obtained from the 1972/73 JSE to Patagonia, had been surveyed and repaired by Rosyth Dockyard but were now badly torn and so rotten as to make repair useless. Baylis now sewed the outer valance onto one of the inners which was then erected as a radio tent and proved very effective.

On 29 Jan Martin celebrated his 29th birthday in style after another day of poor weather. Next day was too rough and windy for fishing but was a good drying day and developed spontaneously into a holiday for "make and mend". Milne took this opportunity to publish the third edition of the "Gibbs Gazette".

On the last day of January Brown and I went to the Southern Cape, first climbing Viking's Hat, then using waders to progress along the beach. Our return was held up by the tide and surf until 2300 hours when Brown led what amounted to a roped swim, having first discovered some interesting and very lovely conglomerate rocks on the beach. We came back over the island in darkness, making some interesting observations on the diurnal rhythms and nesting distributions of 3 petrel species on the way and finally reaching the camp, exhausted, at 0400 hours.

Mogford, Hallpike and Simkins managed a fifth day's fishing next day in poor conditions. After setting a trammel net and longline they used the Agassiz trawl for the first time and were rewarded with a



Gibbs Island. Macaroni
Penguins guard the route
from the camp down to
the Spit beyond.



Gibbs Island. Martin being
attacked by nesting Skua on
South coast.



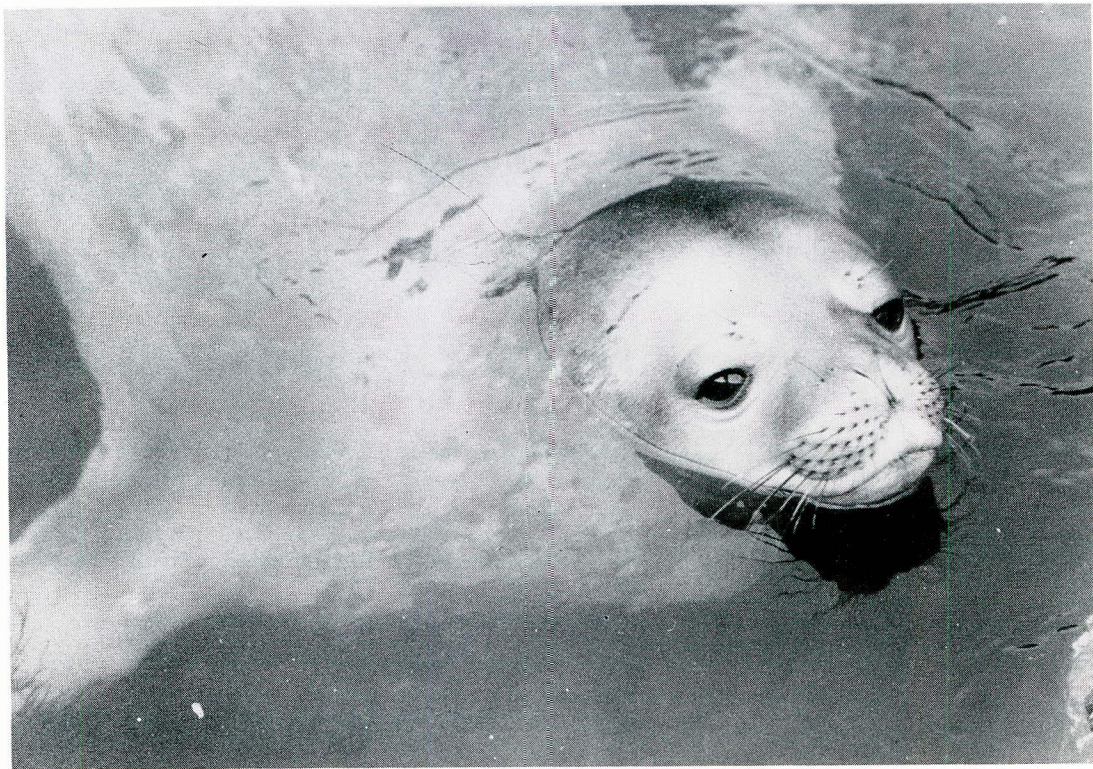
Gibbs Island. Surf assaults
the Spit from the south bay.



Gibbs Island. The Spit awash.
Base camp lay beyond the notch
in the skyline.



The Wilsons Storm Petrel nests underground in scree. Its strictly nocturnal relative, the Black-bellied Storm Petrel, has been found breeding in large numbers only on these islands, by the two JSEs.



A curious Weddell Seal inspects the photographer.

hundredweight of stones and a solitary plunderfish but the longline and net yielded 40 fish including one example of a fifth species. This work was carried out in marginal sea conditions which almost resulted in the raft's broaching when returning through the surf.

Later Martin, Simkins and I made our way to the cache in order to cover more of the island and on the way across we noticed groups of Antarctic Petrels flying around the cliffs, temporarily raising our hopes of finding the most northerly colony of this species in existence. We also carried out altimetry at 3 points on the ridge, the results suggesting an error of 100-150m on the map. After a day spent exploring to the east of the cache and another spent sheltering from a blizzard we set out in squally weather to traverse the ridge to the west but were forced to turn back by the extreme avalanche risk on one unavoidable section of the route. The need to return to the Spit to prepare stores for recovery by Endurance meant that this western third of the island had to be left unexplored.

Back at the Spit, meantime Hallpike's tide gauge had finally ceased functioning but not before yielding what is probably the first adequate tidal data for this whole region.

On 7 Feb we heard on the radio that Endurance would arrive off Clarence that night but, in the event, it was not until pm on 9 Feb that she arrived off Gibbs so the intervening day of fine weather was wasted. I went aboard that afternoon and, after agreeing that the first priority should be to recover the stores from the other islands, I returned to the Spit to organise the striking of the camp and the final move down to the beach in readiness for lift-off later that evening. I also took ashore the mail and our first news from Clarence for 3 weeks.

We had no inkling that our worst 5 days were about to begin.

It began to snow before Endurance returned so, as darkness fell, we pitched the 3 Arctic Pyramids (2 of them being modified inners only) on the small area of beach that was out of reach of normal waves. We could not make radio contact with the ship that night so, in the morning we carried out the stores for the helicopters but bad weather and Endurance arrived together, and another night was spent on the Spit. We still did not have radio contact so we carried out the boxes again the following morning but after a reasonable start the weather deteriorated and waves began to break right over the Spit, threatening the campsite itself. The site itself backed onto a rockfall inhabited by penguins so it could not be moved and we had to build ramparts of rocks to keep the sea at bay; even so, 2 were regularly awash and at 2300 hours one tent was moved onto a platform of boxes, the remaining stores being moved up into the penguin colony. Watches were set throughout that night's high tide.

Dawn brought no improvement in the weather and about mid-morning one of the Arctic Pyramids was flattened by a wave which soaked all the tents and carved away most of our ramparts. Baylis, Milne and Mogford now evacuated to a cave and it was while they were roofing their bivouac with a tarpaulin that Milne was struck by a large rock and severely concussed. With continuous rain accentuating the filthy conditions in the penguin colony they did well to complete the bivouac and treat our doctor. Meanwhile, despite new and bigger ramparts another wave rendered the Ultimate Pyramid unserviceable.

13 Feb brought fresh hope and the arrival of a helicopter was greeted with enormous relief but, to our dismay, it landed my pack (left aboard 4 nights previously) and a note from the Captain explaining why we might have to be left on Gibbs until March and requesting details of the quantities of fuel and food we should require should this prove necessary. This was the nadir of my morale, but the whole party responded remarkably well to this bitter blow. During that forenoon Milne alone was evacuated and we received 7 loads of food and fuel plus two tents. By now the rain was washing a slurry of penguin guano into the cave so Baylis and Mogford moved back into an Arctic Pyramid. The rest of us cached the food amongst the penguins and re-established radio contact with Endurance. I now tried every possible means of persuading the ship to pick us up, I even tried bribing the Captain with fresh Antarctic Cod caught by Mogford. That night, our fifth on the Spit, the seas subsided a little and we had a full ration issue to boost morale (normal rations had been exhausted 2 days previously).

Early on the morning of 14 Feb, to our delight, the ship's flight began to recover personnel, stores and even the canoes; thankfully we had carried the stores out onto the Spit for the last time. Once on board we were immensely relieved to learn that Milne had not sustained a fractured skull, as had been feared initially. Nevertheless, it was agreed that he should stay on board for observation, there being a good chance that he could be landed on Elephant Island to rejoin us when Endurance returned from her visit to the Falklands to assist the Foreign and Commonwealth Office. As things turned out this Falklands visit was "bad news" for the ship's hydrographic programme but "very good news" for Milne and the rest of us.

During the remainder of that day supplies were flown into cache f2 for Mogford's fishing camp, 2 canoes and assorted equipment were flown in to Dump F at the Refuge Hut and, in the evening, 3 canoes plus 7 bodies and their associated kit were landed at Dump E.

At last we were at Walker Point, to be welcomed by the 8 Clarence Islanders whom we'd not seen for 2 months; it was great to be all together again.

CLARENCE ISLAND
by Commander J E Highton RN

On Sunday 12 December, on a cold but sunny evening, HMS Endurance sailed between Elephant and Clarence Islands and for those of us who had never seen these islands before (all except Furse) it was an awesome experience. In the clarity of a perfect evening we could see the rampart of ice that was Clarence rising out of the sea to the east; this was to be our home for the next 2 months. Every ice bulge and crevasse was clearly visible across the eight or so miles of sea which separated us from the island and it was not difficult to imagine that there would be certain difficulties in moving about the west side of the island.

The next day was spent dumping stores on Elephant Island and that phase of the operation was completed by midday on 14 December, the ship subsequently moving to the west side of Clarence to establish dumps at Chinstrap Cove and Humble Point. After agreeing the sites during a recce flight the main dump was established on a mossy shelf 320 m above the sea about 2 kilometres south of Chinstrap Cove and the other just above Humble Point at about 70 m a.s.l.

An early start on 15 December saw 2 caches and our main dump at Cape Bowles quickly and securely established so that by midday the Clarence Island party of Highton, Chuter, Davies, Hunt, Hurran, Montieth, Turnbull and Wimpenny were ashore waving goodbye to HMS Endurance as she sailed westwards carrying the Gibbs party to the smaller islands.

We were all very excited to be ashore and my arrival was marked by a "guard of honour" of presented ice axes, a celebratory half bottle of whisky being consumed before settling in and starting to sort out stores and equipment for the tasks to come.

Our camp was made at 100 m on the moraine above Cape Bowles. It was a fairly flat and apparently sheltered place a good 400 m from the nearest penguin nest. Immediately to the west Mount Irvine rose majestically nearly 2,000 m above us and such was the steepness of the ground that it was obvious that the mountain would not be climbed from this part of the island. However, on Cape Bowles and the next point to the north wildlife abounded and it was clear that there was more than enough scientific interest to keep us all hard at work for the 3 weeks planned stay.

Between 16 and 19 December much progress was made exploring the local area, preparing for the various scientific tasks and practising such things as penguin nest counting, ice axe braking and front-pointing. The canoes were lowered down a 100 m high penguin ladder on the south side of Cape Bowles, launched and paddled round to a picturesque cove to the north of the point, which was well protected from the sea but was exposed to icefalls - it was the best we could find. All the canoeing and fishing equipment was manhandled down the cliff to the north of the point and we were all set to make a very positive start to the scientific programme. This was not to be, however, as on the evening of 20 December, less than 24 hours after celebrating Turnbull's birthday with a mess dinner in the open air, a steadily increasing wind arose from the south. By midnight two of the 4 Vango tents had been flattened with broken poles and a variety of minor tears in the fly-sheets. The storm passed through quite quickly and by

10 am 21 December we were able to assess the damage, which included 5 boxes being blown over the cliff, a pair of rafted canoes adrift in the cove beneath us and a third tent (an Ultimate Pyramid pitched by the beach) which had apparently "disappeared". All these items were later recovered from the cove, the only real damage being to some plastic containers which were smashed.

It took all day on 22 and 23 December to get everything back to normal and we were lucky not to have suffered worse. As a result of our experience tents and stores were really well dug in and dry stone walling erected.

On Friday 24 December a party consisting of Highton, Hunt and Montieth left for Sugarloaf to reconnoitre the routes to Mount Irvine and Cape Lloyd. It took them 13 hours in perfect sunny weather to cover the 10 kilometres separating the two points and such was the variety of height and slope covered on Clarence that this rate of progress was found to apply generally. On arrival at Sugarloaf the tent was pitched on a pebble beach just south of the point amongst a few penguins and a pair of Weddel seals. At this time the weather broke for the second time and, although it stayed quite warm, quite a lot of snow fell and there were strong winds for 2 days. Further exploration of the island on this occasion was not possible due to the snow conditions and, apart from the exploration of the area immediately surrounding Sugarloaf, little of importance was learned except that progress on foot around the island was a slow business, due in particular to the condition and quantity of snow. This party returned to Cape Bowles on 28 December to find that, not surprisingly, no fishing had been done and that the bad weather had also curtailed most of the other activities.

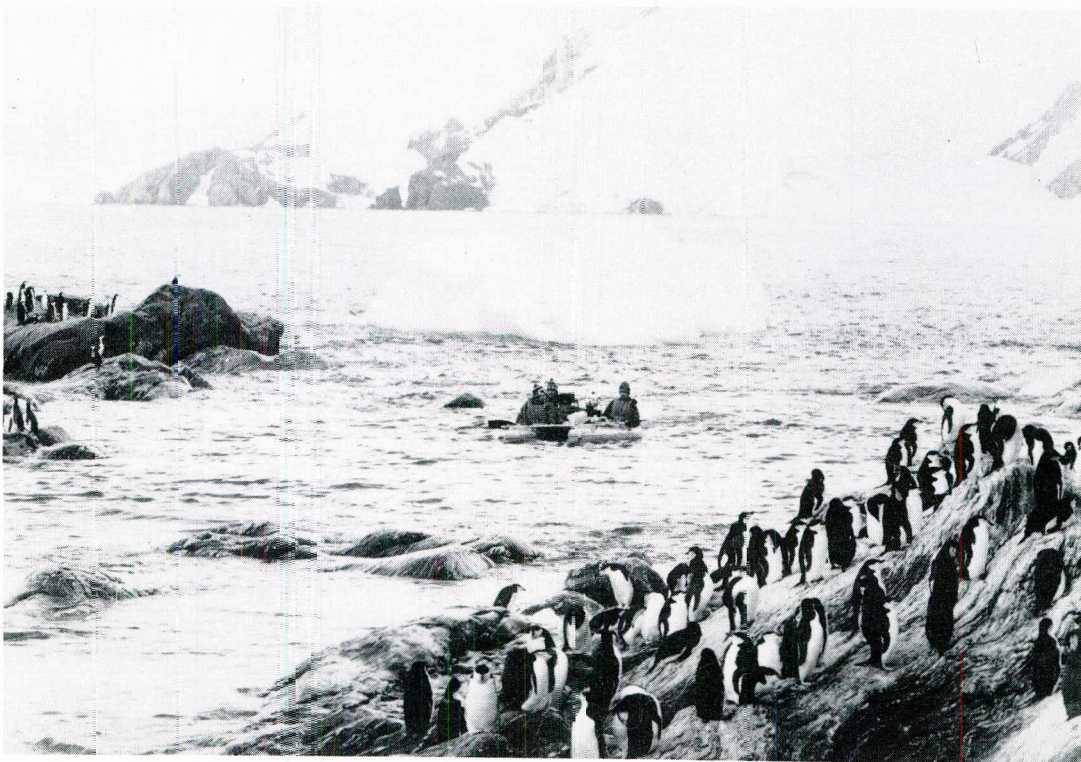
On 29 December it rained very heavily and part of the icefall 200 m above the camp avalanched spectacularly in the night. Apart from some penguin nest counting and kit repairs little was achieved until midday 30 December when a sudden improvement enabled a party to cross over the ridge leading up to Mount Irvine at 500 m and to drop down to a marvellous pebble beach on the eastern end of the precipitous south face of the island. Here it was estimated that some 20,000 Chinstrap penguins were nesting and we had our first encounter with more than the occasional seal - in fact there were 16 Weddells (including 3 pups) and a Leopard seal "hauled out".

The next day, 31 December, despite its being wet and blustery, provided our biggest fishing catch of our time on Clarence - a haul of 71 fish in an overloaded trammel net. So, our New Year's Dinner, enhanced by a bottle of whisky and an excellent "penguin stroganoff" prepared by Hurran and Chuter, was further enhanced by the feeling that the various scientific projects were really beginning to provide useful material.

The New Year started with heavy snow falling on 1 and 2 January but it wasn't cold and on the afternoon of the 2nd the snow turned to rain, washing most of the snow away at camp level. There had not been much wind and the sea was calm so it was decided to try and keep to our plan of moving to Chinstrap Cove as early as possible in the New Year by embarking in the canoes next day. In the event we were fortunate and, though the sea was not glassy calm and there were occasional snow flurries, we got packed up and under way just before 5 pm. Our journey of 12 kilometres was completed in 2 hours with no problems and we carried with us a veritable mountain of kit.



Clarence Island. Highton looks down to the coastal cliffs between Cape Bowles and Sugarloaf when first exploring the route in December.



Clarence Island. A canoe raft returns to Chinstrap Cove from an offshore fishing trip after visiting beaches further north.



Clarence Island. The two Ultimate Pyramid tents of a 4-man exploration party nestle above Craggy Point.



Clarence Island. Hunt and Hurran walk up from the penguin colony at Chinstrap Cove. Beyond the steep coastline stretches northwards.

We passed around Cape Bowles, then under the precipitous cliffs of rock and ice on the south face of Mount Irvine, round Craggy Point into a very quiet sea full of icebergs and brash ice. At Chinstrap Cove we found an apparently ideal beach, small and protected, and, after unloading, set off shortly before 9 pm for our camp at a height of 300 m 2 kilometres to the south. Due to the instability of the snow (sugar snow on top of ice) we had to make a big detour over the top of a ridge so we didn't get to the camp until well after midnight. However, that night saw us comfortably installed and the second phase was successfully started.

Our campsite near Chinstrap Cove was grandly situated on a level moss bed on the edge of a cliff and there were panoramic views of all the islands in the group whenever the visibility allowed. This side of the island was a trap for icebergs which passed back and forth with great regularity and it also seemed to get more sun than the east side of the mountain. There was also a large area over which one could move fairly freely on foot (from a mile north of Chinstrap Cove right down to Craggy Point and inland to the steep ice slope leading up to the Ravelin Ridge and Mount Irvine). It was here that we first tried skis and they were to prove a great asset from then onwards. Several minor expeditions in the immediate area were made getting used to skis and 2 high points (Mummy Bear 650 m, Baby Bear 570 m) and Bear Ridge were climbed on ski.

The main priorities at this stage were to forge ahead as quickly as possible with the fishing and plankton programmes and to make an attempt to climb Mount Irvine. On 5 January fishing got under way satisfactorily though there weren't many fish about and while this progressed over the next day a party went up onto the ridge behind the camp to spy out a route up Mount Irvine, which uncharacteristically revealed itself from top to bottom. A route was seen and a plan for the assault immediately formulated. On 8 January, a fine, very hot day, a party consisting of Monteith and Wimpenny led by Highton, set out on ski crossing the ridge behind the camp at 600 m before moving across the glacier to the bottom of a steep, not too heavily crevassed slope to the east of Chinstrap Cove. This slope took the party up to the edge of a plateau at 1,350 m upon which the final 600 m of Mount Irvine stands. At the end of that day, some 13 hours after setting out, the party was comfortably en-tented in a crevasse 30 m below the plateau, having climbed the whole way up on ski. The next day dawned clear and sunny but by 10 am cloud had enveloped the plateau. Not to be outdone, we set off for the summit in little wind and on good snow, donning our skis as soon as we had clambered out of our crevasse campsite. The visibility, despite the cloud was about 100 m and we made reasonable progress under the ice cliffs to the west of the summit moving southwards and climbing steadily. After $2\frac{1}{2}$ hours we rounded the end of the ice-cliff and were able to head northwards for the summit which we reached in bitter wind and fast reducing visibility some 5 hours after setting out. It was too cold to linger on the top so we set off back down, unable to retrace our tracks as they had been obliterated by spindrift. At 7 pm we were forced to camp again in a crevasse, having arrived at a point where the mountain seemed to drop away steeply in front of us.

The next morning was 10 January and we woke early as I was keen to get a glimpse to indicate our whereabouts. At 5 am and 7 am

whiteout conditions prevailed with a fair amount of wind but shortly after 8 am we caught sight of the Ravelin Ridge which showed us that we were, in fact, over the headwall of the glacier leading down to Sugarloaf. We packed up quickly and in steadily improving conditions recrossed the plateau westwards and got onto the steep slope taking us back down towards Chinstrap Cove and thence back to our camp arriving there at 1730 hours to find Chuter and Hunt waiting.

While we had been up on the mountain the remainder of the party had set up camp on the small beach at Chinstrap Cove. This was done in order to make the most of any opportunity to fish and collect plankton samples. They had not had much success because of wind and had lost the trammel net in an unexpected trench on the seabed. Because of this considerable time had been spent observing Leopard seals and penguins so the time had by no means been wasted.

The fishing party returned to the main camp on 12 January and next day was spent cleaning, mending and preparing for a 3 day expedition to the south west tip of the island by Davies, Chuter, Wimpenny and Monteith. The planned move on Friday, 14 January was thwarted by a particularly vicious storm which flattened 2 of our 4 tents and soaked everyone. By the time the storm had blown itself out some 24 hours later in the early hours of 15 January we were all a little miserable and our visit to the cove later that day didn't improve matters. All but one of the canoes had been damaged (one of them being broken in two) and the work tent had been blown into the sea and its contents spread far and wide. Much was recovered, including the tent, but the storm had plainly set our plans back at a time when we could ill afford it.

The party exploring the south west end of the island finally set off on 16 January leaving the remainder to repair canoes and, if the opportunity arose, to visit Humble Point by canoe. During a successful 3 days around Craggy Point, Davies and his party visited the penguin colony just south of Lunar Glacier, climbed the Ramp (an 800 m peak not recorded on the map of Clarence Island) and visited Craggy Point and the beaches to its north, returning to camp on 19 January.

In the meantime, having patched up the canoes, Highton, Hunt, Hurran and Turnbull attempted to get to Humble Point but were defeated by high winds and brash ice. The combination of wind and ice caused considerable damage to one canoe when the raft was driven on rocks at the entrance to the cove. On 18 January we made the first ascent of the Horn (400 m) a very spectacular rock peak between 2 glaciers immediately north of Chinstrap Cove.

Thursday 20 January was spent packing up stores ready for collection by Endurance in February. Later on that day the canoe party of Davies, Hunt, Wimpenny and Monteith were moved down to the cove to await suitable conditions for canoeing round the south of the island to Sugarloaf. Meanwhile Highton, Chuter, Hurran and Turnbull returned to the camp ready to set off for Sugarloaf overland, hopefully ascending Mount Irvine on route.

We set out the next day in reasonable weather, but making rather slow going because of inexperienced ski-ing. Nevertheless, by the end of the day we were well installed at the foot of the 800 m

slope leading up to the plateau. The next day in deteriorating conditions, this slope was climbed partly on ski, and after 9 hours we camped again in the same crevasse as on my previous trip, only this time in very blustery conditions. On 22 January, in wind and hazy sun, we clambered onto the plateau below the 600 m climb to the summit in reasonable visibility and I decided to try and reach the top from the north east (Mitre Ridge). We made very good progress up to 1750 m before being hit very suddenly by immense winds sweeping down the face of the mountain. After trying to retrace my steps in zero visibility we had to call a halt and some 6 hours later we were comfortably installed in a large snow hole at 1700 m. Here we spent 2 nights and the intervening day while the wind howled outside. The morning of 25 January saw the storm blown out and, in occasional sunshine and good visibility, we made our way down onto Stamina Glacier and then to Sugarloaf, arriving there to find the wind blasting down the ridge onto the point. We eventually managed to get our tents up and once again found ourselves stormbound for 2 nights, though this time with plenty of food.

During the afternoon of 27 January the clouds cleared, though the wind continued, and it was very cold with bright sunshine. Highton and Hurran went to explore a point 2 kilometres north of Sugarloaf and found a marvellous sheltered beach inhabited by a wealth of wildlife, including 50 fur seals. It was an ideal camp-site and so relieved were we to find such an improvement on Sugarloaf that our spirits were much uplifted and we resolved to move our camp down there without delay.

Davies and the canoe party had still not arrived (no surprise considering the weather) so, because time on Clarence was running very short with the whole of the north end of the island still left to explore, I decided to go to Cape Bowles to meet them. I could then ensure that, should they have got that far, they would not try to bring the canoes up to Sugarloaf where the beaches were few and far between and unsuitable for landing. So, on Friday 28 January Highton and Chuter made a rapid trip to Cape Bowles in really good snow conditions, arriving there some 7 hours later. We were much relieved to find Davies and company well installed there. They had apparently had a very exciting journey round to Cape Bowles from Chinstrap Cove on the previous Saturday. The canoes had leaked badly and they had encountered very heavy downdraughts off Mount Irvine on passing round the south side of the island and the weather was so bad that there was no question of going beyond Cape Bowles. Once at Cape Bowles they had repaired the canoes and waited vainly for better weather, then on 27 January had set out for Sugarloaf on foot but were forced to turn back when one of the party developed back trouble.

It was then 29 January and three quarters of the party were at Cape Bowles and 2 just north of Sugarloaf. With only 10 useable days left on Clarence Island and the area north of Fur Seal Point scarcely looked at I was very keen to get everybody moving as quickly as possible. Unfortunately Chuter had slightly damaged his ankle in a minor fall the previous day and could not travel immediately so I took Wimpenny and Hunt to Fur Seal Point on 29 January, an exhausting 9 hour trip. Davies, Chuter and Monteith were to follow the next day.

Hurran and Turnbull had made good use of the 2 days I had been away at Cape Bowles and had collected much valuable data on the birds at Fur Seal Point, including a 24 hour observation of Chinstrap Penguin movements. After a rest day, at the end of which Davies and company failed to arrive as expected, I could wait no longer and on 30 January I set out, with Hurran and Wimpenny, northwards on ski. After a brilliant sunny day of good ski-ing and a fascinating clamber down through some superb seracs we camped at Serac Point and counted birds and seals before setting out next day for Cape Lloyd. Here we encountered a real problem; getting up from Trident Glacier onto a 500 m shelf which was the only way around a steep ridge leading up onto the Ravelin Ridge. The only possible route lay up a steep avalanche gully at the south end of the ice cliff and to the north of a steep, heavily crevassed slope under the Trident Ridge. Much debris had fallen down this chute which was also full of new crevasses at the top. It was with great relief therefore, that we reached the top and skied away to the north. An hour and a half later we arrived at the food cache by Cape Lloyd in driving rain.

Wednesday 2 February was a dull day with intermittent rain turning to snow showers. The cloud was down at 150 m but, having waited until shortly after midday for some improvement we set out to climb Jubilee Peak, visiting Cape Lloyd itself on the way. We were very surprised to find a gas-powered light beacon installed on the point by the Chilean Antarctic Research Vessel "Piloto Pardo" on 19 December. The light was not working and it is difficult to imagine its use.

At 3 pm we set off up Jubilee Peak. The route took us up the narrow ridge to the east of the peak and we had no difficulty finding our way thanks to the precipitous cliffs falling away to the north and south of us. In places the ridge is no more than an overhanging cornice and in several other places ice mushrooms straddle it. The only one to cause any difficulty had fortunately split down the middle along the line of the ridge and this afforded us an interesting scramble onto its top some 70 m higher up. From there the ridge levelled out before rising up to the summit mushroom on top of which we stood at 5.30 pm, 680 m up. At this juncture it started to blow quite hard and with the wind came heavy snow. We didn't get down until nearly 8 pm but it was a most satisfying first ascent.

Much snow fell overnight but, though quite windy, it was very cold so our plan to return to Fur Seal Point via the Ravelin Ridge looked as though it could be followed in good snow conditions. The visibility was very poor - mist down to sea level - so we waited until shortly after midday and set out with the cloud base at about 800 m. Good progress was made up the ridge on ski to 700 m when we reached cloud and a much steeper slope simultaneously. We put on crampons and progressed along the mushroomed ridge at heights varying between 700 and 1000 m before coming to a very big mushroom which blocked the ridge. In the mist we could see no way round it so we camped at its base at 750 m just before 10 pm. We had a very comfortable night with no wind (fortunate because our position was an exposed one) and again had to wait until just after midday for good visibility. This came in fleeting glimpses and I found that we were able to skirt the east side of this obstacle for about 70 m before clambering back up to the ridge. From then on the cloud

lifted from the ridge frequently and we had some superb views along it. During the rest of the day we progressed steadily, crossing mushroom tops at up to 1300 m before having to drop down to the southernmost arm of Trident Glacier because it was getting late. We arrived at Fur Seal Point at 10 pm on Friday 4 February. So ended a most exciting and rewarding trip around the north end of the island leaving unclimbed only the highest point on the Ravelin Ridge - not a problem of any sort from the northern side.

On our return we found that the remainder of the party had arrived on 2 February having spent two and a half days between Cape Bowles and Fur Seal Point. During the evening of 29 January there had been a very heavy fall of ice down into Tasman Cove destroying 2 canoes and badly damaging the remaining 2. Much of the fishing equipment had also been scattered about and some fish samples had been lost. Davies and his party spent 30 January sorting out the mess before setting out for Fur Seal Point the following day. They found the going very hard and were forced by this and poor visibility to camp twice en route.

HMS Endurance was due to arrive on 8 February and it was now time for us to move back to Cape Bowles and prepare for our move to Elephant Island. An attempt to get back by Highton, Hunt and Wimpenny on 5 February was foiled by the very heavy wet snow which had fallen to a depth of well over 30 cm rendering at least 4 of the slopes we should have to cross avalanche prone. So, we returned, hoping for a hard frost that night. It continued to snow, however, and by 7 February there was no chance of getting to Cape Bowles before Endurance arrived, so we moved camp up to Sugarloaf where it was hoped we could be easily sighted and picked up.

In the event Endurance appeared from the south shortly before midday on 8 February and we were successfully lifted off. 5 of us were landed at Cape Bowles to prepare stores for shipment, Davies Hunt and Wimpenny remained on board to prepare for their landing on Cornwallis Island that evening and eventually Chuter, Hurran, Monteith and Turnbull were landed at Walker Point along with their stores from Clarence.

The next 3 days were spoiled by poor weather in the form of fog, snowstorms and heavy wind. The ship's flight had managed to pick up the outlying dumps on all except Gibbs Island and Saturday 12 February saw the Cornwallis Island party and myself transferred to Walker Point.

Davies and his party had spent an exciting few days on Cornwallis. Despite their precarious campsite (an Ultimate Pyramid perched on a melting snow platform on a 30° slope) they had managed to climb very nearly to the top of the island (they reached the northerly mushroom top at 440 m), observed birds and seals and made a brief geological survey in which samples of very young granite were found. Their stay was protracted by the bad weather and they were relieved to be picked up and transferred to Walker Point.

A further 2 days elapsed before the Gibbs Islanders were landed at Walker Point on Monday 14 February; it was very good to see them.

ELEPHANT ISLAND 8 FEB-13 MAR

by Cdr J R Furse RN

After the full team, less Milne, had gathered at Walker Point, the weather smiled on us for several days. The sharp peaks of the Pardo Ridge a couple of hours journey away across the white expanse of the Stadium Glacier provided a magnificent backdrop to the camp. Such spacious surroundings were a novelty for all of us, as also were the lack of penguins and the presence of moss under our beds instead of scree or ice. Indeed the whole point was comparatively verdant with moss and lichen in abundance besides some grass and another flowering plant. Tentage was arranged so that specialists shared with their opposite numbers from the other party so as to make the best use of the very brief time available for getting to know one another again.

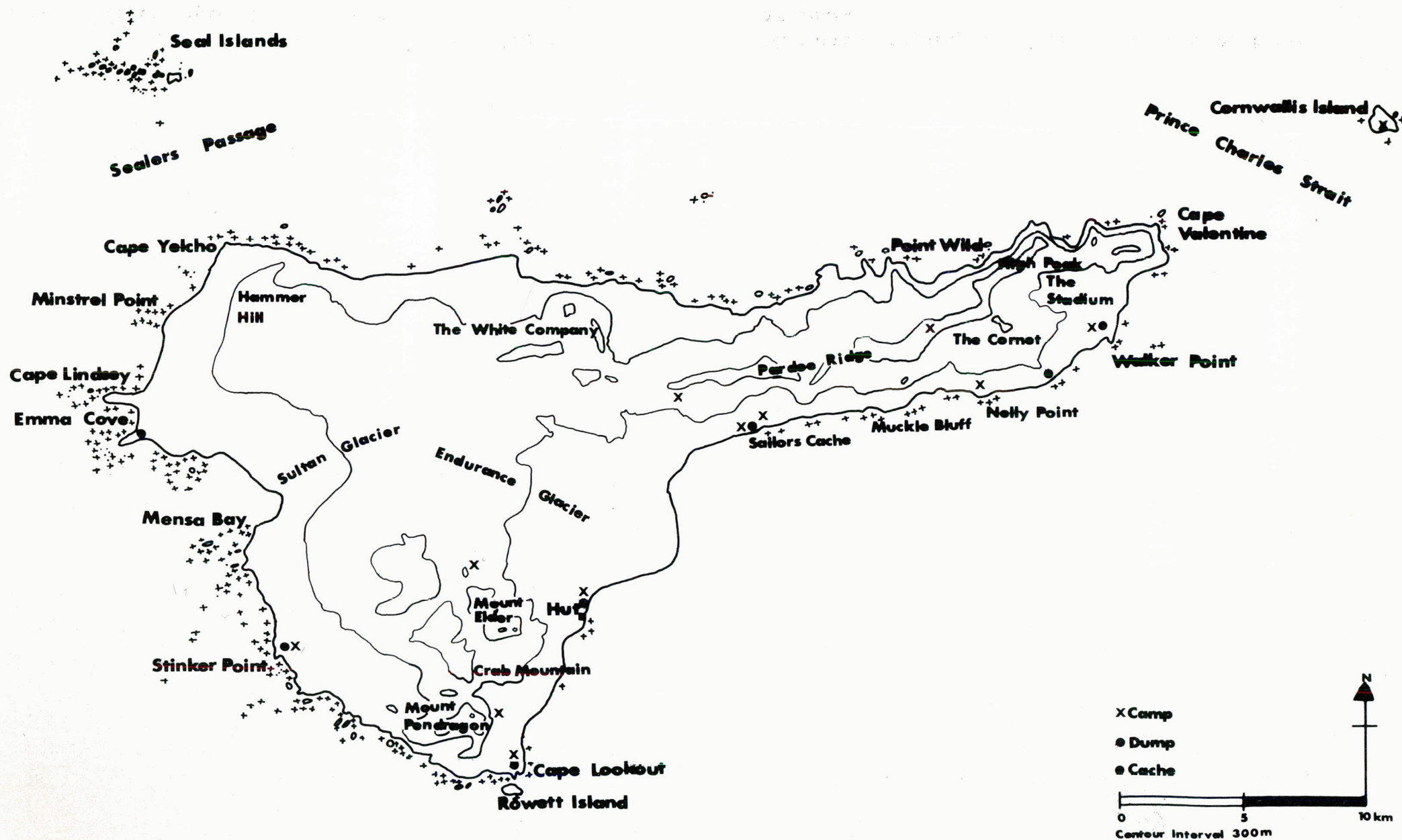
The day after the arrival of the Gibbs Party, Simkins joined Highton, Hurran and Wimpenny to reconnoitre a fine unclimbed peak, the Emblem, at the east end of the island. In the meantime Martin Monteith and Turnbull organised the others to build a magnificent drystone "Christmas House".

16 Feb had been chosen as the Expedition's official Christmas Day and after a very civilised start the festivities began with a short service followed by a feast prepared by Martin and Monteith. This began at lunchtime, recommenced at tea time and continued at supper time after a break for the sods' opera. Both parties produced a number of sketches for this event including "Highton's Performing Maggots", "The Saga of the Clarence Mungsucker", "Vango Morris Dance", the winning sermon from the "Vicar of the Expedition Competition" and many others. The staff of the Victualling Depot at Woolston had not only provided magnificent fare but had also knitted hats and scarves for each member; these, together with presents from home helped make a very convivial evening despite the bitterly cold wind.

Next day 3 parties of 3 left for the Refuge Hut. After walking for 10 hours across the glaciers and negotiating a difficult icefall up the west side of Muckle Bluff they finally camped on the glacier just short of Sailors' Cache. The following morning they left some rations at Sailors' Cache and then continued across Endurance Glacier to the Hut. Here they cleared out the boxes of rations stored since 1971 in the hut and its drystone annexe, and then set about sorting our own stores which had been dumped in December.

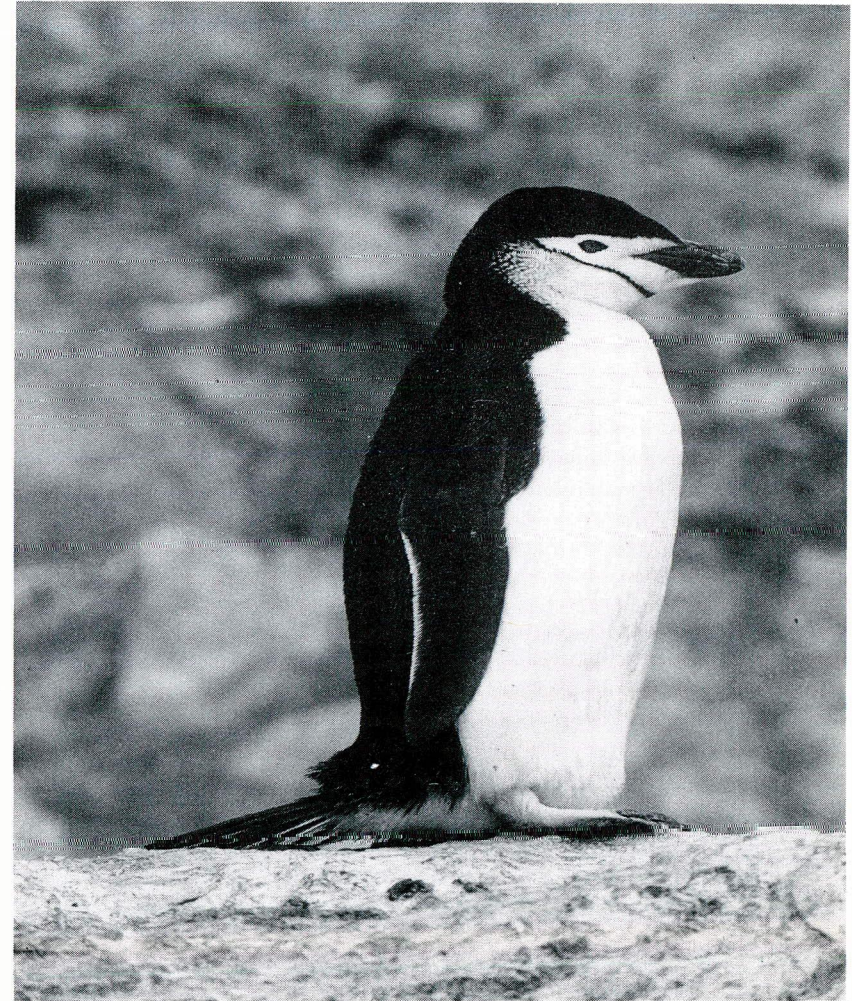
On 20 Feb Hurran, Brown and Monteith left the hut to return to Walker Point, leaving Chuter, Hallpike and Wimpenny to help Mogford's fishing party sledge the fishing, plankton and oceanographic gear down to the beach on "Tarka" and "Bilbo Baggins". Halfway across Endurance Glacier Hurran's party was caught by rising winds and driving rain. They eventually reached Sailors' Cache in conditions which ruled out any possibility of erecting their 'Vango' and were forced to bivouac in polythene bags in a shallow snow scrape partly roofed with skis. The next 2 days were equally unpleasant but they managed to dig ramparts on the beach to ward off wandering elephant seals and behind their protection pitched the tent and dried out. This same blow knocked down both the Ultimate Pyramids of the hut party and forced all 6 to retire to the hut itself.

ELEPHANT ISLAND





A batchelor bull Fur Seal relaxes among the Chinstrap penguins on the Spit at Gibbs Island.



Chinstrap Penguin, the dominant species on these islands.

The weather was better on 23 Feb so Chuter's party now set out for Walker Point, reaching Sailors' Cache without incident. This left Mogford, Martin and Turnbull at the Refuge Hut. Their intention was to canoe down the coast to Cache f2 near Rowett Island and to establish a fishing camp there, dependent on the weather's allowing the move to be made by the end of February. This same day saw Hurran's party leave their tent at Sailors' Cache and set out once more for Walker Point. They tried to by-pass the icefall at Muckle Bluff by taking the high route over Whiskey Col but had to turn back at 600m and negotiate the icefall again. That evening it began to rain again and it was not until 2300 hours that they finally reached the camp, soaked and exhausted having forced the last few kilometres in darkness. This 4 day journey in very bad conditions was probably the most unpleasant of the whole expedition; their good spirits and safe arrival was a great credit to all 3 and particularly to Hurran as leader. Chuter's party, after leaving Sailors' Cache, went over the northern half of the col above Muckle Bluff and this proved to be an excellent route on skis. They were also caught in driving rain but managed to reach Walker Point, wet and tired, just before darkness set in.

Hurran's party had spent 6 days travelling simply to collect our sole remaining operational cine camera and the aerial photographs of Walker Point, both of which had been sent to the hut in error, highlighting the penalty incurred by a relatively minor organisational failure. Chuter's party, similarly, had spent 7 days solely to support the fishing programme, illustrating the restrictions imposed by one major static commitment on an otherwise highly mobile expedition. Nevertheless, these long journeys had given all six, and especially the leaders, their first real independence on the expedition and in itself this made the trips worthwhile.

Meanwhile the remainder of us at Walker Point had enjoyed a varied week in the others absence. On the day of the others departure Highton and Davies had climbed The Necklace and visited the almost fairy tale "Hell's Gates", confirming that it would be impracticable to sledge canoes down to the coast from there. Baylis had set to work to study the moss banks which hold the key to a sizeable piece of the island's past; these banks were discovered in 1971 but were not much studied as their true significance was not realised at the time. His plans to collect full depth cores along a transect were thwarted when the ice corer refused to cope with MRI (Moss-reinforced ice) but he managed to carry out significant work by perseverance and ingenuity and judicious use of his kukri.

On 18 Feb the remaining 5 skied north towards Cape Valentine but when the low cloud dispersed and the sun broke through, Highton, Davies and Simkins moved together quickly up the icefall and achieved the first ascent of The Mask. The next morning was one of those lovely clear, sunlit spells which make up for months of bad weather and all 6 of us seized the opportunity for a day in the hills. Baylis, Davies, Hunt and I climbed The Baron, which involved tunnelling 4 metres up through the overhanging summit mushroom which could not be turned on either side. Highton and Simkins meantime retraced their steps of 4 days previously and by dint of a long traverse on steep ice reached the sharp ridge between The Mask and The Emblem. They then moved along the very exposed knife edge of

snow for 6 pitches before, one at a time, climbing the final finger which gives the Emblem its name. This final pitch over an ice bulge above the steep north face was the most exposed climbing of the whole expedition. They returned to camp late that evening having achieved an extremely satisfying first ascent.

The following morning Davies, Hunt, Simkins and I set off on skis for Nelly Point but, even though we turned back at Chinstrap Camp, were caught in the same blow as Hurran's party. We regained the camp thoroughly soaked to find that the Arctic Guinea had blown out and Baylis and Highton had had to drop one Vango to prevent its destruction. The wind and rain continued overnight and next day when little was achieved apart from establishing radio contact with the hut party. The weather was still bad the following morning and one of the remaining 2 Vangos had to be dropped. However, the afternoon brought a welcome improvement and, after we had all given up hope for Milne's return to the expedition, Lt Cdr Peter Burgess arrived above the camp in his "amazing whirring box" to deliver one doctor, now completely recovered after his week on Endurance.

Because of the bad weather, the shortage of cine cameras and lack of time I had abandoned plans to repeat Shackleton's passage from Cape Valentine to Point Wild in our canoes. Mistrusting our remaining small tents I determined instead to take the two 4-man "Windover" pyramids to the hut, transporting them by canoe. So, on 23 Feb 5 of us sledged a rafted pair of canoes over to Chinstrap Camp, taking only 2 hours. However, while lowering them to the beach "Mischief" was hit by falling rock and slid, bounced and somersaulted for 2 ropes lengths before stopping just before the final ice cliff. Despite having been damaged in the fall, the engine, miraculously, still worked and Davies was able to repair the cracks in the hull.

24 Feb dawned fine so Highton, Davies and Simkins set off for High Peak. After climbing the icefall to reach the ridge they were forced out onto the precipitous north sea cliffs by a 20 metre wide crevasse. They eventually turned back at 990 metres just below the summit mushroom because the continuing heavy thaw was making the snow very unstable. They returned, soaked, shortly before the arrival of Chuter's party brought the numbers in camp at Walker Point up to 13.

The rain which began that evening continued for 4 days, enforcing a most frustrating period of festering in tents. However Hurran and Baylis did manage to advance their survey and botanical tasks during brief clearances and on 27 Feb everyone turned to to rationalise stores in the laager of boxes around the tents. The weather finally cleared in the following forenoon: Hurran and Davies went to Chinstrap Camp for survey observations and to complete fibreglass repairs to "Mischief", 5 went to Pickup Point to count seals and to take cine films and the remainder carried on with scientific work around Walker Point.

On 1 March 2 parties left for the hut by different routes, leaving 6 members at Walker Point to complete the survey and botany tasks before following on some days later. Hunt, Milne and I moved to Chinstrap Camp with Baylis and Hallpike backpacking the 2 "Windover" tents for us then returning to Walker Point. Next morning we found that "Mischief's" repairs were still tacky but the



A Wasp helicopter from HMS Endurance lands one of the Gibbs party at Walker Point where the Clarence party waits to welcome him.



Two skiers relax at Walker Point on returning from the three previously unclimbed eastern peaks of Elephant Island in the background. Cornwallis Island lies on the horizon.



Elephant Island. A skier pauses among crevasses on the Stadium. Behind him rise lower slopes of the Mask and the Emblem.



Hut camp. These drystone walls were necessary to prevent our Vango Force 10 Mk V Everest tents being flattened by the wind yet again. Crab Mountain, beyond the camp, exceeds 600m yet does not appear on the map.

sea was calm so we filled her with buoyancy bags and I sat on the central load. After lunch we launched the raft through light surf and motored west in a slight swell. There was a big surf running at Muckle Bluff and, though we attempted to land, we eventually continued westwards after coming upon a submerged reef in the trough between 2 rollers. Shortly after this the engine stopped, probably due to damp, and Milne had to temporarily vacate the James K Caird to bale out all the water which had come inboard via his spray deck. We were now opposite a 5 Km stretch of ice cliffs which has no beach so we jettisoned petrol and other non-essentials and continued paddling. An hour later the engine re-started and we carried on to Sailors' Cache arriving offshore after a total of 3 hours. The engine now stopped again and we had to beach through unexpectedly heavy surf. We came in very fast on a 3m high wave. The following wave shot the raft up against the ice slope at the top of the beach, swamping the 2 canoes and towing the bowman up the final 10m. Before we could begin unloading another big wave dragged the raft back down the beach pinning me on my back; Hunt saved me by holding my head up above the next wave which drove the raft back up the beach temporarily pinning Milne against the ice. We then managed to cut free 3 packs and a tent and to salvage a rope, an iceaxe and 3 paddles before the raft was swept down under the heavy dumper surf and carried eastward under the icecliffs as a swamped wreck. It took only 5 minutes to pitch the tent and most of the next day was spent drying out. Just 3 hours after the wreck brash-laden waves 4-5m high were battering the beach despite a kilometre of heavy brash inshore and continuing calm; we had much to be thankful for.

On 4 March, using paddles in lieu of ice axes we crossed Endurance Glacier to the Refuge Hut and were relieved to find that Mogford, Martin and Turnbull were still there. They had been unable to move south or to do any fishing from the beach below the hut because of the high winds and wild seas. Despite this frustration they had enjoyed their 9 days solitude, during which time they had lived in the hut. Around the hut they had prepared tent platforms and erected a small township of protecting walls, 3 of drystone construction, and 5 incorporating our own and the previous expeditions stores boxes.

Shortly after the canoe party left Walker Point on 1 March, Highton, Davies, Simkins and Wimpenny set out intending to reach the Refuge Hut by traversing the Pardo Ridge westward from Mount Heathcliffe. They reached Doddlers Gap in blustery conditions after a 3 hour ski trip and, because visibility was bad and the way barred by a big crevasse, pitched camp for the night at 580m. An apparent improvement in visibility and drop in wind next morning prompted them to attempt the ridge but visibility deteriorated again forcing them to re-pitch camp at 820m, just 20m below the north side of an unnamed summit. It was much colder on 3 March but thick cloud still prevented their movement along the narrow, ice-mushroomed ridge. Unfortunately none of the party had yet caught even a fleeting glimpse of the ridge so they descended to 450m on the north face and then progressed, still in thick cloud, to their next camp on the east edge of the upper reaches of Big Wave Glacier. Next day, in steadily improving conditions, they made their way up to the col west of Flat Top. At about 750m they crossed spectacular ice fields behind a prominent snow summit which crowns the subsidiary ridge to the north east but which is not shown on the map. From the col they gained the summit of Flat Top and were rewarded with wonderful views along the length of Pardo Ridge and of much of the rest of the island.

They then continued to traverse west over another 2Km of the ridge, taking in Pic de Gaulle before descending to camp at 400m on the edge of Endurance Glacier. Although disappointed at having seen so little and at being unable to climb more of this superb ridge, they had greatly enjoyed their 4 days of ski-mountaineering, particularly Simkins, who had skied very little before arriving on Elephant. In the morning they skied across the glacier to the hut in tantalising variable weather. (It was not quite clear enough to afford Martin, Milne and myself a view from the summit of Mount Elder that same afternoon).

The 6 left at Walker Point had completed their survey and scientific work by 3 March though Hallpike was disappointed to have been unable to fix enough icebergs for observations of drift. During their last 2 days they also completed packing and securing the boxes ready for recovery by Endurance and Hurran and Monteith took an opportunity to climb the Postern.

After a final "tidy round" they left Walker Point on 4 March and moved to Nelly Point where they camped and, in good weather, pursued their various interests, including the counting and mapping of Giant Petrel chicks to provide a comparison with statistics obtained in 1971. Next day they moved to Sailors' Cache, taking advantage of good weather to film their crossing of the Muckle Bluff icefall, which had changed alarmingly in the space of 10 days. Not liking the look of the weather next morning they delayed their crossing of Endurance Glacier for 24 hours. This proved to be a wise decision as there was torrential rain that day, completely saturating 4 of us who had made a trip to Crab Beach from the hut.

On 7 March Hurran's party, followed by Baylis', crossed the glacier in bright sunshine. When they arrived at the hut, all 16 members of the team were gathered together for the first time since December. We celebrated the event with a brew and planned the final forays for the remaining 5 days on the island.

Three parties left the hut next day; 3 men to level on Endurance Glacier, 5 for a geological survey of the southern part of the island and 5 for survey and other work at Stinker Point, leaving 3 at the Refuge Hut.

Highton, Davies and Hallpike set off on foot hauling their levelling gear on a Hjelper sledge held together with masking tape and a tin of cherries. They camped near the top of the glacier below a rockface which served as an ideal datum for levelling but poor visibility and storm force winds prevented their doing any levelling so they returned to the hut next day.

Wimpenny, Mogford, Monteith, Simkins and Turnbull set off southward across the upper slopes of Hut Glacier in cloud and a rising wind. While descending the icefall to Crab Glacier one of Monteith's crampons broke and fell out of sight down a crevasse. He and Turnbull therefore returned to the hut while the other 3 continued down across the glacier and made camp. Next morning they climbed over the east ridge of Mount Pendragon by the bealach (490m, not less than 400m as shown on the map) and descended to camp at Cache f2 on the spit opposite Rowett Island. They explored around Cape Lookout and found the beacon left by Quest in 1923, still in place but flattened against the rocks. On 10 March they started for the Green Glen but were forced to turn back when they encountered very high winds in an area which is particularly confused on the map. The following morning they started back for the hut in order to meet

their deadline, climbing Mount Pendragon by the south ridge after traversing across steep snow from the bealach on the east ridge. They enjoyed good visibility up this new route as far as the false summit, when they became enveloped in cloud. As they climbed the summit this changed to driving fine rain which persisted as they tried to pick a route down the confused north ridge to the plateau. After descending 200m they were having to abseil off snow mushrooms on an ever-steepening slope with visibility below 50m, and wisely retraced their steps back over the summit and down the ridge to the bealach. By the time they reached the other side of Crab Glacier they had almost dried out but as they crossed the beach it began to rain again. They crossed the lower level of Hut Glacier as darkness fell and reached the hut at 2300 hours, soaked and exhausted but justifiably pleased with their achievements.

Hurran, Baylis, Chuter, Hunt and Martin on their way to Stinker Point had led Wimpenny's party up to the SE ridge of Mount Elder on 8 March but had some difficulty as Hunt was without crampons, having lost them in the shipwreck at Sailors' Cache. As they moved off the ridge towards the plateau in thick cloud on a route which none of them had seen, two were knocked off their feet by terrific gusts and they rightly decided to return to the hut and wait for better weather. However, even stronger winds prevailed next day and it was not until the 10 March that Hurran's party, swelled now by Brown and Turnbull, set out again, this time going further up the ridge to reach a better escape onto the plateau. Brown's boots had been damaged on Gibbs and his feet were very painful after his shuttling between Walker Point and the hut; his fortitude was not rewarded as, once again, the party prudently retired after tremendous gusts had blown Hurran off while trying to progress across a slope of only 20° on front points. Finally, on 11 March Hurran, Brown, Martin and Turnbull succeeded in getting to Stinker Point, taking 6 hours and being in cloud all across the plateau.

11 March was our first fine spell for 6 days and we had superb views of the whole of Pardo Ridge and even Mount Irvine on Clarence Island. Hunt and Highton red-leaded the interior of the hut on the previous evening, so now Monteith and Milne set to work on the exterior. They made a very smart job of this using dayglo orange overall set off by blue door and steelwork, though the panels of 1" marine ply unavoidably remained sodden and delaminating. That evening Hunt prepared a gastronomic extravaganza for a mess dinner in the hut.

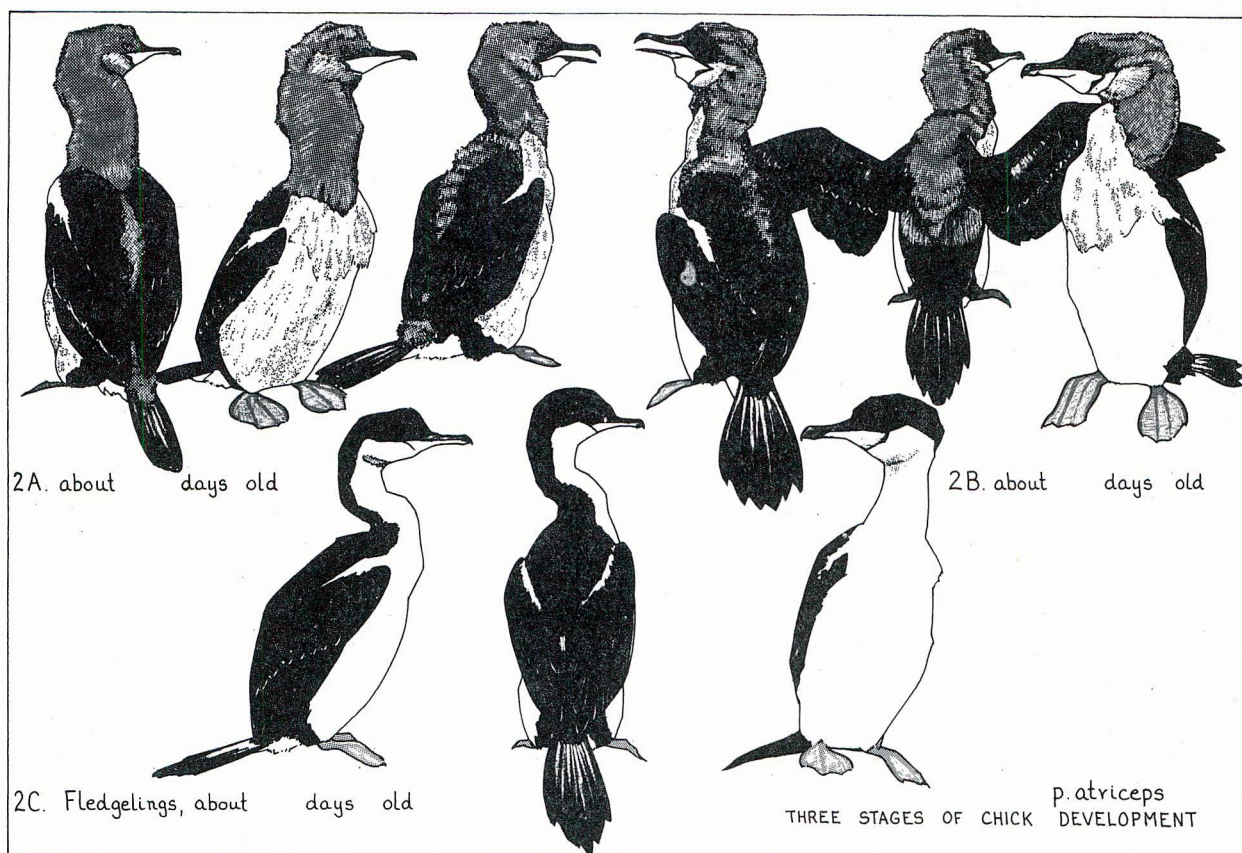
Throughout 12 March the wind rose steadily from a gentle force 8 gusting 50 knots at breakfast until by teatime it was continuously off the 60 knot scale of our anemometer with gusts estimated at 100 knots. This was a grand last day at the hut as the sky was almost clear and there was just a little icy grapeshot on the glacier. 2 of the Vangos were fast approaching their final death throes so we could not dismantle the protective walls of boxes but "Tarka" and "Bilbo Baggins" were sledged up from the beach by 2 teams of 3 (providing great cinefilm material) and the rest of the fishing gear was backpacked up.

Fortunately the wind eased a little overnight. Endurance was sighted while we were still rushing to strike tents, screw down box lids, clear out the hut, cache all the spare food and fuel in the hut and annexe and carry boxes up to the helicopter landing site. The first Wasp arrived shortly after 0900 hours and during the forenoon 4 of us, plus most of the gear, were recovered while the remaining 8 cleared the whole area before being transferred to

Endurance themselves.

The party at Stinker Point had greatly enjoyed their time there, counting more than 2,000 seals, carrying out altimetry for the large scale mapping, investigating the wreck in Wreck Bay and counting and mapping the Giant Petrel chicks. The wind on 12 March had not been more than gale force, suggesting that the high winds at the hut were due to the funnelling effect of Mounts Elder and Pendragon and to the Katabatic effects of the plateau and of Endurance Glacier. I had told the party to stay at 1 hour's notice through the afternoon and thence to be at 5 minutes readiness. In the event the 2 helicopters arrived out of the blue at 1305 hours just as they were setting out to map the moraines and within 5 minutes all 4 were aboard and flying away from Elephant Island round the south coast to where Endurance was anchored; a grand finale to their expedition.

During the afternoon the remaining boxes and bodies were lifted from the hut and then the stores were picked up from Walker Point. Chuter, having been landed here to help organise the loads, was the last team member to tread the surface of Elephant Island - until next time.



RETURN JOURNEY

by Cdr J R Furse RN

After the very speedy recovery operation the ship remained in the area to obtain continuous salinity/temperature/depth data. This occupied one day, after which she departed for the Falklands so we were unable to visit Seal Islands to investigate the mysterious lumps of coal collected there in 1970. After our last nostalgic sight of an iceberg we crossed the rather indeterminate Antarctic Convergence and once again enjoyed a calm passage.

In West Falkland Chuter and Hunt helped the ship set up a survey camp and the following day the whole team lunched with Richard and Griselda Cockwell at Fox Bay and enjoyed a delightful reintroduction to civilization. Endurance then sailed for Port Stanley for a 1 week stay during which Wimpenny, Chuter and Davies completed the long and tedious task of sorting out all the boxes of equipment in the hold. This proved to be very worthwhile as much of the gear needed cleaning, mending and rationalising. Eventually 78 boxes, totalling about 10,000 lbs, were neatly secured. Apart from occasionally assisting Wimpenny and Co this week was quite relaxing, except for Baylis who was chasing up and editing all the parts of this report.

Ashore, the team renewed acquaintance with the "Rose" and held a mess dinner at "Emma's" to wish Davies good luck. Five of us also visited the Canopus guns mounted as shore batteries near the airport; Kent Archaeological Society had asked Endurance to bring back one of the two 6" guns but at over 10 tons without the shield we were unable to get them aboard. Highton, Hurran and I also sounded out opinions concerning the disposal of the heavy fuel oil in the tanks at the old whaling station at Grytviken, which threatens to pollute the South Georgia coast: the response was enthusiastic.

The ship sailed for Montevideo on 24 March, arriving 4 days later after good passage in fine weather and improving seas. Here 15 of us bade farewell to the ship and flight, who had done so much to help us, and went ashore leaving Davies on board. Originally I had planned that he would return to Portsmouth with Endurance, but we now hoped that he would be able to return with the old NP8901 by RAF transport from Montevideo much earlier.

In Montevideo we were all looked after right royally. Highton and I enjoyed 2 days at the Residence with the Olivers (surely the finest ambassadors for Great Britain) while the others stayed at the Yacht Club and with members of the British Society.

On March we flew to BA to join our 'Aerolineas' flight. This was not the one we had originally intended catching and we only caught it by the skin of our teeth after a frantic whip round to scrape together the extra £92 per head excess fare. However, the flight was subsequently swift and uneventful apart from Hurran's assuming the role of Pied Piper to a number of appreciative South American children. After intermediate stops at Sao Paulo, Rio de Janeiro, Madrid and Paris we touched down at Heathrow at about 1700 hours on 31 March. There we found many of our friends and families waiting to meet us and joined in a short press conference before going our separate ways.

In a new spring we were all keenly anticipating our third summer in a year of summers.

REVIEW

by Cdr J R Furse RN

Achievements

We set ourselves very ambitious aims which we were still achieving when the expedition finished. Some might say that we did not achieve exceptional success in any one specialisation; I would reply that we did achieve remarkable success in many fields.

Our primary aim was the scientific exploration of the whole island group. Most of the planned fieldwork in this respect was achieved. Our secondary aim was adventure in mountaineering and canoeing and this was achieved in high degree, as described in this report. Our tertiary aim was to train potential leaders of expeditions to all levels and this also has been achieved, with several excellent leaders proven: Highton and I and several others now hope to gain our MLC (summer). An incidental aim was to help morale within, and recruitment into, the Services and this still remains to be achieved through lectures and films etc.

Conditions during the expedition - some figures

We took out 10 canoes. 1 was smashed by brash, 4 were avalanched on beaches and 2 were sunk in surf. We bring back 3 survivors.

We took out 14 new and 9 used tents. They were knocked down by wind 19 times and by waves 4 times, whilst poles were broken on at least 5 other occasions; 4 new tents were outworn, 1 was left behind and 2 were sunk in canoes. We bring back 7 thoroughly used tents plus assorted bits.

The weather, predictably, was poor, with winds up to 100 knots and gale force 8 recorded on 9 days a month, snow on 15 days a month, and rain (which was worst of all) on 8 days a month. Sometimes we had sunshine and often it was very, very beautiful. It was always a very wild, very powerful place.

Team selection and Morale

It is customary to comment on morale in expedition reports. I will not do so because the whole team was (and still is) such a terrible bunch. If I were lucky enough to be invited to lead another tough, 16 man expedition anywhere in the world I would first ask John Highton to come as deputy leader, then I would get hold of Eddie Bright, and then I would take the same team again. To my Selection Committee, under David Dalgliesh, I say thank you for the most important success of the whole expedition.

Personal reflections

I have derived tremendous personal satisfaction from this expedition; from organising it, from the physical challenge of the adventure, and from the scientific discoveries and material collections we have made. Working up and presenting the results will give me continuing pleasure and satisfaction.

I return full of enjoyment of wild places, spiritually at peace and mentally revitalised. Over these months I have looked at my

life and my career in clear perspective and know that I am happy in my situation. In forthcoming years I will perform my job far more effectively because this expedition has recharged me. Above all, I have made 16 good friends within the team and many more outwith it. They have all increased my love of people, and what is more, they have restored my faith in Britons and my optimism for Britain.

These are my own reflections. I believe the other team members to share similar feelings.

The islands we leave

The Elephant Island Group had remained remarkably unknown, mysterious, and even notorious until Malcolm Burley's Joint Services Expedition of 1970/71. That JSE and visits last season by geologists from RV Hero had explored respectively 1 island and 1 scientific discipline. Now the whole group will become known, with data covering the spectrum of earth and life sciences. We have made a thorough reconnaissance. Professional scientists of the British Antarctic Survey can now concentrate effectively on specific aspects of interest or on particular geographic areas. Nevertheless, there are still parts of these remote islands which have never been visited, studied or climbed.

The follow-up work

We now embark on the crucial task of analysis and presentation of the scientific results with the help and guidance of BAS staff and other professional scientists.

At this moment equipment is being cleaned and sorted for return and for the new JSE Store which is to be set up with gear purchased by us. Detailed reports on equipment and other subjects will be made to help organisers of future services expeditions.

All team members will be involved in presentation of the islands and of the expedition by slide lectures and by articles in journals and periodicals. The cinefilm will be edited, and the still photographs will be sorted and distributed as described in the still photography report.

My book is being published early next year by Anthony Nelson (PO Box 9, Oswestry, Shropshire WY11, 1BY). It describes the expedition through my eyes but incorporates passages from the journals kept by 11 other members to provide 12 different coloured threads woven into the story.

The next expedition

I am presently considering expeditions to Greenland, Arctic Canada, Turkey, Iran and Afghanistan. The Falkland Islands offer wonderful prospects for canoeing journeys combined with natural history, but it is the magic of the Antarctic which has most of us in thrall. Elephant Island itself has tremendous scope for a 6 - 8 man follow-up expedition combining adventure with science. Further south the prospects are limitless but transport harder to come by.

These may be idle dreams; South Georgia is the firm prospect. There is a job to be done there, a job we are well suited to do, and there is strong support for our doing it. I could not expect the Navy to spare me a third time but all of us in the team will be supporting the Joint Services Expedition to South Georgia 1979. The organiser, and hopefully leader, is Commander John Highton RN and his Deputy is Captain Chris Hurran RE (both subject to availability). We all wish them the best of luck!

ACKNOWLEDGEMENTS

The Expedition wishes to acknowledge and thank all those people and organisations who have taken such trouble to help us. The interest, encouragement, advice, enthusiasm and material support so freely given by so many has been the foundation of the Expedition's success.

My difficulty has been how to acknowledge such generosity in the bare 2 pages dictated by economy, but I finally decided to list either individuals or organisations for which they work, but never both. This rule has excluded many of those people who have helped us most eg those from BAS, the Hydrographic Department, HMS Endurance, DNPTS and the Naval Stores organisation in Portsmouth. Doubtless others, who have helped us in our years of preparation, have been omitted in error.

To all these benefactors, whether named or not, and to our womenfolk at home, go the heartfelt thanks of my whole expedition team.

Patron Sir Vivian Fuchs FRS

Organisations

Capel Curig Training Camp	Director of Public Relations
Joint Services Expedition Trust	Joint Air Transport Establishment
JSMTTC, Scotland and Wales	Defence Medical Equipment Depct,
Services Kinema Corporation	Ludgershall
HM Victualling Depots, Botley and Woolston	
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Royal Geographical Society	Scott Polar Research Institute
British Antarctic Survey, Cambridge,	Port Stanley, Signy Island and
	RRS John Biscoe
British Embassies at Brasilia, Buenos Aires and Montevideo	
Universities of Glasgow, Manchester, Leicester, Durham, Birmingham,	
	Aston and Miami

Torry Marine Laboratories Aberdeen	(Unilever and Min of Ag and Fish)
Fylde Mountaineering Club	Royal Naval Mountaineering Club
Royal Naval Bird Watching Society	Polar History Society of GB
Royal Antediluvian Order of Buffaloes	, Border Lodge 8704
Observer Magazine	British Antarctic Survey Bulletin
Anthony Nelson	Navy News
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Dr B Stonehouse	Mr A Tritton	Mr A Stephenson OBE
Dr P Tilbrook		
Hosts in Rio de Janeiro, Buenos Aires and Montevideo.		

INTRODUCTION TO SPECIALIST REPORTS

The following annexes have been written during the last week on Elephant Island and on passage to Montevideo.

The reports on the expeditionary means used to achieve our scientific aims provide information of general use for any expedition. I believe that all expedition organisers will find the reports on equipment and food to be exceptionally valuable, as they collate the comments of all sixteen team members on both the quality and the quantity of every item at the end of an entirely self-contained 3 month expedition.

By contrast, the reports on each scientific discipline are raw preliminary ones. The aim of all our scientific fieldwork is to provide material for scientists working on this geographic region and on specific related topics. On our return to the UK, the collections will be submitted to professional scientists in the British Antarctic Survey, the British Museum and various other institutions by previous arrangement. Scientific results will be published in the BAS Bulletin and other appropriate journals when the field observations and laboratory examinations have been collated: this will take at least a year in most disciplines. In order to give advance notice of the nature of the material and observations available, preliminary reports are included here despite their shortcomings.

These reports were hastily prepared under difficult conditions so, inevitably, they contain errors. Further, I have rationed each specialist to a single page, thus preventing even mention of much of the work; the reports attempt simply to summarise the main work of geographical description. In most disciplines there were additional aims and many specialists did work to support other team members. The list below shows these main and subsidiary scientific aims. Professional scientists wanting raw information before publication should contact the expedition team member involved or the institution working on the material (shown in brackets) either direct or through me.

After the expedition's return a book will be published by Anthony Nelson, PO Box 9, Oswestry, Shropshire SY11 1BY. This will consist of a personal narrative of the expedition plus appendices describing the island group in relation to each scientific discipline. The book will be the first definitive account of this island group and it will also incorporate some of the particular studies made in various topics eg the studies on Chinstrap penguins. Enquiries may be made either through me or Anthony Nelson at the above address.

AIMS

Terrestrial Zoology (Captain J W Chuter REME)

1. To preserve samples of specific habitats containing arthropods, enchytraeids and other invertebrates from all those islands visited (BAS, BM).
2. To collect live protozoa in certain habitats (BAS, BM).

Botany (Captain J P Baylis RAEC)

1. To make a quantitative and qualitative survey, including collections, of the terrestrial flora of all the islands visited (BAS).

2. To study the mosspeat banks at Walker Point, taking cores for radiocarbon dating and pollen analysis (BAS).
3. To collect specimens of marine algae (BM).

Geology (Lieutenant M G Wimpenny RM and Lieutenant C L Brown (RN)

1. To extend the general surveys of Clarence, Gibbs, Aspland, Eadie, O'Brien, Elephant, Cornwallis and Seal Islands, particularly inland, supported by structural data and a representative collection of rocks (BAS).
2. To examine in more detail any igneous masses, veins, sills, mineralisation etc and contact metamorphic effects (BAS).

Geomorphology (Flight Lieutenant D J Monteith RAF)

1. To describe the landforms of all islands visited and to relate them to previous surveys of the southern Shetlands (BAS and Dr John).
2. To examine and describe in greater detail the platforms and moraine systems at Stinker and Walker Points.
3. To correlate HMS Endurance's offshore depth soundings with postulated glacial troughs.

Survey (Captain C J Hurran RE)

1. Control surveys on Walker and Stinker Points, leading to photogrammetric plotting of maps at 1/10,000 scale.
2. Survey reconnaissance at possible landing strips for aircraft.

Glaciology (Commander J E Highton RN)

1. To obtain 10 metre ice cores close to the summit of Clarence and at the head of Endurance Glacier for analysis of oxygen isotope ratios (BAS and SPRI).
2. To measure temperatures at 10 metre depths at these sites (BAS).
3. To provide surface profiles of suitable glaciers on Clarence and Elephant (Survey 2 refers) (BAS).

Meteorology (Lieutenant A J N Simkins RA)

1. To provide an objective record of weather comparable with records elsewhere.

Oceanography (Lieutenant T R Hallpike RN)

1. To measure drift of visible icebergs from all coasts visited.
2. To obtain 17 day continuous tidal observations at Clarence, Elephant and Gibbs (HN).
3. To obtain temperature profiles, clarity, surface wind and light intensity. To take samples at selected depths for measurement of temperature, pH value, salinity, silicate and oxygen contents.
4. To estimate surface currents around the island group.

Marine Biology and Fish Foods (Flight Lieutenant G J Turnbull RAF)
This work is supported by a Winston Churchill Memorial Fellowship

1. To make quantitatively comparable collections by vertical net hauls off various islands (BAS, BM and Mr Garrod).
2. To determine species of adult Euphausiids caught and found stranded.
3. To collect and preserve 1-5 gram Krill samples plus other planktonic crustacea (Torry Marine Lab, Unilever), together with samples of crustacea molluscs and other benthic fauna obtained when trawling (BAS).
4. To correlate the findings with oceanographic and meteorological observations and, where possible, with feeding habits of birds and fish.
5. To study the feeding of all species by preservation of stomachs (EAS).
6. To compare variations of feeding habits of selected species with related observations on size, maturity, engorgement, season, time of day, light plankton availability, position, depth and oceanographic conditions etc.

Ichthyology (Flight Lieutenant F L Mogford RAF)

1. To catch as many specimens of as many species as possible using trammel nets, Agassiz trawls, fishtraps and baited hooks at a maximum number of locations.
2. To make a representative collection of preserved complete specimens (BAS and BM).
3. To assess abundance of each species around the islands; and to determine whether the fauna belongs to the Weddel or West Wind Drift.
4. To collect specimens of each species for pollution analysis (Torry Marine Lab).
5. To collect 100 specimens of *Harpagifer bispinis* for ecological analysis (BM).
6. To study growth rates of 2-3 selected species by examination of otoliths of sexed and measured specimens (BAS).
7. To obtain an objective record of physical variations by recording length, weights and fin rays (D₁, D₂, A and P) for all fish caught.

Fish Parasites (Surgeon Lieutenant Commander A M Milne RN)

1. To make a representative collection of preserved parasites dissected from as many host species of fish as possible (BM).
2. To collect from various species of fish, specimens of elasmobranch spiral intestine, larval nematode parasites, lesions and blood flukes (Torry Marine Lab).
3. To collect free-living turbellarians (BM).

4. To collect fish eyes in special preservative (Inst of Ophthalmology).

5. To collect serolid isopods (Edinburgh University).

Ornithology (Commander J R Furse RN)

This work is supported by a Leverhulme Trust Research Fellowship.

1. To extend the first census of breeding birds to cover Clarence, Gibbs, Aspland, Eadie, O'Brien and the remainder of Elephant (BAS).

2. To estimate breeding cycle dates of all species, and chick growth rates of penguin species in each area visited (BAS).

3. To preserve complete stomach contents of breeding Chinstrap penguins at various sites and dates for quantitative analysis (BAS).

4. To preserve complete stomach contents of smaller samples of other penguin and petrel species, for comparison (BAS).

5. To study the foraging rhythms of Chinstrap penguins (BAS).

6. To measure all birds collected and to preserve samples of each species for organichlorine analysis (BAS and Dr Bogan).

7. To collect recent fossil penguin bones from Stinker Point (not achieved).

Marine Mammals (Lance Corporal L S Hunt (RCT))

1. To census the breeding population of Fur Seals on Clarence, Gibbs, Eadie and O'Brien and, if possible, parts of Elephant (BAS).

2. To count all seals hauled out, sexing Elephant Seals (BAS).

3. To record any tagged Fur Seals or Elephant Seals seen (BAS).

4. To record all sightings of whales or dolphins, plus stranded specimens (BAS).

History (Lieutenant N J L Martin RN)

1. To survey the wreck at Stinker Point and attempt to identify it.

2. To search for and describe any other evidence of landings before 1916.

Medical (Surgeon Lieutenant Commander A H Milne RN and Flight Lieutenant G J Turnbull RAF)

1. Detailed report on medical stores (RNAD Ludgershall).

2. Sleep patterns.

3. Personality change, morale curve and social patterns.

4. "Before and after" study of certain blood parameters.

HISTORY

Whale Vertebrae. The only specimens were found on Elephant Island, the major concentration being on Bondi Beach near Stinker Point. Here, they were strewn over a half mile stretch and varied considerably in size. Isolated vertebrae were discovered on George's Rib beach, Hut Bluff beach and Crab beach. In no case was any writing found on the bones in the form of signatures or graffiti.

Wreckage. Wreck Bay, below Stinker Point on Elephant Island, is the principal site of wreckage, wooden masts, deck planks and hull sections being scattered everywhere. Since the only metallic parts are nails and a few eye bolts and mast bands, it seems likely that these remains are of either a sealer or an early whaler. The major items were photographed and this should enable further research to be carried out at the National Maritime Museum, Greenwich. The Museum will also be approached concerning a large strop and toggle found on George's Rib beach and a variety of metallic remains washed up on the Spit at Gibbs Island. The latter consisted of an electrical junction box made in the USA, a small winch, a few pieces of angle iron and what seemed to be a deck beam 8' long. There is a tradition that a small landing craft was lost in this area and this would tie in with our findings.

Known Visits and evidence left up to 1939

Feb	1820	William Smith discovered "Sea Elephant Island"
	1820's	Sealers certain to have operated in the area and fair number of landings probably made.
from	1840	Whalers operated in the area infrequently.
	1916	Sir Ernest Shackleton took refuge on Elephant Island after failure of his Imperial TransAntarctic Expedition.
	1923	Frank Wild in the "Quest" placed beacon at Cape Lookout
	1928	Holte dahl visited Clarence Island
	1937	Discovery II visited Cape Bowles (Clarence Is) and Gibbs Island

Recent Evidence. The 1970/71 JSE left a refuge hut at Hut Bluff (Elephant Is) as well as a number of food dumps. The Chilean ship "Piloto Pardo" placed a beacon at Cape Lloyd (Clarence Is) in Dec 1976. Finally, this expedition has left a dry stone wall shelter at Walker Point and a number of dry stone walls at Hut Bluff, Cape Bowles and Narrow Isle. The food dumps remaining from this and the previous expedition are at:-

O'Brien Island	20 rations
Central Bay, Gibbs Island	20 rations
Humble Point, Clarence Island	50 rations
Cape Lloyd, Clarence Island	30 rations
Walker Point, Elephant Island	80 rations
Chinstrap Camp, Elephant Island	50 rations
Sailors Cache, Elephant Island	25 rations
Stinker Point, Elephant Island	50 rations
Hut Bluff, Elephant Island	300 rations
Cape Lindsay, Elephant Island	20-30 rations

Small quantities of kerosene are to be found at each, together with petrol at those dumps set up by the 76/77 Expedition.

GEOLOGY REPORT

It is planned to study the geochemistry of the samples collected at Birmingham University. Dr T Ixer of Aston University will be making a study of the opaques found, including the Gibbs Island chromite.

Quartz veins are ubiquitous throughout the island group and show many structural features such as boudinage, tight 'S' folds and rotation of boudins.

Aspland Island Group A noticeable variation in the types of schists exists in this small group of islands. O'Brien Island is composed of grey schists dipping at moderate angles towards ENE. The quartz-mica schist contains a large number of garnet-rich bands. On Eadie and Aspland green schists are commonly layered with grey schists, the layering being very pronounced in the south of Aspland. Small lenses of igneous material are to be found on Eadie in the green schists, predating the main period of metamorphism.

Clarence Island A small but representative collection of rocks was made. The island consists of green and dark grey phyllites varying from cms to 100m in thickness. The amounts of green phyllite increase rapidly to the north. No high grade garnet schists were found. The strike of the rocks is almost N-S and was generally horizontal in the east, dipping rapidly to steep angles to the west in the west. An unusual rock type, probably pyroxene and garnet, is found in thin lenses associated with green phyllite on Sugarloaf Ridge and predates the main phase of folding.

Cornwallis Island The granodiorite of this island is dated at 9.5 ± 0.4 m.y. Little study is possible on exposed rock in situ as it is usually deeply weathered. However, blocks in moraines indicate that layering does occur in the mass and it has been permeated by veins of late stage quartz-rich fluids. Zenoliths of dark material are frequent. No contact with the country rock was found in situ but the moraines again provided specimens indicating some recrystallisation at the contact.

Elephant Island A collection of rocks from the 1970/71 JSE, including samples of blue schist from the NW coast is still held at BAS, Cambridge. East of the Endurance Glacier the rocks are grey and green phyllites; west of the Glacier the rocks are predominantly calcite-rich schists, with high grade garnet-rich schists in the south. These grade into blue schists in the northwest (not visited on this expedition). Bands of pink garnet marble upto 10m thick are found from Hut Glacier southwards.

Gibbs Island The structure of the island has been well covered by de Wit et al (1976). For this reason the programme on the island concentrated on establishing more geochemical support for the macro-and-micro-structural evidence of the island's history. Large collections of the chromite-rich dunite were made from Narrow Isle. A comprehensive sampling programme was carried out across the Gibbs Island Sheer Zone around Crystal Bay. These samples included some specimens of the granitic material described by de Wit. A brief study of the recent beach conglomerates was also made.

BOTANY REPORT

Within the limitations imposed by time and the difficult terrain, full collections were made on all the islands except Elephant. A little quantitative work was done on Gibbs Is but time and weather were generally against this. There were often problems over identification so, in order to save time, a sample of each species present in each community was taken for identification at a later date in UK. The drying of specimens also posed many problems, arising from the acute lack of space in the tents, the heavy condensation within the tents and the difficulty of storing part-dried samples when tents were moved (either by design or by the wind). The technique eventually adopted involved the use of rocks heated on a stove and subsequently placed beneath a ration box containing the samples.

The most thorough collection was obtained from Gibbs Is where well-defined relationships between flora and underlying rock were apparent. Wind blown and bird-carried specimens were often found lying on glaciers and, on a number of occasions, the species was subsequently either not found actively growing at all or was found only in situations which produced far less luxuriant growth forms. This highlighted our inability to cover all the ground, particularly on O'Brien Is.

On Elephant Is most of the available time was devoted to investigating the deep moss banks at Walker Point. Two major banks were observed, one facing south and the other west. The S-facing one was the more extensive and was studied in most detail; it was mapped, depths of the exposed edges were noted, collections were made of the species growing on it and on the scree below it, the slope was measured of the surface, of the substratum, and of the peat strata using a clinometer, and samples were taken at 1' vertical intervals for radio carbon dating. It had been hoped to obtain a number of vertical cores through the bank but, unfortunately, the ice corer which we had proved totally inadequate for the job, "moss reinforced ice" having the consistency of teak. As a compromise, a narrow groove was cut back about 1' into the permafrost on the downhill exposed edge of both large banks and the samples taken the back of the grooves.

No extensive, uncontaminated, permanent bodies of fresh water were found. Penguins rapidly reduced any pools to stinking wallows of black anaerobic mud and any other pools were formed as a result of ice dams which rapidly disappeared when a thaw set in. However, a series of pools linked by streams was found at Walker Point and this flowed for several days before the snow field which fed it became exhausted. Samples and useful data were obtained from the site over this period.

Rough seas and the inaccessibility of good rock pools hampered the collection of marine algae. One good site was found on O'Brien Is, however, and this collection will be forwarded to the British Museum.

HYDROGRAPHIC REPORT

Whilst on O'Brien, the movement of passing icebergs was measured by sextant from an observation post at the campsite. This position was heightened by altimeter and resected using prominent land features as marks. These, together with depression angles from the horizon, were used to fix the icebergs. A series of rocks close to the camp were calibrated in good visibility to enable observations to be made in nearly all conditions. The approximate times of high and low water were recorded each day and the period observed to be very similar to that of Galveston in the Gulf of Mexico. A strong tidal rip was observed to run in an easterly direction through the gap between Eadie and O'Brien, commencing as the tide began to flood, reaching a maximum after about 1 hour, and normally lasting for 3 to 4 hours. During the period icebergs close to the O'Brien coast moved in a westerly direction on an eddy current until meeting the rip and being swept east to join the main stream running north between Aspland and Gibbs Islands. The rip was noticeably strongest during spring tides and was not apparent when the tide was ebbing and setting to the west.

Whilst on Aspland a very strong tidal rip was observed to run through the 20 metre gap between Eadie and Aspland in which there was a large rock creating very broken water except at slack water. With an east-going set the main stream hugged the Eadie shore but, when setting west, flowed along the Aspland coast.

On Gibbs Island an automatic tide gauge was set up on the north side of the Spit and despite bad weather, 18 days continuous readings were obtained. An observation post was established at the campsite and, as on O'Brien, resected by sextant and heightened by altimeter. Icebergs were observed over periods of never less than 2 hours and it was observed that whilst the tide was ebbing the set was westerly and that whilst flooding it was easterly. Close inshore on the south side, however, an eddy current was observed to run in the opposite direction to the main stream.

Over a 3 day period on Clarence Island iceberg observations were made from sites at Cape Bowles and Chinstrap Cove and except where tidal rips existed, the speed of the larger icebergs never exceeded 2 knots.

The use of the Sechi disc, bathythermograph and nansen bottle was severely limited by bad weather since work from the rafted canoes was very difficult in all but dead calm conditions. However, 1 day's observations were obtained on both Gibbs and Clarence, the former being a single set of observations from the bay south of the Spit, and the latter a series of 5 stations along the coast off Lunar Glacier. Water samples for salinity and oxygen determinations were also collected from depths between 18 and 50 metres to support the plankton project.

No iceberg or oceanographic observations were made on Elephant Island but additional tidal records were obtained at Tasman Cove on Clarence Island and at the western end of Endurance Glacier on Elephant Island. In neither case, however, were more than 4 days continuous readings obtained.

Full details of this work will be available from the Hydrographic Department, MOD, Taunton, and will be offered to BAS for publication.

TERRESTRIAL ZOOLOGY REPORT

The invertebrate fauna programme was confined to collecting live and preserved material together with associated details of habitat, location, local climate etc. These collections were made on behalf of BAS Cambridge and the British Museum, who may subsequently publish their results.

In the majority of cases individual organisms were collected using forceps, aspirator or small brush after searching the habitat by eye. On a few occasions a microscope was used to search for the smaller fauna but this method was generally found to strain the eyes and to produce poor results. On one occasion a heat extraction process was used. This employed a primus stove and heat deflector which gently heated the surface of the habitat sample and drove the fauna down through a grid into a funnel and thence into a tube of preservative. This method was very successful in obtaining the faster moving fauna but required more than 24 hours for the slower moving organisms and it was not possible to keep stoves going for such a long period. It was found that the most productive extraction method was to collect a sample of the habitat and then, in warm surroundings, to crumble it over a sheet of white paper and to collect the observed fauna with an artist's brush, transferring them directly into tubes of preservative.

The collection of live material was simply effected by putting 100 gm samples of the various habitats into plastic bags or bottles. These samples were kept at ambient temperature and, when transferred to HMS Endurance, were placed in a cold store at a temperature of 0°-4°C.

After collection each sample was labelled with a reference. Notes on habitat, location etc were made against this reference in a notebook.

Preserved collections were made on Aspland, Eadie and O'Brien Islands. On Gibbs Island samples of moss carpet were collected for fauna extraction in UK. Clarence Island yielded two collecting areas, Chinstrap Cove and Cape Bowles, where preserved collections were made and further samples of moss turf, scree soil and bird nest material were taken. Collections of preserved material were made at Walker Point on Elephant Island in addition to samples of moss turf, moss carpet and grass soil. At Hut Bluff on Elephant Island there was a small freshwater pool and stream where samples of water and alga were taken and preserved.

The main classes of invertebrate fauna encountered were those of Acari (mites), Collembola (spring tails), Nematodes, Enchytraeids and Lumbricidae (worms).

PLANKTON REPORT

Emphasis was placed on the collection of specimens from the neritic waters around the islands, numerical - and species - analysis being left until return to UK when BAS guidance will be available.

Both Gibbs and Clarence Islanders used the canoe-raft assembly as a work platform from which to carry out the hauls and were equipped with the same items for carrying out the various studies. One 200 mesh per inch (MPI) phytoplankton pup net, one 60 MPI zooplankton net, 40% formalin, sample bottles and Secchi disc were carried together with hydrographic gear which included one Nansen bottle, lead line with tallow, metred drum cable and a bathythermograph. Specimens were preserved in 4% formalin in seawater in wide-mouthed powder jars of 125 ml, 250 ml and 500 ml capacity, the ratio of supernatant to specimen mass being maintained at 10 to 1.

The 60 MPI net (3' diameter) was used for vertical hauls only; the 200 MPI net (8" diameter) nets could be hauled vertically or horizontally. The 2 litre seawater samples obtained with the Nansen bottle were collected for nitrate, phosphate, silicate, oxygen (Winkler method) and salinity determinations and pH was measured in the field using Ames sticks. The Secchi disc was used to indicate plankton density. The bathythermograph was very heavy and, in any case, it soon became unserviceable but as work was confined to shallow water, thermocline detection was unnecessary. Temperatures were measured using the Nansen bottle thermometers.

The optimum size of party in the canoe-raft was 3, one of whom was responsible for canoe handling, and wet-suit items were normally worn. Thunder flashes and ice-axes were also normal equipment for deterring predators such as Leopard seals.

When making vertical hauls a sea anchor was used to minimise drift and a hauling rate of approximately 0.5 m/sec (hand-over-hand) was used to minimise spillage and turbulence in the net mouth. Trawls with pup net and lead sinker were made at 2 knots for the same reason. Since the maximum depth of water was only 50 m sampling at different levels was not carried out and studies of diurnal variation were ruled out by the rapidly changing sea conditions.

Vertical hauls only were made at Tasman Cove near Cape Bowles but at Chinstrap Cove a 5 point transect was completed off 2 glacier snouts, separated by a 2 kilometre rock buttress. Here a 2 kilometre horizontal trawl at a depth of 40-50 m was also effected using a boundary between melt and oceanic waters as the transect line. On Gibbs Island the weather permitted only one day's vertical hauls to be completed and on Elephant Island precluded any plankton work at all. Nowhere were any stranded Euphausiids encountered.

Detailed results will be offered to BAS for publication and the preserved material will be held either by BAS or at the RAF Hospital, Ely, Cambridgeshire.

ICHTHYOLOGY REPORT

The fundamental aims of the ichthyology programme were achieved by 2 parties, one operating on Clarence Island and the other in the Gibbs Island Group. Bad weather prevented any fishing on Elephant Island.

Fishing was carried out from rafted canoes, the wood and canvas decking and one empty cockpit providing sufficient storage space for kit. Waterproof jackets and chest-high waders were always worn.

Frequent gale force winds with attendant heavy surf restricted fishing to 1 day in 10 and on two occasions violent storms washed away preserved specimens. A further setback was an avalanche on Clarence Island which buried the results of one catch. All fishing was confined to well sheltered bays and, as a result, the maximum depth worked was 30 m.

The most successful fishing methods were trammel nets and 50-hook long lines, the hooks being baited with penguin meat, fish and limpets. Wherever possible gear was set out then left overnight and retrieved the following morning as any delay resulted in amphipods attacking the fish which were then no longer of use for preservation. Hand line fishing was a particularly useful method in bad weather. Traps also were constructed but on each occasion they were lost in storms. A trammel net was also lost when it sank in 100 m and a long line when it stuck fast in weed on the sea bed.

A total of 300 fish were caught, comprising 5 species a percentage of each of which was preserved. Some of these specimens will go to Torry Marine Laboratory for pollution analysis, the remainder to the British Museum. Part of each catch was examined for parasites and stomach contents. It was found that after 24 hours the fish became very slimy, which made handling at low temperatures very difficult; they were also capable of inflicting uncomfortable bites for several hours after being caught. Starfish and spider crabs were taken in nets and on baited lines and gammarids were trawled. Rock pools in the littoral zone produced limpets and amphipods but no fish.

The most abundant species of fish caught was Notothenia coriiceps neglecta. A growth rate study was carried out on 100 of these fish. They were weighed, sexed, measured for standard and total length and their otoliths extracted. The latter will be used for age determination. In addition the fin rays in the anterior and posterior dorsal, pectoral and anal fins were counted. The physical variations within the species will be compared with earlier data to establish regional differences.

20% of fish caught were Notothenia rossii marmorata. All of these appeared to be immature and were normally caught in the deeper water. The ice fish, Chaenocephalus aceratus was the biggest fish caught, weighing $1\frac{1}{2}$ - $2\frac{1}{2}$ kg. These "bloodless" fish were all ripe females, the orange/pink roe being visible through the body cavity wall. They were normally caught in nets but one was taken on a long line having refused to relinquish a hooked 600gm fish which it had swallowed. Other species caught were Parachaenichthys charcoti; (2 taken in nets) and Harpagifer bispinis (2 caught in Agassiz trawl on stony bottom).

FISH FEEDING, FISH PARASITES, TURBELLARIANS AND FISH EYES

Fish Parasites

Ecto- and endoparasites from fifteen specimens of *Notothenia neglecta* were collected. Ectoparasites found were leeches, monogenea and crustaceans. Of interest with regard to the endoparasites in this species were the heavy larval nematode infestation of the liver, the large numbers of acanthocephala in the distal rectum, and the paucity of other infestation in the gastro-intestinal tract, notably the lack of nematodes. Digenea were found in only one specimen. The parasites will be given attention by Dr D Gibson of the British Museum.

Turbellarians

Several species of free-living littoral zone polyclad and triclad turbellarians were collected from O'Brien, Gibbs and Elephant Island. These will be examined by Mr S Prudhoe of the British Museum.

Fish Feeding

The stomachs of 10 specimens of *Notothenia neglecta* caught off Gibbs Island were preserved intact for subsequent examination by BAS in Cambridge. The number of specimens available was limited by the difficult fishing conditions and by the loss of a trammel net fairly early in the expedition. It is possible, however, that specimens destined for other programmes may subsequently become available for dissection.

It was not possible to make any comparison of feeding habits or to relate differences to environmental factors.

Fish Eyes

It was intended to carry out this programme on Elephant Island but adverse weather conditions precluded fishing throughout this period so the aim was not achieved.

METEOROLOGY REPORT

Meteorological data was obtained from all the base locations occupied by the Expedition to provide a general climatological basis for the various scientific programmes. At each location a suitable "screen" was constructed and standard observations of air temperature, precipitation, humidity, wind speed and direction, barometric pressure, cloud, visibility and past and present weather were recorded at 1100 hrs and 2300 hrs GMT. Because of the roving nature of the expedition, the equipment used had to be lightweight and manportable so it comprised a hand-held anemometer, aspirated psychrometer, max-min thermometer, altimeter/barometer and prismatic compass.

It is not possible to say at this stage whether the climatological conditions encountered by the expedition varied greatly from the norm, except to say that wind speeds were higher than expected, compared with the 70/71 Expedition. Cloud cover was always high and stratified cloud type predominated, being mainly of orographic origin. Visibility was, by normal standards, good while relative humidity was high throughout the period with the majority of readings being between 80% and 99%.

A more detailed report is in the course of being produced and will be obtainable from the Expedition's leader.

Location & Dates	Temperature			Wind Speed		Precipitation		Cloud Cover Oktas
	Max °C	Min °C	Avg °C	Avg Knots	% Days 34 Knots	Nº Days Snow	Nº Days Rain	
O'Brien Is 17 Dec - 3 Jan	3	-3	-0.4	5.2	0	10	0	7.4
Aspland Is 3 Jan - 8 Jan	4	-2.5	0.5	6.8	20	4	0	7.1
Gibbs Is 9 Jan - 13 Feb	4	-3.5	0	15.4	36	20	11	7.3
Clarence Is								
Cape Bowles 15 Dec - 3 Jan 22 Jan - 1 Feb	7	-3.5	-0.1	12	27	11	3	7.4
Skua Camp 4 Jan - 22 Jan	12	-2.25	0.3	9.1	8	4	2	7.2
Fur Seal Beach 3 Feb - 8 Feb	4	-1		1.9	0	1	0	8
Elephant Is								
Walker Point 15 Feb - 4 Mar	8	-3.5	1	13.8	35	11	9	6.5
Hut Bluff 25 Feb - 13 Mar	5	-6	0	18.9	53	12	12	6.7
Exped Avg (141 obs-days)	12	-6	0.1	12.2	39 in 141	73	37	7.2
70/71 Avg (Hut Bluff) (111 obs-days)	16	-10	-0.5	13.7	9 in 111	69	32	6.6

SURVEY REPORT

Existing survey coverage of the Elephant Island Group is provided by chart number 3205 (South Shetland Islands and Bransfield Strait, 1:500,000) and by the map produced as a result of the previous expedition. This map is titled "British Antarctic Territory, South Shetland Islands, 1:200,000 series D501, sheet W61 54 (Extended) 1 GSGS and 20 copies were obtained through the Directorate of Military Survey for field use during the expedition. The only significant item of inland information found on the chart but omitted from the map is the spot height of Mount Irving (1924m) on Clarence Island. The surveys at Stinker and Walker Points were intended to produce detailed mapping of 2 major snowfree areas of Elephant Island.

Preparation for the survey aspects of the expedition fell broadly into 3 parts. Firstly, air photography of Walker and Stinker Points at 1:10,000 was flown with the relevant triangulation points pre-marked as part of HMS Endurance's programme in Jan 1976. Secondly, the necessary equipment was mustered in May 1976 by the School of Military Survey and prepared for Antarctic use. Finally, during Sep and Oct 1976, 3 weeks at the School of Military Survey were devoted to office reconnaissance, plotting a draft map of Stinker Point and revising the practical techniques and computations likely to be used in the field.

The main items of equipment taken were 2 theodolites, 2 levels and 5 altimeters with all the necessary ancillary equipment. Theodolites and levels were winterised by covering knobs with chamois leather and by the use of thinner than normal oil. All equipment was subjected to hard use and withstood it remarkably well. In particular, all the instruments on Gibbs Island were immersed in seawater at one time and, with the exception of one altimeter, were still usable in the latter stages of the expedition. Three-section banderoles were used to mark stations and it was found that the screw joints were unable to withstand the high winds experienced.

The most comprehensive fieldwork was carried out at Walker Point. Two triangles were observed and altimetry readings were taken at 4 points. Initial computations indicate that sufficient accuracy was obtained to control the plotting of a 1:10,000 map from air photography. In addition a tacheometric survey of the main moss bank in the area was carried out.

The draft map of Stinker Point was produced from air photographs with control by aerial triangulation using the 2 pre-marked triangulation points. Altimetry readings at 6 points indicate that it is remarkably accurate and requires cartographic amendment only.

Reconnaissance of possible landing strips for light aircraft was limited by shortage of time and bad weather. At first sight, the only suitable location visited was in the area of the Refuge Hut on Elephant Island.

On return to UK a further period will be spent at the School of Military Survey during which computations will be checked and the maps of Walker and Stinker Points produced. These will be made available to BAS and to those scientists on the expedition who will be using them to amplify their detailed reports.

Note Certain names on the maps in this report have yet to be approved by the Antarctic Place Names Committee.

GEOMORPHOLOGY REPORT

Work was carried out on Gibbs, Eadie, Aspland, O'Brien and Clarence Islands to identify remnant beaches and wave cut platforms. No evidence similar to the residue beaches reported on Elephant Island by the 1970/71 Expedition was found. This is probably due to the steep nature of the ice-free regions and their limited area. These ice-free areas consist of moraine systems and scree slopes composed of angular material. It is noteworthy that this material is all sizeable and any grainy material is removed by wind action during the frequent violent storms experienced in the area.

Other expedition commitments coupled with the short time available did not allow further work to be carried out on Elephant Island. However, arrangements were made to obtain a depth soundings chart of the area around the Island group from HMS Endurance.

The small amount of material gathered will be forwarded to the Universities of Durham and Aberdeen.

GLACIOLOGY REPORT

Owing to the extreme conditions of wind, cloud and rain it was not possible to carry out the planned programme of coring and levelling on Endurance Glacier. It is of note, however, that a good nunatak was found from which 10 Kilometres at an elevation of between 350m and 500m could readily be levelled. This nunatak is 5.2 Kilometres from the Refuge Hut on a bearing of 304° (T), its base being at a little less than 500m. A level carried out on an approximate bearing of 030° (T), towards the highest point of the White Company (12 Kilometres distant) would involve only gradual changes in height over an almost crevasse-free part of the glacier.



Clarence Island. A party prepares to leave the camp at Sugarloaf, self-sufficient for five days.



Clarence Island. Nesting Chinstrap penguins enjoy the sun against a backdrop of the glacier snout.



Cape Pigeon



Kelp Gulls are often seen, but their nests are difficult to find.

ORNITHOLOGY REPORT

Our studies were geared to a mobile expedition with simple observations that could be made by the inexperienced team on Clarence Is. In fact this team did a very effective, conscientious job.

The breeding survey covered much of the islands; 1/30,000 maps showing the distribution and numbers of all breeding species have been drafted and will be lodged with BAS. Antarctic Fulmars were very numerous on all the islands except Elephant Is where there were none. Adelie Penguins were found breeding in numbers only on Clarence Is. Rockhopper Penguins were seen at Aspland and Clarence Is, with 1 chick hatched; together with a moulting Royal Penguin at Gibbs these made 7 species of penguin recorded in the Group. Black-bellied Storm Petrels were common on the cliffs of all the islands but colonies of Snow Petrels were found only on Elephant Is. Antarctic Petrels were seen flying around the cliffs of Gibbs Is and offshore near O'Brien Is but with no proof of breeding. On Elephant Is some Chinstrap colonies had expanded a little since 1971 but numbers of Giant Petrels were as before.

Breeding dates were found by random sampling over the hatching periods. Large samples of Chinstraps showed synchrony within colonies and some differences between colonies. Adelie hatching dates were closer to Chinstraps than expected. Samples of up to 100 Fulmars showed marked synchrony of hatching, after the Cape Pigeons. By contrast Antarctic Terns hatched from mid-December to mid February. Clutch sizes were recorded for over 50 Shag and Sheathbill nests and chick growth rates of some Chinstraps and Fulmars were measured.

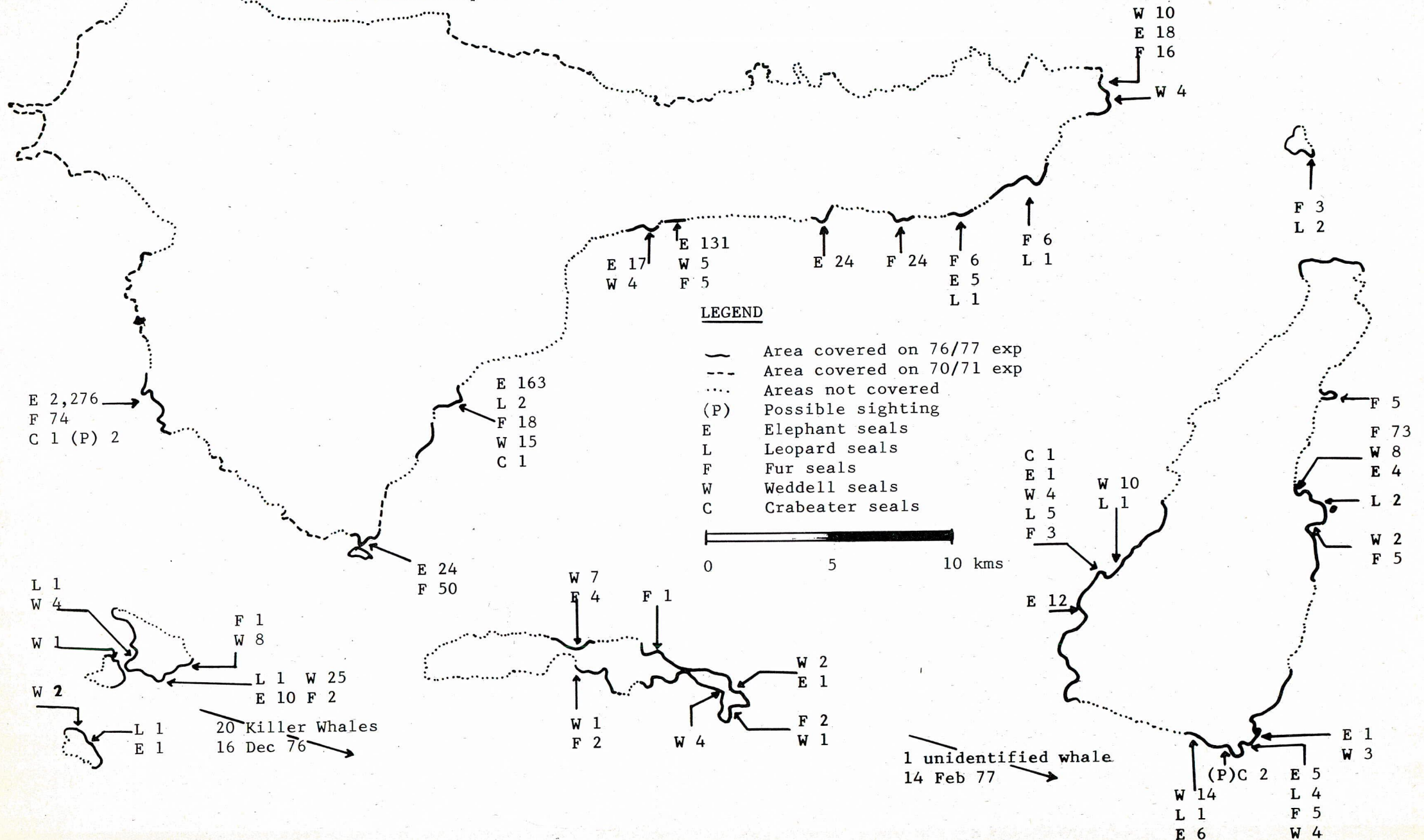
Stomach contents were collected from about 50 breeding adult Chinstraps and 10 Macaronis. The former brought home up to 880 gms of krill, ie nearly 25% of their body weight. A 24 hour "traffic count" of Chinstraps at the end of January indicated one foraging trip per day being made per pair, which differs from earlier findings. Incidental observations on feeding rhythms included evidence that Antarctic Fulmars were primarily nocturnal foragers.

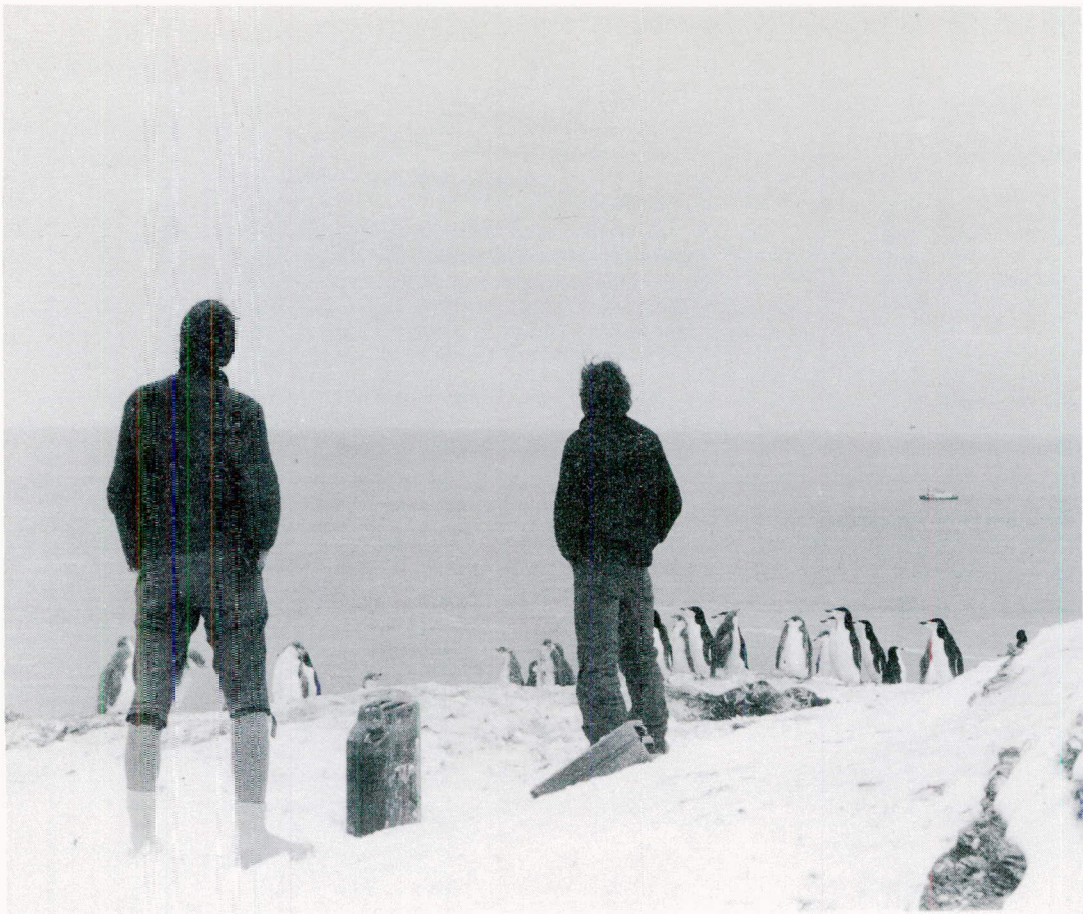
Culmen and flipper or wing measurements were taken on all birds collected and samples of muscle and liver for organochlorine analysis were taken from 5 species.

Lack of time prevented our digging at Stinker Point where the Geomorphologist on the 70/71 expedition recorded "penguin" bones about 10,000 years old.

MARINE MAMMAL REPORT

A condensed map showing marine mammal coverage and counts





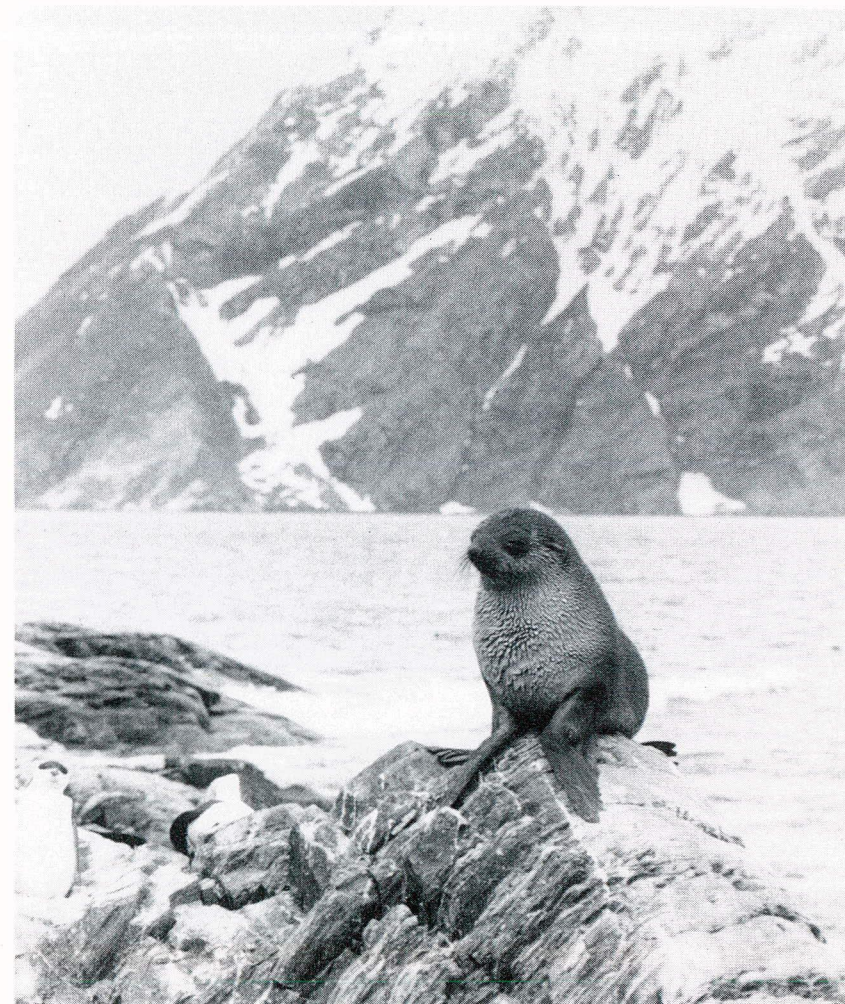
Clarence Island. HMS Endurance finds the party delayed at Sugarloaf by heavy snowfalls.



View west from Walker Point towards the canoe beach. 20Km away are the hills above Endurance Glacier and the Refuge Hut.



Adelie penguin. Found breeding on Clarence and Gibbs Islands.



Fur seal on Aspland Beach. O'Brien behind.

STILL PHOTOGRAPHY REPORT

The aim of the still photographic coverage was to produce pictures to illustrate scientific programmes and to record the activities of team members throughout the expedition. The material obtained will be used to supplement lectures and written articles and to raise funds for the JSET.

The standard format was 35mm. Owing to shortages in the services 5 private cameras were used and 2 Pentax cameras and lenses were bought out of expedition funds. The Services provided 2 Pentax SV cameras, 4 Calypso Nikkor II underwater cameras, 4 Konica 35 and 2 Olympus RC35 cameras.

Wet cameras were an everyday problem on account of the humidity and salt spray and this dampness also caused films to snap and cameras to jam. The cameras were not winterized but did not suffer adversely as a result. The underwater cameras were ideal for these conditions, remaining fully serviceable throughout the expedition; however, they did require the use of a separate light meter and the majority of these were badly affected by the atmosphere and by immersion in salt water.

The Pentax and private cameras provided the backbone of quality photographic equipment. Wide angle to 300mm lenses were used, the optical ranges being doubled by use of 2X convertors. A zoom lens was also purchased and was found to be ideal for most occasions. It is suggested that a wide angle lens, 2 x convertor and 150mm/200mm/zoom lens would have been an ideal combination. Three Pentaxes suffered from shutter problems, one private camera was rendered useless by salt water and another by a mechanical fault.

Of the Konica and Olympus cameras supplied to meet the general needs of the team only 2 survived and it was felt that an uncommitted SLR interchangeable lens camera at each base camp would have been an asset to meet the specialist demands of those equipped with fixed lens cameras.

The first frame of each film was used to photograph a film number written on the cover of the photographer's record book, in which the film details were entered. This procedure ensured identification of films after processing.

A total of 900 films were exposed. Kodak Ektachrome X and Kodachrome 64 were used for most of the colour photography, only a small amount of High Speed Ektachrome being needed. For black and white work Kodak Plus X was preferred to Ilford FP4 because the plastic cassettes supplies with the Kodak film protected it from the wet. Ilford HP4 was used to photograph birds in flight. It is recommended that the majority of the film be supplied in 36 exposure cassettes with only a limited number of 20's for specific tasks.

Most of the team maintained an active interest in photography throughout their time on the islands and as a result it is hoped that there will be a quality portfolio covering all aspects of the expedition. Each team member will be furnished with a set of lecture slides and the Scott Polar Research Institute will be given a complete set of the best slides. Photographs of outstanding quality will be used to illustrate magazine articles and a book, and the photographic agencies "Camera Press" and "Bruce Coleman" will be offered material to include in their libraries.

CINEPHOTOGRAPHY REPORT

Five expedition members were involved in cinephotography, one overall director and four assistants. All were trained as cameramen and two members were responsible for on-location sound recording. The aim was to produce sufficient material for both a 30-50 minute film suitable for TV companies and for an Army adventure training film, working on an exposed footage to final print ratio of 12:1. The film was sponsored by Army Adventure Training authorities, enabling material support to be gained from the Services Kinema Corporation.

The task was tackled by writing a film script, the basis of which was human interest. Five members of the Expedition were selected as main characters and filming concentrated on them.

Pre-expedition training consisted of a week-long course at the RN School of Advanced Photography. There was also active liaison with DPR (N), SKC and various television and private film companies. Equipment consisted of 4 Bolex HL6 clockwork cameras fitted with wide angle, normal and telephoto lenses in a triple turret mount. One 16-100mm zoom lens was also used. Each lens was fitted with a UV filter and the camera body had an additional polarised filter capability to counter bright snow conditions. Accessories included 4 cable releases, 2 Sony VCT 20A tripods and 4 neckstrap camera supports. Exposure calculations were made with Weston Euro Master meters using the invercone method. For sound recording the expedition purchased 2 secondhand Uher 4000h mono tape recorders. 22,000' of Ektachrome 7241 film was supplied by SKC and thirty 5" tapes came from naval sources.

On the islands, 3 members of the team were with the Gibbs group and 2 were on Clarence Island. Film was shot then details logged in a record book detailing script reference, cameraman's identity and film number, exposure length and subject description. Filming was conducted on a planned basis wherever possible; however, this proved difficult due to the problem of stopping action and authentically recording it when the cameraman was an integral part of the action. 10,000' of film was shot on the islands, falling short of the planned footage because 3 cameras became unserviceable in canoeing incidents. The film script was altered in the field to accommodate the more predominant atmospheres of the expedition. Taping of on-the-spot interviews and of sounds peculiar to the environment was carried out.

The main problems associated with work in the field were maintenance of equipment in the cold, moist atmosphere and the susceptibility of equipment and film to loss in or damage by salt water. Both lightmeters became inoperable due to immersion in seawater. The cameras proved rugged but prone to failure in moist conditions. Tripods and neckstraps supports proved invaluable and both these items are to be recommended. The team's main frustration was the 18 second running time of the cameras. Electric motors and 200-400' reels would have been invaluable. Taped interviews appear very false when conducted by a member of the expedition. One of the main mistakes made by the team was that of leaving the filter holder off the camera, which may result in valuable footage being ruined. Because of the team's inexperience further camera familiarisation prior to the expedition would have been valuable. Without sufficient preparation novices are severely handicapped in the professional world of film making. If sufficient training is not available it might be more effective to engage professionals. On return to UK the exposed footage will be processed by SKC,

MOUNTAINEERING REPORT

The expedition made successful first ascents of the summits of the outlying islands and of the 3 unclimbed peaks at the east end of Elephant Island. The Clarence Islanders also made successful first ascents of a number of subsidiary peaks and traversed the Ravelin Ridge.

The Gibbs group had less scope for climbing but found many routes of interest. Technically the hardest climb of the expedition was probably an attempt by Baylis and Simkins on the East Summit of O'Brien Island by way of the North Gully (grade 3+) which failed in bad weather at the base of the summit mushroom.

On Elephant Island, in addition to the first ascents, successful ascents were made by various parties of Mount Elder, Flat Top, Pic de Gaulle, Necklace and Postern via routes pioneered by the 70/71 expedition. Additionally, Mogford, Wimpenny and Simkins climbed Mount Pendragon (highest on the island at 973 m) by a new route up the South West ridge.

The islands still offer plenty of scope for the mountaineer with a few unclimbed peaks remaining on Elephant and Clarence Islands and a great variety of fine routes on the peaks already climbed.

Below are listed all the first ascents together with the data, composition of party and height as found by altimeter.

CLARENCE ISLAND PARTY

Baby Bear 598 m; 7 January; Highton, Chuter, Wimpenny, Monteith. From Skua Camp the party, on skis, followed Bear Ridge southwards to col and then to summit.

Mount Irvine 1930 m; 8/9 January; Highton, Wimpenny, Monteith. From Dump B the party moved over Bear Ridge, across Right Glacier, then up a steep, crevassed slope to the plateau at 1280 m, where they camped. Next day they traversed South East before cutting back north to the summit. Whole route climbed on skis.

Mummy Bear 690 m; 12 January; Highton, Monteith, Wimpenny, Hurran. Ascended on skis from north side of Lunar Glacier reaching summit via western ridge.

The Ramp 823 m; 17 January; Davies, Wimpenny, Chuter, Monteith. From campsite south of Lunar Glacier party moved up northwest ridge to summit, descending by southwest ridge to Craggy Point.

The Horn 386 m; 19 January; Highton, Hunt, Hurran, Turnbull. From Chinstrap Cove Camp the party ascended the snout of Left Glacier which was crossed to the east side of the Horn. 300 m from the top crampons were removed and the rock climbed to the summit.

Jubilee Peak 684 m; 2 February; Highton, Wimpenny, Hurran. The party started from Cape Lloyd, ascending by way of the narrow, corniced East Ridge, gaining summit through split mushroom.

Ravelin Ridge 800 m-1300 m; 3/4 February; Highton, Wimpenny, Hurran.

The party ascended to a height of 800 m from Cape Lloyd before removing skis and proceeding southwards along the ridge for approximately 5 miles. They then descended by the south arm of Trident Glacier to Fur Seal Camp.

White Tor, Cornwallis 457 m; 9 February; Hunt, Davies, Wimpenny. Ascended from the campsite on the southwest side up the northwest ridge to the west summit.

GIBBS ISLAND PARTY

Fortune Summit, O'Brien Is 438 m; 10 December; Baylis, Simkins. Climbed by the east facing slope to the ridge, then north to summit, descending northeast of summit.

Aster Peak, Eadie Is 450 m; 4 January; Furse, Hallpike, Brown, Mogford.

From northeast beach up boulder scree to shoulder at 280 m then by snow gully to mushroomed summit.

Mount Jubilee, Aspland Is 800 m; 4 January; Milne, Baylis, Martin, Simpkins.

Party set off from Babel Point traversing northeast until way was found through cornices requiring 200' grade 2+ ice climbing to gain ridge which led easily to summit mound. Time and deteriorating weather allowed only Simkins to gain summit.

ELEPHANT ISLAND

The Mask 760 m; 18 February; Highton, Davies, Simkins. The party climbed the sustained 40°-55° west facing ice slope which led to the summit mound.

The Emblem 715 m; 19 February; Highton, Simkins. The pair gained the high point on the ridge between the Mask and the Emblem by way of a steep ice traverse from the north. Highton led off along the narrow corniced ridge to reach the base of the summit mushroom. Due to wind and poor condition of ice the corniced summit was climbed in turn by Highton and then Simkins.

The Baron 748 m; 19 February; Furse, Hunt, Davies, Baylis. Climbed by east ridge to base of summit mushroom which had to be tunnelled through to gain top.



O'Brien Island. Two climbers on the headwall of Camp Corrie with the summit ridge just visible 300m above.



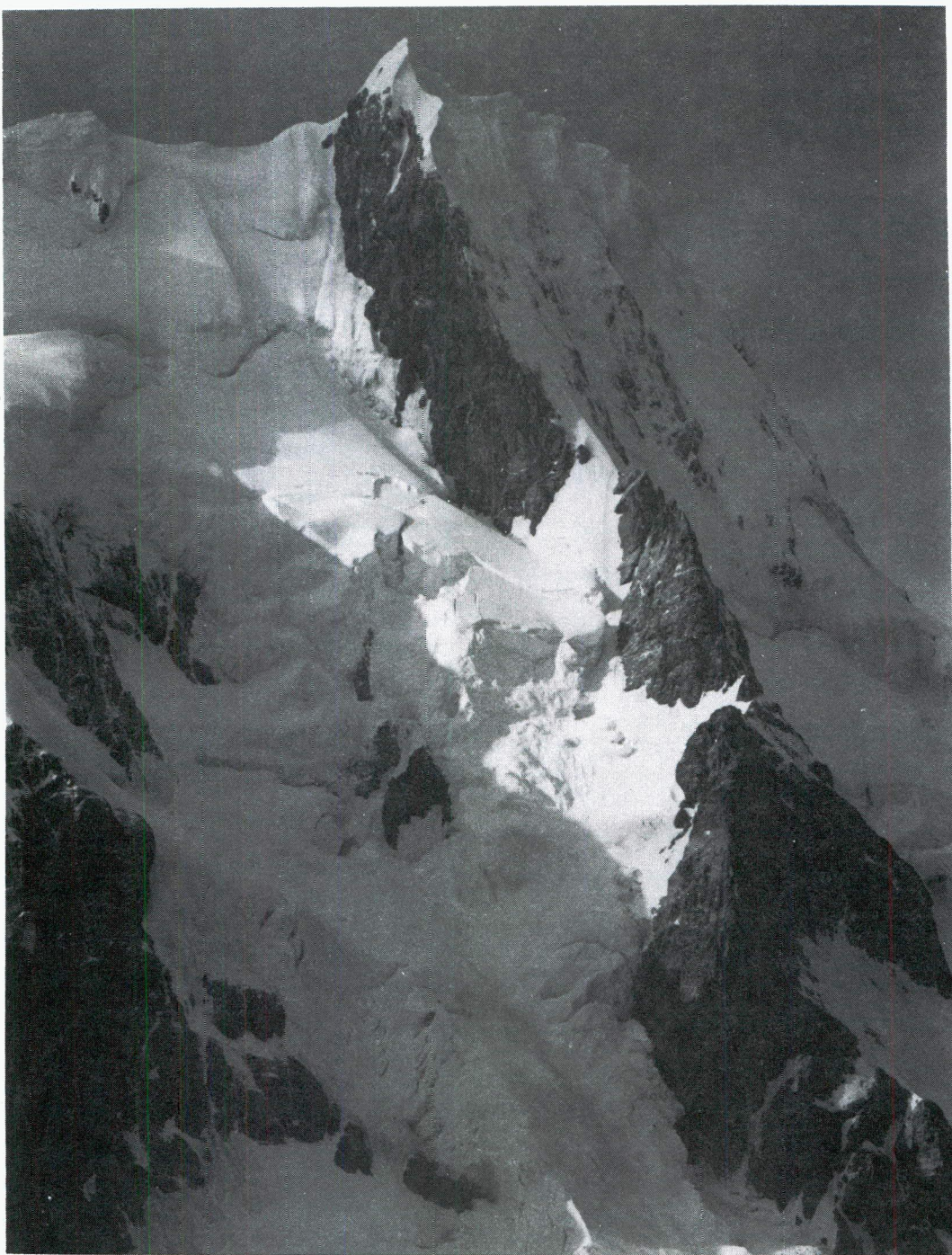
Highton and Hurran relax in the snowhole which they shared with Chuter and Turnbull during a 2-day blizzard above the plateau on Mount Irving whilst crossing Clarence Island.



O'Erian Island. Nesting Chinstrap penguins share their beach with the Expedition's canoes. Eadie Island provides the backdrop.



Elephant Island. A party sledges "Mischief" and "James K Caird" westward from Walker Point prior to the journey on which they were both sunk.



The evening sun picks out the final finger of the Emblem. Seen in telephoto from Walker Point.

CANOEING REPORT

The canoe controversy raged furiously throughout the expedition and has since continued unabated. Expedition members enthusiasm was usually inversely proportional to the number of times the individual had been shipwrecked! Nevertheless, much valuable experience was gained. General opinion amongst members at the close of the expedition was that, considering the rigours of the environment in which they were expected to operate, the canoes had operated satisfactorily both individually and as rafted pairs. What was questioned was their validity as a means of polar transport, considering their great dependence (when manned by relatively inexperienced canoeists) on good weather and sea states, when movement around the island on foot was not nearly so restricted.

Canoe transport could have been dispensed with entirely by the Clarence Island party without jeopardising any of the exploratory aims, for all the beaches visited were accessible from inland. Only the scientific programme required the use of canoes but many of the days wasted whilst waiting for good sea conditions could have been profitably put to other uses.

The most notable success of the canoes on Clarence was the 14Km passage of 8 men plus full equipment (radio, scientific kit, personal packs) from Cape Bowles on the east coast to Chinstrap Cove on the West in fine weather in early January. The return trip with 4 crew men and 4 damaged canoes, however, was nightmarish. Of the 55 days spent on Clarence, canoeing was possible on 23 and actually took place on 17 (12 scientific and 5 movements).

The Gibbs Island party relied much more on their canoes for inter-island transport and could not have completed their exploration aims without them. The craft were used successfully to make the passages from O'Brien to Aspland (4Km), Aspland to Eadie (1 Km across a narrow strait subject to tide rips), and to ferry the entire party and kit out to MV Lindblad Explorer for passage to Gibbs Island. This transfer to Lindblad Explorer took $1\frac{1}{2}$ hours and provided the party with their most interesting technical canoeing on a lumpy sea. Of the 58 days spent in the small island group 23 days were suitable for canoeing and advantage was taken of 18 of them (13 fishing and 5 movement). On Elephant Island canoeing took place on only one day and resulted in the total loss of 2 canoes and an engine so the day could hardly be described as "suitable".

Of the 10 original canoes only 3 survived the expedition unscathed. The Clarence Island canoes suffered most. "Bunny" was smashed by a small growler thrown up the beach by a violent storm but the loss of the repair kit in the same storm rendered the relatively light damaged suffered by the other 4 much more serious. A few days later "Happy Haggis", rafted up, was holed, sunk and recovered whilst attempting to leave the cove in brash ice and a heavy swell. These 4 survivors were later to limp back to Cape Bowles where an ice fall in the cove smashed "Happy Haggis" and "Bear Pooh" beyond repair and badly damaged "Boss-cat" and "Tigger". All the Gibbs Island canoes survived to reach Elephant Island in one piece but "James K Caird" and "Mischief" were subsequently wrecked on a beach on the south coast of Elephant Island whilst attempting a landing in unexpectedly vicious surf. These 2 were the only boats to be lost at sea.

Although canoeing inexperience undoubtedly contributed a little to most of the incidents they were largely due to underestimating the very changeable and harsh environment in which the craft were operating.

Equipment. The basic craft was a 'Tasman' twin cockpit, long distance touring canoe designed by Charles Evans and manufactured at the Canoe Centre at Crediton. Overall length was 5.5m, beam 66cm and unladen weight about 40Kg. They were fitted with overstern rudders, had good stowage space fore and aft and were strongly constructed. Some small modifications were made for the expedition. Each canoe was fitted with 3 U-section fibreglass rafting brackets moulded to the deck; one forward of the front cockpit, one forward of the after cockpit and one on the stern deck. Each canoe carried 2 rafting poles of aluminium tubing, 5cm in diameter and 158cm in length, stowed internally until required. To raft up, the poles were secured to the rafting brackets by cross tying with polypropylene line, lateral movement being prevented by a 1m length of nylon rope secured through the end of each rafting pole. The arrangement proved to be very strong and no problems were experienced with it. An engine board of 25mm marine grade plywood with an oak engine-mounting transom was then fitted over the centre and stern rafting poles between the canoes. Wooden slats on the underside of the board ensured correct location on the poles and nylon line lashings served to secure it to the poles.

The outboard motors were Johnson Euro 76 4HP. They performed very creditably, were light, robust and compact, and were able to drive the rafts at about 5 knots. One engine survived 2 complete immersions in sea water, one shipwreck, one icefall and a 300m slide through a penguin colony losing several pieces of casing en route, yet it still continued to operate until finally lost in another shipwreck. These engines were extremely good value.

Paddles, which had jointed metal looms and flat plastic blades and were supplied by Ottersports, proved adequate. Spraydecks were of neoprene-proofed nylon and stood up well to some hard usage. All the ancillary equipment performed satisfactorily, including the "Crewsaver" buoyancy bags, the "Whale Gusher" pumps and the "Henderson Chimp" pump.

Wetsuit clothing was taken to wear in the canoes but was little used because of the inconvenience of drying out the kit after use in such unfavourable conditions. The most popular clothing was a pair of body-length waders (the bottom half of an RN dry diving suit) over climbing breeches and seaboot stockings. On top a thick sweater, waterproof nylon anorak, buoyancy aid, spray deck and woolly hat kept most of the weather out, if not all the water. In the zero water temperature neoprene gloves or mitts were found to be essential.

A more comprehensive equipment report is in the course of being prepared and will be lodged with DNPTS and the British Canoe Union.

With hindsight and hard won experience of Antarctic canoeing the majority of team members would favour single canoes about 4.8m long with a 66cm beam, smaller cockpit, longer foredeck and watertight bulkheads. A capability for rafting, similar to that of the Tasmans, for load carrying and engine mounting in suitable weather conditions would also be added. The remainder would favour HMS Endurance.

MEDICAL REPORT

Prior to departure all members were dentally assessed, given a series of immunisations, examined clinically and told of the medical hazards of a cold environment. Also bloods were grouped and cross-matched. Malaria prophylaxis was taken on the outward journey. Mild but persistent diarrhoea afflicted several in South America but it cleared by the time the islands were reached. Vitamin capsules were taken throughout the expedition.

Medical problems in the South, which were few and not serious, included 2 cases of mild haemorrhoids, a deep puncture wound of the wrist from a crampon spike, concussion consequent on a blow from a rock, a locked knee from a fall on scree (no sequelae, though the probable medial meniscus tear may require attention later), an Achilles tendonitis, a requirement for a few temporary fillings, transient insomnia, strained lateral collateral ligament of the knee, 2 cases of low backache, one case of gastritis, mild dyspepsia, an onychomycosis, a few minor lacerations and bruises and a scalding. Also one doctor removed the other's lower right first molar.

Blood transfusion equipment, the facility for grouping and much useful advice was given by Royal Naval Hospital, Haslar. All other medical supplies were provided by Royal Naval Armament Depot, Ludgershall and consisted of 16 first-aid kits, 6 identical "dump" boxes complete with contents list, instructions and first-aid notes, and 2 sets of boxes, one for each of the 2 doctors. Each of these sets comprised a box of drugs and instruments, an insulated "fluids" container, a dental valise and a dressings box. Lists of the supplies taken, together with a report on their suitability are held by Commander Furse and by RNAD Ludgershall who, incidentally, have supported the expedition extremely well.

Three research programmes were conducted.

1. All members completed daily sleep charts throughout the expedition and will continue to do so for a similar period "at home" on return to UK. The object of this is to contrast the quantity and quality (subjective) of sleep at home with that in the field and to relate this to activity and individual morale.
2. The effect of the cold environment and field rations on certain blood parameters was studied. Blood samples were taken prior to the expedition and after a further 6 months. The parameters under investigation are serum, iron, folate, vitamin B₁₂ (peripheral blood films), thyroid function, plasma protein and immunoglobulin assay (laboratory analysis). The help of Wing Commander C Mewrick and Flight Lieutenant R G Dugdale of the RAF Hospital, Ely is greatly appreciated.
3. Psychological reaction to the cold, isolated environment in groups of 8, then of 16, was explored using a model based on the Hippocratic concept which divides personality into 4 "humours". Each personality was placed by one observer on the "map" and the assessment repeated on 3 occasions, any movement being noted. A "sociogram matrix" was also devised to measure the interplay of characters in the groups. Valuable guidance on this programme was received from Dr John Anderson of Science 4 Dept MOD London.

It is planned to submit a paper on these three studies to "The Journal of Naval Medicine".

FINANCE

The expedition banked with Williams & Glyns. My original budget for a 12 man team in 1974 was £5,400. Since then inflation has doubled many costs and economies in the Ministry have reduced the material support available; despite this, I was able to increase the team's size to 16 this year. These three factors have combined to increase the budget to £23,000 and I now hope that the expedition fund will end up with a credit balance representing a notional "profit" of nearly 4%. If so, that balance will be surrendered to the JSET.

Travel absorbs half the expenditure. Though maximum utilisation has been made of standard service equipment, purchase of non-service equipment has absorbed a further quarter of the budget. (Compare our expenditure of £2,500 on canoeing kit alone with Shackleton's £14,000 for his specially built ship "Endurance".) The remaining quarter of the budget is for photographic equipment, cine film, report, insurance and printing etc..

The JSET endorse expeditions, and every second year they select one for sponsorship, making available up to £6,500 to cover travel and freight costs; on this occasion, ours was selected. A similar sum has been contributed by the team members, proportionate to their pay. The remaining £10,000 has been provided by the generosity of many varied organisations and individuals. This expedition could not have been mounted without the support of both the JSET and the following contributors. I and the whole team wish to record our gratitude and appreciation.

Army Central Fund	Lady Birley	Boyd Line Ltd
Barclays Bank Ltd	Mr P L Brown	Ellis & Everard Ltd
Fleet Amenities Fund	Mr W R Freer	Homa Castors Ltd
Mr W J Hurran	Miss Peggarty Jesse	Leverhulme Trust Fund
Lt Cdr J McGrath RN	Peter McRae Group	Miss Lettice Rathbone
Newtonhill Jumble Sale	Mr W U B Reid	RAF Germany
RAF Bruggen	RAF Hospital Ely	RAF Support Command HQ
RN Kayak Association	Taylor & Son	White Fish Authority
British Petroleum Co Ltd		Boston Deep Sea Fisheries
British Aircraft Corporation		Winston Churchill Memorial Fund
H W Coates of Cosby Ltd		HMS Cochrane Welfare Fund
Commandant General Royal Marines		HMS Collingwood Ships Fund
Flag Officer Plymouth's Fund		Flag Officer Scotland and N Ireland
Rear Admiral & Mrs J P W Furse		High Voltage Applications Ltd
Godman Exploration Fund		Hawker Siddeley Foundation
Joint Services Expedition Trust		Mount Everest Foundation
HMS Revenge (Starboard Crew)		RAF Expedition Training Funds
RN Adventure Training Funds		RN Bird Watching Society
Trans-Antarctic Association		Trenchard Memorial Award Fund
Miss Jeanneta Warner CBE		Gino Watkins Memorial Fund
Sir James Caird Travelling		Commander in Chief Naval Home Command
Scholarship Trust		Benevolent Fund
Nuffield Trust for the Forces of		Royal Engineers Mountaineering &
the Crown		Exploration Club
WEXAS (World Expeditionary		
Association		

EQUIPMENT AND FOOD

18 months before our departure the first important steps were made: a Customer Code Number was acquired (through DNPTS), a store for the collection, checking and packing of all the gear was arranged (PSTO (N) Portsmouth), and the first draft of the stores list made. Equipment came largely from Naval sources but many items were provided from other service sources eg units/establishments, RAF (MOD, Harrogate), RM (CGRM, Whitehall), ROD Thatcham (Adventure Training Store). In addition, £7,000 of expedition funds were spent on items not available from service sources. Food was supplied by DGST (N) and was 4 man-day compo, bulk food supplement, individual RM arctic rations, plus a selection of extras acquired by an expedition member plus individuals' own 'goodies'.

All stores were ordered for delivery to PSTO (N) by the end of April '76 (6 months prior to HMS Endurance's departure) and, by September some 13 tons of stores and scientific equipment had been packed into 450 cases and itemised ready for delivery to the ship in mid-September. Stores were packed into standard Type H Plycases where possible and all cases weighed less than 400 lbs (Wasp's load limit). After the expedition, 78 cases weighing 10,000 lbs were returned to source via PSTO (N), non-returnable items going to ROD Thatcham as a basis for future Joint Service Expeditions.

Stores were accounted for and an expedition D787 raised. Many items became defective or were broken in circumstances beyond individuals' control (wind, heavy seas and ice-fall were the main contributors) and records of loss/damage were kept. In general most equipment was adequate or better and the food was both excellent and plentiful. Experience before and during the expedition prompts the following comments:

- a. All tentage should be new and of 'pyramid' design.
- b. Boxes should be smaller and sturdier than the plycases used and should be marked on all 6 sides with identity and destination.
- c. Individuals should be encouraged to keep personal kit to a minimum.
- d. In certain areas far too much kit was taken viz clothing, tools, duplicated scientific items, and stationery.
- e. HMS Endurance did not have the capacity to carry bulk petrol across the Equator.
- f. A central checking and packing store is very worthwhile.
- g. A surprising number of items were available from service sources, and there were probably some of which we never learned. An expedition member with experience of Naval and tri-service stores could have saved much time and some expedition funds also.

A list of all items of food and equipment taken, plus their sources, and detailed comments is held for reference purposes by DNPTS.

A similar list is included in this report and incorporates members' comments in the form of numbers voting for each of 3 categories covering both quality and quantity. Only members with experience of the item commented in each case.

EQUIPMENT EVALUATION

Symbols used are as follows :-

** excellent	‡ unsatisfactory	§ sufficient
* satisfactory	+ excessive	- insufficient

ITEM	QUANTITY	SOURCE	QUALITY			QUANTITY		
			**	*	‡	+	§	-
<u>Clothing</u>								
Balaclava	17	RN	1	10	2	3	10	-
Headover	15	RM (M&AW)	6	7	-	-	12	-
Snow goggles	16	Thatcham	-	6	4	1	9	-
Anorak GP	14	Thatcham	-	7	3	2	8	1
Cagoule	14	Thatcham	1	6	6	1	12	-
Tiso Mountain Jacket	16	Adventure Eqpt	3	9	1	2	13	-
Overtrousers proofed nylon	14	RAF	1	11	2	1	13	-
Gaiters	14	Thatcham	1	9	5	-	8	6
Gloves fireball	15	RM (M&AW)	-	4	7	4	7	-
Gloves blue wool	18	RM	-	9	3	1	9	-
Mittens winter outer	20	RM (M&AW)	-	13	3	-	11	2
Mittens winter inner	20	RM (M&AW)	2	8	2	-	11	1
Gym shoes	17	RN	-	10	-	1	13	-
Boots ski march c/w insole	10	RM (M&AW)	-	6	-	3	6	1
Bootlaces	30	RM (M&AW)	-	-	1	4	-	-
Jersey wool heavy	14	RM (M&AW))	3	10	-	4	9	-
Jersey wool heavy	18	RN)						
Shirt KF	30	RM (M&AW)	9	6	-	2	13	-
Scarf	16	RN	-	7	1	3	5	-
Undershirts	42	RM (M&AW)	2	8	-	3	7	-
Vest string	32	RN	1	8	1	7	6	-
Breeches whipcord	14	Thatcham	1	7	4	3	10	-
Breeches	6	RAF	1	3	3	4	5	-
Trousers cotton and nylon	14	RM (M&AW)	2	4	-	3	6	-
Drawers cold weather	42	RM (M&AW)	1	9	-	2	8	-
Stocking SM	48	RN	-	6	5	9	2	-
Socks mens white	30	RM (M&AW)	4	9	-	1	12	1
Stocking loop stitch	30	Local purchase	11	3	-	-	14	1
Braces	18	RN	1	6	3			
<u>Miscellaneous</u>								
Dubbin	60 tins	RN	2	8	-	2	9	1
Knife	16	RN	-	6	7	6	8	-
Watches	16	RN	1	11	3	-	12	2
Lanyard	14	RN	1	11	-	2	11	-
Lip Salve	100 sticks	45 Cdo	1	9	-	12	-	-
Soap	60 bars	RN	-	9	2	14	1	1
Kit Bag	16	RN	-	9	1	5	6	-
Goggles ski	6	RM (M&AW)	-	3	-	-	5	-

ITEM	QUANTITY	SOURCE	QUALITY			QUANTITY		
			**	*	I	+	8	-
Camp								
Rucksack (Karrimor Pamir + K2 frame)	16	Adventure Eqpt	8	4	2	-	15	-
Climbing sack	14	Thatcham	1	10	1	9	4	-
Tent Ultimate Pyramid	3	SCRDE	10	5	-	-	4	11
Tent Arctic Pyramid	5	S/Hand	-	6	9	4	7	2
Tent Arctic Guinea	4	S/Hand	-	3	12	10	4	-
Tent Vango Mk 5 Everest	11	Adventure Eqpt	-	9	7	-	13	1
Tarpaulin 12' x 12'	12	RN	2	12	-	3	10	-
Groundsheet 6½' x 3'	12	RN	-	5	3	6	4	-
Sleeping Mat	18	RM (M&AW)	3	10	1	-	9	3
Sleeping bag + liner + valise	15	RAF	-	2	1	5	-	-
Sleeping bag (Point Five)	2	Local purchase	-	-	2	3	-	-
Sleeping bag		Polywarm	15	1	-	-	13	2
Mattress pneumatic	0	RM (M&AW)				-	-	4
Survival bag double	16	HMS Caledonia	2	12	1	-	15	-
Stove kerosine	26	Local purchase	16	-	-	8	8	-
Hexamine stoves	30	RN	-	9	3	9	3	-
Hexamine blocks 4 boxes		RN	-	9	1	9	4	-
Lamp Tilley	7	RN	10	6	-	2	9	5
Lamp Tilley mantle	40	RN	-	9	-	4	6	-
Candles wax 40 lbs		RN	4	11	-	-	12	3
Torch	20	RN	3	10	1	-	14	-
Torch batteries	336	RN	-	11	-	6	9	-
OM kerosine grade A	270 galls	RN	1	15	-	-	14	-
Can fuel 4½ gal	80	RN	4	10	-	-	12	-
Bulb lamp filament	30	RN	-	7	-	4	6	1
Matches waterproof	5 packs	RN	7	4	-	-	4	8
Matches 48 doz boxes		RN	-	10	5	9	5	-
Funnel 1.1/16" spout	7	RM (M&AW)	4	10	-	1	9	5
Funnel 1 pint	4	RN)	-	12	1	1	11	1
Funnel 2 pint	4	RN)						
Plastic 5 gall container	8	RN	-	11	1	4	8	-
Water bottle + cup	16	45 Cdo	-	8	4	9	6	-
Cup plastic	24	RN	6	8	1	-	15	-
Vacuum flask 1 pint	20	RN	-	11	1	5	10	-
Carrier common vacuum flask	14	RM (M&AW)	-	10	-	7	8	-
Pressure cooker	4	RM (M&AW)	-	4	-	8	1	-
Arctic pot	15	45 Cdo	8	8	-	-	14	-
Mess tins	24	RN	1	14	-	8	7	-
Jug 2 pint	4	RN	2	4	-	12	2	-
Stew pan 8 pint	4	RN	2	14	-	6	10	-
Saucepan 4 pint	22	RN	-	12	1	12	4	-
Kettle 4 pint	7	RN	3	12	-	9	4	2
Opener can	7	RN	-	5	2	10	5	-
KFS	20	RN	1	8	6	-	14	1
Bucket plastic	6	RN	1	12	-	4	5	4

ITEM	QUANTITY	SOURCE	QUALITY			QUANTITY		
			**	*	I	+	S	-
<u>Camp (contd)</u>								
Sponge	28	RN	10	6	-	1	14	-
Dishcloths	60	RN	-	3	4	8	2	-
Paper towel	30 rolls	RN	14	2	-	-	7	7
Pads scouring	100	RN	4	11	-	9	5	-
Toilet roll (absorbent)	24 rolls	RN	3	9	-	4	9	-
Brush sink snow	14	RM (M&AW)	6	7	-	3	9	3
Brush nail	16	RN	-	6	3	7	2	-
Detergent GP	7 galls	RN	-	3	1	15	-	-
Brush hand	8	RN	-	6	1	10	1	-
Bags poly (12" x 9")	1000	RN	3	10	-	5	9	-
Bags poly (6" x 9")	200	RN	2	6	1	6	6	-
Plastic tubing 27"	54 lbs	RN	4	11	-	3	11	-
Cling film	12 rolls	NAAFI	-	5	-	11	-	-
Snow shovel	4	RM (M&AW)	13	2	-	-	6	9
Snow saw	6	HMS Caledonia	1	7	1	-	9	-
Clock alarm	6	DOE	-	8	2	6	5	-
Compass Silva No 2	20	COD Donnington	-	11	4	-	13	-
Compass prismatic No 1	4	COD Donnington	3	7	1	1	9	1
Heliograph	20	RN	-	13	-	15	-	-
Altimeter	12	RAF	4	7	1	-	10	3
Altimeter	2	Thatcham	-	-	5	2	1	-
Binoculars	6	RN	-	6	6	4	5	1
Kit Fishing Arctic	15	RAF	-	9	-	9	6	-
Whistle safety	14	Thatcham	-	10	-	2	11	-
Signal kit distress	24	RN	1	13	1	-	15	-
Thunderflash small	144	RN	-	7	6	9	3	2
Hjelper sledge (+ harness)	4	RM (M&AW)	1	4	3	2	6	-
<u>Climbing</u>								
Rope nylon No 2 (120 fthm)	4	RN	1	8	-	5	5	-
Rope nylon No 4 (120')	20	RN	1	14	-	-	15	-
Rope belay No 3 (8')	4	Thatcham)						
Rope belay No 4 (10')	4	Thatcham)	-	7	-	4	6	-
Rope belay No 3 (10')	4	Thatcham)						
Prussic loop	8	Thatcham	-	6	1	1	3	1
Prussic loop	120 cm	Adventure Eqpt	-	14	1	-	10	2
Sling nylon	28	RAF	-	9	-	6	6	-
Cord nylon white (120 fthm)	6 reels	RM (M&AW)	9	7	-	1	13	2
Waist line (1" hemp)	70 fthm	RN	-	-	3	8	1	-
Waist belt	14	RAF	-	10	4	5	8	1
Karabiner (screw gate)	60	RN	1	11	3	5	11	-
Karabiner (Hiatt)	28	Adventure Eqpt	1	10	-	2	11	-
Jumars	6 prs	HMS Cochraine	3	6	-	7	3	1
Piton angle	10	Thatcham	-	4	-	7	1	-
Piton horizontal	10	Thatcham	-	5	-	7	1	-
Piton leeper	10	Thatcham	-	2	2	7	1	-
Ice screw tubular	20	Adventure Eqpt	3	10	-	1	11	1
Piton hammer	8	Thatcham	-	2	2	7	3	-
Descendeur (fig 8)	14	RAF	2	8	-	3	9	-
Ice axe 28"	14	Thatcham)	-	13	2	-	14	2
Ice axe	6	RN)						

ITEM	QUANTITY	SOURCE	QUALITY			QUANTITY		
			**	*	I	+	S	-
<u>Climbing (contd)</u>								
Deadman	5	Thatcham)	1	12	-	4	7	1
Deadman	9	HMS Caledonia)						
Crampons	41 prs	RN	3	5	4	6	7	-
Crampons (adjustable)	6 prs	HMS Caledonia	6	5	-	-	2	9
Crampon straps	14 sets	Adventure Eqpt	1	10	-	-	11	1
Helmets climbing	4	HMS Caledonia	-	12	1	1	10	3
Dye fluorescent	6 kgs	RN	3	4	-	5	2	-
<u>Canoes</u>								
Tasman canoe	10	Canoe Centre	1	6	7	3	11	1
Paddles flat blade split	34	Ottersports	-	13	1	3	12	-
Spray deck	24	Ottersports	1	13	1	1	14	-
Buoyancy aid (M)	6	Thatcham)	2	12	1	-	14	-
Buoyancy aid (L)	10	Thatcham)						
Paddle blade	6	Ottersports	-	8	-	8	5	-
Spray deck blank	8	Ottersports	-	14	-	1	9	2
Spray deck material	2 sq yds	Ottersports	-	8	-	6	3	-
Spare rudder	3	Canoe Centre	-	8	2	1	7	2
Tiller wire	100'	Canoe Centre	-	8	-	3	7	-
Tiller wire clamps	48	Canoe Centre	-	8	1	1	7	-
Rudder bracket	6	Canoe Centre	-	8	4	-	9	1
Rudder pins	6	Canoe Centre	-	2	8	-	1	9
Water pump (+ spares)	4	Whale Gusher	-	10	1	2	8	-
Bailer	8	RN	-	9	2	1	10	-
Canoe harness (+ trace)	12	45 Cdo	-	1	-	4	-	-
Wet suit top	16	RN	3	11	2	3	13	-
Wet suit bottom	8	RN	-	7	6	11	3	-
Wet suit boots	8	RN	-	6	5	10	3	-
Divers dress trousers	6	RN	11	4	-	-	7	9
Johnson "Euro 76" 4HP	4	E P Barrus Ltd	9	5	1	-	15	1
<u>outboard</u>								
Gasoline	90 galls	RN	1	15	-	10	5	-
Can gasoline 1 gall	4	RN	1	1	1	1	7	3
<u>Ski</u>								
Skis touring	17 prs	RN	-	13	-	-	12	-
Sticks ski metal	8 prs	RM (M&AW)	4	7	-	-	7	5
Ski skins	16 prs	Adventure Eqpt	-	12	1	1	10	1
Ski repair kit	4	RM (M&AW))	-	3	1	1	4	-
Ski repair outfit	4	RM (M&AW))						
Repair tips ski	6	Thatcham	3	4	-	-	7	-
Basic ski dressing	4 packs	RM (M&AW)	-	4	-	3	-	-
Ski wax	20 sets	RM (M&AW)	-	1	4	6	1	-
Ski scraper	14	RM (M&AW)	2	1	-	-	-	4
<u>Tools</u>								
Tool bag	4	RN	-	10	1	-	6	4
Tool box	2	RN	-	1	6	6	-	-
Saw 33"	2	RN	-	5	4	7	1	-
Frame Hacksaw	4	RN	-	8	-	1	5	2
Blades hacksaw	24	RN	-	8	-	3	6	1
Screwdriver small	4	RN	1	9	-	-	4	7

ITEM	QUANTITY	SOURCE	QUALITY			QUANTITY		
			**	*	I	+	8	-
<u>Tools (contd)</u>								
Screwdriver medium	4	RN	1	8	-	-	4	8
Screwdriver large	2	RN	1	9	-	1	7	4
Screwdriver Phillips 2"	4	RN	1	6	-	4	5	-
Screwdriver Phillips 3"	4	RN	1	7	-	4	5	-
Hand drill	4	RN	2	10	1	-	10	3
Twist drill 1/16", 1/8", 1/4", 3/8", 3/16"	4 each	RN	-	12	-	-	7	5
Mallet	2	RN	-	6	-	6	4	-
Hammer claw	2	RN	-	9	-	2	5	3
Hammer ball	2	RN	-	8	1	3	6	2
Sledgehammer 7lb complete	7	RN	-	9	1	3	6	-
Centre punch	4	RN	-	6	-	3	3	2
Chisel cold	6	RN	-	7	-	1	8	-
Pliers sidecut	4	RN	-	9	-	-	7	3
Pliers long snip nose	4	RN	-	9	2	1	8	1
10" plier wrench (mole)	2	RN	2	9	-	3	5	3
Wrench plier 7"	2	RN	3	6	-	2	4	5
Hand vice	6	RN	-	4	1	2	2	-
File 12" flat	1	RN	-	8	-	-	8	2
File 8" round	4	RN	-	9	-	1	7	3
File 8" flat	4	RN	-	8	1	3	7	-
Spanner adjustable	2	RN						
Emery paper Nos, 0, 2, 3	2 QR each	RN	-	8	-	14	-	-
Wet & Dry 180, 240, 320	48 sheet each	RN	-	9	-	15	1	-
Oilstone	2	RN	-	10	1	-	6	5
Tape measure	6	RN	-	11	-	1	12	-
Steel rule 6"	6	RN	-	7	-	6	4	1
Steel rule 12"	6	RN	-	10	-	3	7	1
Tape measure 100'	6	RN	1	8	1	2	8	-
Spade	6	RN	2	6	1	5	6	-
Shovel hand	4	RN	3	6	1	3	4	5
Punch eyelet 1/4"	4	RN	-	4	2	1	2	2
Eyelet male 1/8"	144	RN	-	4	-	1	3	1
Eyelet female 1/8"	144	RN						
Rivetter blind	2	RN	-	5	1	2	1	4
Rivets 1/8"	288	RN	-	-	2	1	3	1
Blow lamp	5	RN	-	1	5	3	2	-
Scissors large	5	RN	-	7	-	4	4	-
Nail puller	3	RN	-	3	-	3	3	-
Pinch bar	2	RN	-	3	-	2	2	-
Brush wire	2	RN	1	3	-	1	3	1
Marlin spike	2	RN	-	4	-	5	-	1
Pick digging + handle	6	RN	2	9	-	-	9	1
Paint brush 1/2"	8	RN	-	7	-	1	4	5
Paint brush 1"	6	RN	1	7	-	1	3	5
Paint brush 2"	2	RN	1	5	-	1	4	4
<u>Repair Materials</u>								
Nails 6"	51b	RN				6	4	-
Nails 1 1/4"	51b	RN				3	5	3
Screws 2" wood (brass)	31b	RN				5	2	1

ITEM	QUANTITY	SOURCE	QUALITY			QUANTITY		
			**	*	I	+	8	-
<u>Repair materials</u>								
Screws 1" wood	3lb	RN				1	6	2
Screws 2" wood	1½lb	RN				4	7	2
Split pin 1/16"(steel)	48	RN						
Split pin 1/8"(steel)	24	RN				8	-	-
Split pin 1/32" (steel)	100	RN						
Jubilee clip 1"	48	RN				7	1	-
Jubilee clip 2" and 3"	24 each	RN				7	4	-
Siezing wire	200'	RN				2	7	3
Paint dayglo orange	8 qt	RN				1	8	1
Paint black	2 litre	RN				2	8	-
Paint white	2 pint	RN				2	8	-
Sailmakers palm	4	RN				-	8	4
Sailmaker needles	4 pkts	RN				-	7	4
Twine (fine)	5lb	RN				1	8	2
Twine (medium)	5lb	RN				2	7	1
Cod line (80 yds)	20	RN				-	10	1
Insulating tape	5 rolls	RN	-	7	2	6	2	1
Tape making 2"	30 rolls	RN	3	9	-	1	9	1
Stayput tape 3½"	12 rolls	Adventure Eqpt	4	6	1	1	8	-
Bostik clear	24 tubes	RN	1	7	2	5	5	-
WD 40 aerosol	12	RN	11	-	-	-	9	1
OM 13	3 btls	RN	2	4	-	3	3	-
Grease silicone	3lb	RN	1	3	-	2	4	-
Hose ½"	60'	RN	-	6	-	4	3	-
Leather pieces assorted	30 pkts	RN	7	4	-	8	2	-
Tent materials	6 pk	HMS Caledonia	-	7	-	2	7	1
Rubber patches	6 pks	HMS Caledonia	-	5	-	3	3	-
Wood ¾" marine ply	4 sheet	RN	2	5	-	8	2	1
Wood 1" dowel (ash-dressed)	120'	RN	-	6	2	3	-	3
Wood 2" x 1" (ash-dressed)	100'	RN	-	-	7	7	2	-
Bamboo sticks	144		-	8	2	9	2	-
Dayglo flags	144		5	6	1	7	1	-
<u>Photography</u>								
Lens cap (spare)	0					-	-	7
Polarizing filter 58 mm	2	JSE						
Komura Telemore 2X converter	2	JSE	4	-	-	-	2	1
Viritar 2X converter for Pentax K	1	JSE	4	-	-	-	2	1
Pentax 28 mm lens hood	2	JSE	-	-	2	2	-	-
Pentax mount adapter	2	JSE	-	2	-	-	1	-
Pentax SN camera body	2	RN	-	5	-	-	-	5
Pentax 55 mm lens	2	RN	-	2	-	1	2	-
Pentax 135 mm lens	2	RN	-	2	-	3	1	-
Pentax 300 mm lens	2	RN	-	3	-	1	3	-
Pentax 35 mm lens	2	Army	2	2	-	-	4	-
Pentax 150 mm lens	2	Army	2	2	-	-	4	-
Pentax bellows	2	RN	-	3	-	3	-	-
Skylight filter 49 mm	6	JSE	-	4	-	-	3	-
Polarizing filter 49 mm	2	JSE	-	3	-	-	3	-

ITEM	QUANTITY	SOURCE	QUALITY			QUANTITY		
			**	*	I	+	S	-
Photography (contd)								
Yellow filter 49 mm	2	RN	-	3	-	-	3	1
Rollei camera	1	Private	4	-	-	-	1	5
Mamiya camera outfit	1	Private						
Pentax camera outfit	1	Private						
Topcon camera outfit	1	Private						
Olympus OMI outfit	1	Private	3	-	-	-	-	4
Calypso Nikkor u/water camera	5	RN & DPR	6	1	1	1	1	6
Calypso Nikkor case	5	RN & DPR	1	3	3	-	3	-
Kodak Ektachrome X (20 exp) 350		Army & RN	1	4	5	5	4	-
Kodak Ektachrome X (36 exp) 200		RAF				-	4	4
Kodak H/speed Ektachrome 150 (20 exp)		Army & RN				4	2	1
Kodak Kodachrome (36 exp) 100		JSE				-	4	3
Ilford FP4 (36 exp)	150	RAF				5	1	-
Kodak Plus X (36 exp)	150	Army				-	6	3
Ilford HP4 (36 exp)	50	RN				-	7	-
Polaroid camera	0					-	2	6
Pentax auto bellows	1	RAF	-	1	-	2	-	-
Cable release	4	RAF	-	2	-	-	2	-
Lens brush	2	RAF	-	2	-	-	-	4
Weston light meter & invercone	6	RAF	3	3	2	-	4	4
Tripods	4	RAF & RN	-	-	6	6	-	-
Minitripods	6	JSE	-	2	1	1	3	-
Changing bags	2	JSE	-	2	-	-	2	-
Kodak grey cards	20	JSE	-	2	1	8	-	-
Lens tissues	6 packs	Army	-	-	2	2	-	-
Lens cloths	20	RAF	4	5	-	-	9	-
Frame record books	16	RAF	6	3	1	-	12	-
35 mm developing tank	2	JSE	-	1	-	3	1	-
300 cc flask	2	JSE						
Thermometer	2	JSE						
Developing chemicals	2	JSE						
Olympus RC 135 camera	2	Army	-	2	1	1	1	-
Olympus lenshood	2	JSE	-	1	1	1	1	-
Olympus UV filter	2	JSE	1	2	-	-	4	-
Olympus batteries	4	JSE	-	3	-	-	1	2
Konica C35 camera	4	Army	3	1	1	-	4	-
Konica lenshood	6	JSE	-	2	-	4	-	-
Konica yellow filter	1	JSE	-	1	1	-	-	5
Konica batteries	12	JSE	-	4	-	-	4	-
Konica flash units	4	Army	3	2	-	-	4	-
Konica flash batteries	10	JSE	-	4	-	-	4	-
Pentax KM body	2	JSE	1	1	1	-	1	2
Pentax K 55 mm lens	2	JSE	-	3	-	2	1	-
Pentax K 28 mm lens	2	JSE	3	-	-	-	3	-
Pentax K 200 mm lens	2	JSE	3	-	-	1	2	-
Pentax K 85-210 Zoom lens	1	JSE	-	1	-	-	1	1
Pentax K camera case	2	JSE	-	3	-	-	3	-
Skylight filters 52 mm	6	JSE	-	2	-	-	2	-

ITEM	QUANTITY	SOURCE	QUALITY			QUANTITY		
			**	*	I	+	\$	-
<u>Photography (contd)</u>								
Skylight filters 58 mm	3	JSE	-	2	-	-	2	-
Yellow filter 52 mm	1	JSE	-	2	-	-	2	-
Yellow filter 58 mm	2	JSE	-	2	-	2	-	-
Polarizing filter 52 mm	2	JSE	-	2	-	2	-	-
<u>Afterthoughts</u>								
Boots Dolomite	6	Private	5	-	1			
Scarpa comicci	2	Private	-	1	1			
Greenlander	6	Private	2	4	1			
Super RD	2	Private	2	-	-			
Caber	1	Private	1	-	-			
Nordica	1	Private	1	-	-			
Hawkins Pillar	1	Private	-	-	1			
Gloves Dachstein	7	Private	8	1	1	-	15	-
Helly Hansen	7	Private	6	1	-	-	14	1
Silk inners	16	RN	4	3	2	2	5	1
Wetsuit	16	JSE	6	3	2	-	6	3
U/wear RAF aircrew	1	Private	1	-	-			
Danart	5	Private	5	-	-			
Helly Hansen	1	Private	1	-	-			
Duvet jacket	7	Private	7	-	-	-	5	4
Polar jersey	5	Private	5	-	-	1	3	4
Wetsuit helmet	16	JSE	-	6	1	9	3	-
Towel	24	Private				8	1	-
Salewa ice hammer	4	JSE	6	4	-	-	-	9
Snowstakes	0					-	5	4
Climbing harness	7	Private	3	4	-	1	8	-
Holster	4	Private				-	3	5
Ski stick, wooden	8	RN	-	-	10	9	-	-
Henderson Chimp pump	1	JSE	-	4	1	-	4	-
Berghans Cyclops rucksack	1	Private	1	-	-			
Tent "Windover"	2	HMS Endurance	-	6	1	1	3	3
Monocular/telescope	0					-	2	4
Araldite twin pack	0					-	-	10
Polybags 2' x 2'	600	RN	1	4	-	2	5	1
Rags	6 bales	RN	8	2	3	6	6	-
Brace	6		3	5	-	3	3	-
Screwdriver (jeweller's)	1 set		3	1	-	-	-	5
Housewife	13		7	3	-	-	6	3
Washing powder	6 pkts					-	7	1

FOOD REPORT

- Royal Marines Arctic 24 Hour Ration. Four menus, A, B, C, D.
1120 rations taken on the Expedition. 6,500 calories per ration. 1.4 kg/manday

Meal	Item	Menu	Quantity	Quality			Quantity		
				**	*	±	+	8	-
BREAKFAST	Porridge	All	3½ oz	13	2	-	-	15	-
	Drinking Chocolate	All	2½ oz	13	2	-	-	14	-
SNACK	Beef Spread	A	2 oz	2	9	1	-	14	-
	Chicken Spread	B	2 oz	1	9	3	1	13	-
	Chicken & Bacon Spread	C	2 oz	4	8	-	-	10	-
	Cheese	D	2 oz	-	13	-	-	14	1
	Biscuits (Fruit)	All	3 oz	10	5	-	-	15	-
	Chocolate	All	2x2 oz bars	7	8	-	-	12	1
	Chocolate caramels	All	2 oz	4	9	1	1	13	-
	Nuts & raisins	All	1½ oz	-	10	3	2	11	-
	Dextrose tablets	All	1 oz	2	11	-	3	12	-
	Biscuits (plain)	All	3 oz	3	12	-	1	9	3
	Margarine	All	1 oz	-	12	2	2	11	-
MAIN MEAL	Soup (various)	All	1 oz	1	14	-	4	11	-
	Beef granules	A	2. oz	1	14	-	-	15	-
	Curried beef granules	B	2½ oz	5	11	-	-	14	1
	Mutton granules	C	2½ oz	4	11	-	-	16	-
	Chicken supreme	D	2½ oz	6	7	3	-	14	2
	'Smash' dehydrated potato granules	A, C	2 oz	2	11	1	2	14	-
	Pre-cooked rice	B, D	3 oz	5	10	-	1	14	1
	'Surprise' dehydrated peas	All	1½ oz	10	6	-	1	15	-
	Apple flakes	A, C	1 oz	8	7	-	-	11	2
	Apple & Bilberry flakes	B, D	1 oz	9	6	1	1	12	-
	Mixed vegetables	None	None		-			4	9
	Carrots	None	None		-			2	11
	Beans, sliced green	None	None		-			4	7
DRINKS	Coffee	All	2 x 3/16 oz	1	13	2	-	13	3
	Tea ('Nestea' instant)	All	2 x 1/16 oz	1	11	4	3	11	1
	Oxo	All	1 cube	-	13	-	1	13	2
	Milk, dried	All	½ oz	-	8	4	4	11	-
	Sugar	All	1 oz	-	16	-	1	11	4
SUNDRIES	Salt	All	1.25 grms	-	16	-	14	2	-
	Wooden spatula	All	1	3	13	-	2	14	-
	Can opener	D	1	9	7	-	-	14	1
	Matches, safety	All	1 Box	2	14	-	-	15	-
	Toilet paper	All	10 sheets	2	10	2	7	8	-
	Paper tissues	All	1 packet	12	4	-	-	10	3
	Menu sheet	All	1						
	Jam	All	None		-			2	11
	Polythene bags	None	None					12	4

2. Four Hour composite rations. Seven menus, A, B, C, D, E, F, G
896 rations taken on the Expedition. 3,500 calories per ration. 2.3 kg/man/day

MEAL	ITEM	QUANTITY	MENU							QUALITY			QUANTITY		
			A	B	C	D	E	F	G	**	*	±	+	δ	-
BREAKFAST	Sausages	16 oz	1	1	1	1				4	11	1	-	11	3
	Baked beans in tomato sauce	16 oz	1	1	1	1	1	1	1	2	12	-	-	7	2
	Bacon grill	16 oz		1				1		5	10	-	-	8	3
	Baconburger	15 oz				1				3	12	-	-	11	2
	Oatmeal blocks	5 x 1 oz	1	1	1	1	1			10	6	-	1	7	8
MAIN MEAL	Goulash	16 oz	2							5	9	-	-	15	-
	Corned beef	12 oz		2						3	12	-	2	12	-
	Casserole steak & onion	16 oz			2					7	8	-	-	14	-
	Chicken curry	16 oz				2				2	13	-	-	15	-
	Steak/kidney pudding	16 oz					2			3	11	2	3	13	-
	Chicken supreme	16 oz						2		2	10	2	1	15	-
	Stewed steak	16 oz							2	3	12	-	-	15	-
	Soup mixes: Mushroom	3 oz	1							2	12	2	1	15	-
	Chicken	3 oz			1					1	13	2	-	16	-
	Oxtail	3 oz		1		1				-	14	2	3	13	-
	Green pea	3 oz					1			2	13	1	2	14	-
	Onion	3 oz						1		4	11	1	1	11	4
	Vegetable	3 oz							1	3	12	1	1	15	-
	Mulligatawny	None			N	O	N	E		-				10	6
	Carrots	10 oz	1			1			1	1	15	-	-	14	2
	Mixed vegetables	10 oz		1						-	15	1	-	14	2
	Processed peas	10 oz			1		1	1		1	15	-	-	13	2
	Mashed potatoe powder	6 oz	1	1	1		1		1	2	11	3	3	13	-
	Rice - not pre-cooked	10 oz				1		1		-	7	9	3	12	1
	Apple pudding	22½oz	1							9	7	-	-	15	1
	Rice pudding	24 oz		1			1			5	10	1	-	15	1
	Mixed fruit pudding	16½oz			1					6	10	-	-	15	1
	Fruit salad	24 oz				1				4	12	-	-	15	1
	Canned pears	24 oz						1		5	11	-	-	13	3
	Chocolate pudding	16½oz							1	2	12	2	1	15	-
	Custard Mix	None								-	-	-		16	-
TEA	Luncheon Ham	16 oz	1			1				5	10	1	1	12	3
	Hamburgers	15 oz					1	1		4	11	1	1	12	3
	Salmon	16 oz		1					1	4	11	1	2	13	1
	Rich cake	10 oz		1						11	4	1	1	12	3
	Tea bags	4x½oz	1	1	1	1	1	1	1	5	11	-	1	13	2
	Coffee (Maxwell House)	½ oz	1	1	1	1	1	1	1	2	9	5	-	7	9
	Sugar	14 oz	1	1	1	1	1	1	1	-	16	-	1	10	5
	Milk instant	1½oz	2	2	2	2	2	2	2	-	14	2	4	11	1
	Cheese processed	8 oz	1	1	1	1	1	1	1	2	13	1	-	16	-
	Margarine	7½oz	1	1	1	1	1	1	1	-	15	1	3	13	-
	Jam (various)	9 oz	1	1	1	1	1	1	1	5	11	-	1	15	-
	Salt	1 oz	1	1	1	1	1	1	1	-	16	-	-	15	1
	Mustard	¼ oz	1	1	1	1	1	1	1	1	15	-	4	10	2
	Chocolate bars (milk or tiffin)	Barx2oz	4	4	4	4	4	4	4	-	16	-	-	13	3
	Boiled sweets	4 oz	1	1	1	1	1	1	1	-	9	7	12	3	-
	Matches	Booklet	1	1	1	1	1	1	1	-	4	12	-	7	9
	Can opener		1	1	1	1	1	1	1	8	8	-	1	14	1
	Toilet paper	24sheets	1	1	1	1	1	1	1	1	12	3	3	10	3
	Contents list		1	1	1	1	1	1	1						
	Plastic bag	None			N	O	N	E						11	5
	Reclosure lids (plastic)	None	2	2	2	2	2	2	2	2	14	-	1	12	3
	Paper towels	None			N	O	N	E							8
	Plain chocolate bar Bournville	None			N	O	N	E							11

3. Bulk Rations.

Description	Item	Quantity	Quality			Quantity		
			**	*	I	+	S	-
<u>Bread Mix</u>	Flour 50lb bags	5	-	16	-	9	7	-
<u>Biscuits</u>	Dried Yeast	None	-	-	-		13	3
	Sugar	200lbs	-	16	-	5	11	-
<u>Cereals</u>	Rice Milled	30lbs	-	16	-	8	8	-
	Spaghetti, 7lb cases	8	2	14	-	3	13	-
	Oatmeal blocks Cans of 10xloz	96	10	6	-	2	14	-
	Chocolate digestive biscuits	20lbs	8	8	-	-	13	3
	Garibaldi biscuits	10lbs	-	13	3	1	15	-
	Gingernut "	10lbs	5	11	-	-	13	3
	Fig roll "	10lbs						
	Biscuits, plain, in pks of 6, Tins 19½lbs	Tins x 8						
<u>Beverages</u>	Cocoa powder 1lb tins	12	8	8	-	1	14	1
	Ovaltine 1lb tins	12	5	9	2	2	13	1
	Milk, evaporated	None	-	-	-	-	12	4
	Milk, condensed	None	-	-	-	-	4	12
	Lemon juice powder 2lb tins	6	4	12	-	4	12	-
	Orange " " " "	6	3	13	-	4	12	-
<u>Sauces & Spices</u>	Thick brown sauce, bottles, large	24	2	10	4	10	6	-
	Tomato sauce, bottles, large	24	1	14	1	7	8	1
	Chutney 1lb jars	24lbs	7	9	-	2	9	5
	Pickles, mixed 1lb jars	24lbs	1	11	4	5	8	3
	Pepper, white ground 4oz tins	8	1	15	-	1	14	1
	Cheese, paremsan 3¼oz packets	12	1	15	-	2	13	1
	Curry paste, 4oz jars	18	1	11	4	-	13	3
	Curry powder	None	-	-	-	-	8	8
	Spices & herbs	None	-	-	-	-	6	9
<u>Sundries</u>	Scrambled egg mix 4oz sachets	112	3	10	3	-	9	7
	Tomato paste 1lb tins	24	3	11	1	4	11	-
	Packets of jelly (Various flavours)	72	1	14	1	4	11	1
	Bisto	None	-	-	-	-	15	1
	Coconut, dessicated	6lbs	-	14	2	7	9	-
	Golden Syrup 2lb tins	12lbs	8	8	-	1	6	9
	Raisins	10lbs	4	12	-	3	11	2
	Sultanas	10lbs	4	12	-	2	12	2
	Cooking fat 1¾lb cans	48	1	15	-	7	9	-
	Butter concentrate 1lb cans	48	5	10	1	6	9	1
	Custard powder 1lb bags	6	1	13	2	2	12	2
	Onion, dehydrated boxes 1lb	6	9	7	-	-	10	6
	Peanuts ½lb tins	6lbs	4	12	-	1	13	2
	Peanut butter 1lb jars	12	3	11	2	2	13	1
	Honey jars	45lbs	9	7	-	1	14	1
<u>Canned Vegetables & Fruit</u>	Potatoes whole 18oz cans. Cases of 24	4 cases	8	8	-	-	13	3
	Tomatoes 18oz cans cases of 24 cans	6 cases	-	16	-	2	14	-
	Beans, green, 15½oz cans cases of 24	8 cases	2	13	1	2	14	-
	Carrots 18oz cans cases of 24 cans	12 cases	2	14	-	1	15	-
	Vegetables, mixed, diced, 18oz cans Cases of 24	4 cases	-	13	3	2	13	1
	Peas, garden 18oz cans cases of 24	12 cases	-	16	-	2	14	-
	Beans broad	None	-	-	-	-	11	5

4. Bulk rations. (contd)

DESCRIPTION	ITEM	QUANTITY	QUALITY QUANTITY					
			**	*	+	+	6	-
	Apricots 29oz cans Cases of 24 cans	3 cases	7	9	-	1	14	1
	Peaches 29oz cans cases of 24 cans	3 cases	4	12	-	1	15	-
	Pears 29oz cans cases of 24 cans	3 cases	6	10	-	-	14	2
	Pineapples 29oz cans cases of 24 "	4 cases	6	10	-	1	13	2
	Cherries 20oz cans cases of 24 cans	2 cases	2	14	-	2	14	-
	Blackberries 20oz cans cases of 24	1 case	7	9	-	-	11	5
	Apples 28oz cans cases of 24 cans	6 cases	2	11	3	5	11	-
	Beans in tomato sauce	NONE	-	-	-	-	14	2
	Lyons fruit cakes, tinned 2lb	36	8	8	-	2	12	2
	Mayonnaise	NONE	-	-	-	-	13	3
<u>Meat</u> <u>& Fish</u> <u>Products</u>	Pork sausages 1lb.cases of 24 cans	4 cases	7	9	-	1	8	7
	Luncheon meat 1lb. Cases of 24 cans	4 cases	4	12	-	-	12	4
	Herrings in tomato sauce 14oz tins	36 tins	2	13	1	1	14	1
	Sardines $\frac{3}{4}$ lb tins	96 tins	9	7	-	-	9	7
	Tongue & ham	NONE	-	-	-	-	12	4
	Dried vegetables	NONE	-	-	-	-	12	4

