

SCIENCE AND RESEARCH INTERNAL REPORT NO.15

**EVENT K281 1987-88
ROSS ISLAND HISTORIC HUTS: REPORT ON
ARCHAEOLOGICAL WORK AND MANAGEMENT
CONSIDERATIONS**

by

Neville A. Ritchie

This is an unpublished report and must be cited as Science and Research Internal Report (unpublished). Permission for use of any of its contents in print must be obtained from the Director (Science and Research).

Science and Research Directorate,
Department of Conservation,
P.O. Box 10-420
Wellington, New Zealand

April 1988

Table of Contents

1.0	Abstract and Introduction	1
2.0	Itinerary	2
3.0	Outline of Major Tasks	2
4.0	Cape Evans	3
4.1	Excavation of Bowers' Annexe	3
4.1a	Introduction and Background	3
4.1b	The Excavation: Strategy, Structure, and Stratigraphy	3
4.1c	Recovered Artefacts	6
4.2	Recommendations Concerning Structural Work	6
4.2a	The Stables and Cold Porch	6
4.2b	Reinstatement of Bowers' Annexe	8
4.2c	Completion of Annexe Excavation	8
4.2d	Pros & Cons of Installing a Snow Deflector	8
4.2e	Deformation Monitoring	9
4.3	Cape Evans: Comments Concerning Artefacts	9
4.3a	Artefact Conservation Recommendations	9
4.4	Disposal of Dangerous Chemicals	9
4.0	Cape Royds	10
5.1	Relocation of Stores	10
5.2	Recommendations Concerning the Structure	10
6.0	Hut Point	12
6.1	Recommendations Concerning the Structure	12
6.1a	Roof Repairs	12
6.2	NW Veranda Snow Accumulation Problem	13
6.3	Monitoring of Levels	13
6.4	Observation Hill Cross	13
6.5	Repairs and Re-erection of Vince's Cross	13
6.6	Historic Precinct: Hut Point	14
7.0	Butter Point Depot	14
8.0	The Ross Island Historic Huts: General Matters of Concern	17
8.1	Selection of Conservation Event Personnel	17
8.2	Need for Small Technical Advisory Group	17
8.3	Artefact Conservation: a Conservation Strategy	18
8.4	Establishment of a Conservation Facility in Antarctica	20
8.5	Conservation Priorities and Roles	21
8.6	A Possible Source of Funding for Artefact Conservation	22
9.0	Priorities for the 88-89 Season	22
10.0	References	22

Figures

1a	Section showing Arrangement of Boxes forming the wall of Bowers' Annexe.	4
1b	Plan of Bowers' Annexe showing position on fallen wall and other features.	4

Appendices

1.	Contents of Provision Boxes in Collapsed Wall, Bowers' annexe.	24
2.	Items recovered during excavation of Powers' annexe, Cape Evans.	25
3.	List of food cans stored in packing case inside Royds Hut.	26
4.	Butter Point Depot: List of Provision Boxes and Contents.	27
5.	Butter Point Depot: Items removed to Scott Base.	28
6.	Butter Point Depot: Items removed to New Zealand.	32
7.	Visitor Numbers: Cape Evans and Cape Royds	32

1.0 Abstract and Introduction

In 1783 the Ross Dependency Research Committee adopted a five year programme (as recommended by the Historic Sites Management Committee) of evaluation, maintenance, restoration, and conservation work on the three 'Heroic Era' huts on Ross Island (see Quartermain 1963). The work schedule was outlined in a document known as the Corporate Strategic Plan (Turner and Harrowfield 1984). Fieldwork undertaken during the 1987-88 summer constituted the third year of the programme. However, since its inception several changes have been implemented in the work schedule, and the Historic Sites Management Committee has been dissolved and replaced by a higher profile organisation, the Antarctic Heritage Trust, charged with "co-ordinating and raising funds for a programme of conservation and restoration (of historic sites) in the Ross Dependency, and elsewhere in Antarctica" (n.d.).

The 1987-88 field personnel spent one month on the Ice between December 29th 1987 and January 29th 1988. The team consisted of Dr Neville Ritchie, the Event Leader, an archaeologist employed by the Department of Conservation, Hamilton; Mr Nelson Cross, a historic buildings restoration specialist (Dept of Conservation, Alexandra); and Mr Chris Cochran, an conservation architect employed by the Ministry of Works and Development, Wellington. Ritchie was a member of the previous year's team (see Ritchie and Simmons 1987). Following the precedent established last year, structural matters are outlined in a separate report (refer Cochran 1988). This report centres on the archaeological work, artefact conservation issues, and general site management considerations. Although the two reports have different authors, the recommendations are the result of a team effort; each of the three member team contributing their specialist knowledge to the final package. In addition, N. Cross has produced an independent report (Cross 1988) which reiterates his personal views on various conservation matters, which for the most part, are addressed in the reports by Ritchie and Cochran.

2.0 Itinerary

30/12/87	N Ritchie & N Cross fly ex Christchurch to Antarctica.
31/12/87	at Scott Base, organised field equipment.
1/1/88	assessment work at 'Discovery' expedition hut, Hut Point.
2/1/88	on survival course
3/1/88	am: completed course, pm: helo'd to Cape Evans.
16/1/88	C Cochran & youth group arrive at Cape Evans.
20/1/88	all helo'd to Cape Royds
22/1/88	pm helo'd to Scott Base.
24/1/88	at Scott Base and Hut Point
24/1/88	at Scott Base and Hut Point
25/1/88	on standby to helo to Butter Pt, no go
26/1/88	helo'd to Butter Point, return in early evening.
27/1/88	drying & recording stores removed from Butter Pt
28/1/88	drying & recording stores removed from Butter Pt
29/1/88	packed items for shipping to Lyttleton. Fly to NZ. 9pm.

3.0 Outline of Main Tasks

The rationale for maintaining the historic huts in Antarctica and conserving their contents has been well documented previously (see Turner 1979, Turner and Harrowfield 1984).

The main tasks this year, in addition to routine maintenance and evaluating future priorities, were:

1. the excavation of Bowers' stores annexe adjacent to the Cape Evans Hut;
2. the removal of provisions away from the exterior walls of the Cape Royds hut;
3. architectural recording and the production of drawings for three huts. The latter task was principally undertaken by Cochran (1988).
4. The team also recovered c.300 kg of assorted provisions and packaging from Scott's Butter Point Depot. The Depot, sited near the seaward edge of Bowers Piedmont glacier, is in an area which is rapidly ablating and is expected to calf off in the near future.

Details of the summer work programme and recommendations are now outlined on a site by site basis. In each instance, comments concerning the pre-arranged work programme are made, followed by additional recommendations pertaining to the individual sites. The discussion in section 8 incorporates sites collectively. The discussion are followed by seven information appendices.

4.0 CAPE EVANS

Cape Evans was the primary work-site this summer. The team (except for Cochran who arrived on 16/1/88) spent 2 ½ weeks at the site from 3/1/88-20/1/88. The three meber youth group ably assisted at Cape Evans from 16/1/88-20/1/88.

Compared with the 1986-87 season there was considerably more snow cover around Cape Evans this year, necessitating more snow shovelling than anticipated. Snow was up in Bowers' annexe to a depth of two metres, and was over one metre deep in front of the hut door. Most of the area surrounding the hut was covered by snow varying from 50 cm to 1.5 metres.

4.1 Excavation of Bowers' Annexe

4.1a Introduction and Background

The major job (for the past two seasons) at Cape Evans has involved assessment and an attempt to resolve problems resulting from snow accumulation against the SE wall of the hut within the collapsed remains of the stores erected by Bowers in 1911.

"Bowers has completed his southern storeroom and brought the wing across the porch on the windward side, connecting the roofing with that of the porch. The improvement is enormous... roof and all thoroughly snow-tight, an excellent place for spare clothing, furs, and ready use stores, and its extension affording complete protection to the entrance porch of the hut".

Scott (1913: 130-131)

In recent years (but ironically not in 1988), snow trapped within the trough-like remains of the annexe, has formed melt pools from which water has gradually seeped into the interior of the hut causing dampness, high humidity, and associated deterioration problems. Short of total reconstruction of the annexe to create a buffer (an option which remains viable), the only immediate solution was to remove all or part of the collapsed wall of the annexe (which were made of stacked provision boxes) to decrease the entrapment of snow and channel away meltwater. While the removal of any portion of the original fabric is undesirable, in this case, the need to take action to reduce or eliminate factors causing deterioration inside the hut was considered paramount.

4.1b The Excavation: Strategy, Stratigraphy and Structure

Ritchie and Simmons (1987:7-10) conducted trial excavations in 1987 with a view to undertaking a systematic excavation and recording project during the summer of 1988. A shallow drainage channel excavated around the SE end of the hut in 1987 had worked effectively. The snow in this area had melted and the meltwater drained away, in part due to the removal (in 1987) of impediments such as scattered provision boxes. As noted, on arrival this year, the excavation team (N Ritchie & N Cross)

**BOWERS ANNEX 'TERRA NOVA' EXPEDITION HUT, CAPE EVANS
SIDE PROFILE & PLAN VIEW**

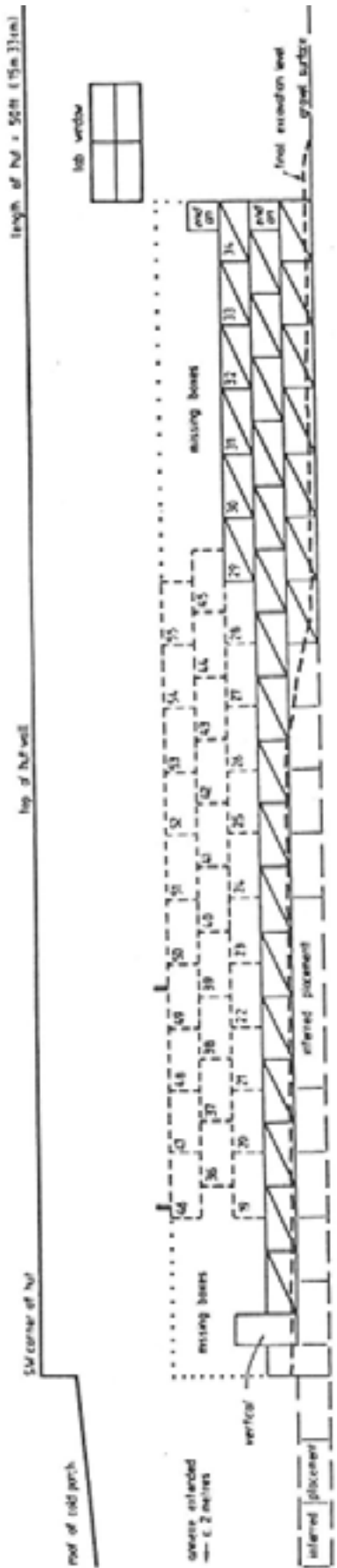


FIG. 1a
SIDE PROFILE OF OUTER WALL
(wall consists of Colman's flour boxes, ex BAE Shore Party)

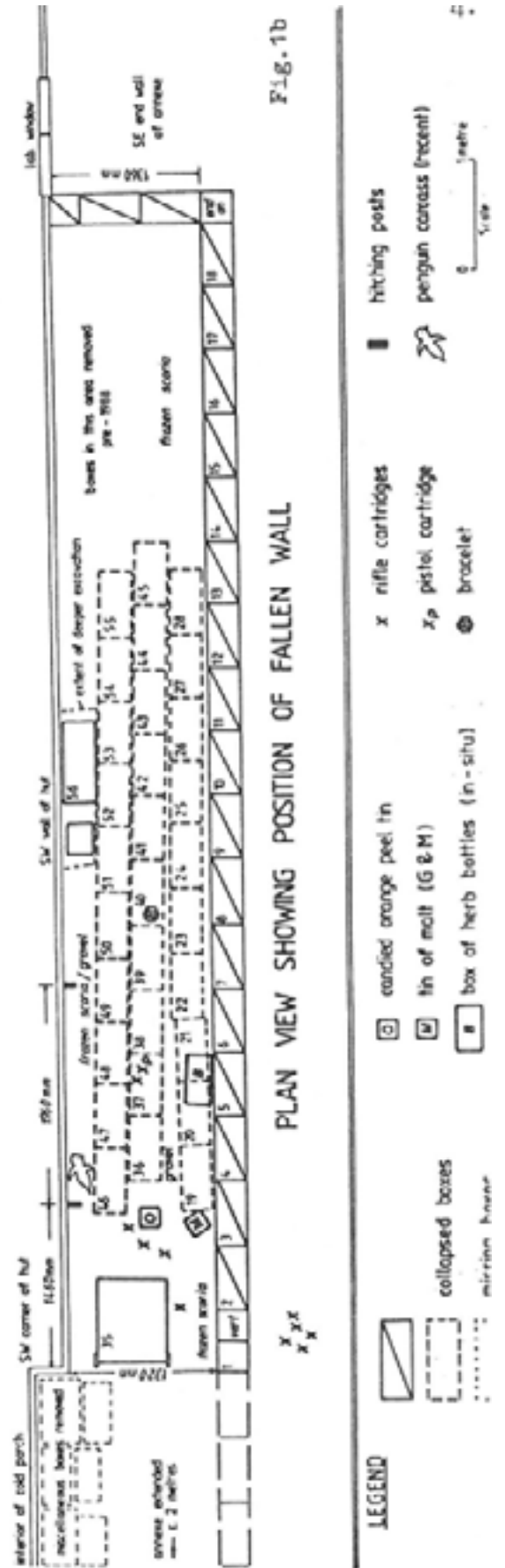


FIG. 1b

PLAN VIEW SHOWING POSITION OF FALLEN WALL

- LEGEND**
- collapsed boxes
 - missing boxes
 - candied orange peel tin
 - tin of malt (G & M)
 - box of herb bottles (in-situ)
 - rifle cartridges
 - pistol cartridge
 - bracelet
 - hitting posts
 - penguin carcass (recent)

were confronted with a considerably greater snow depth over the annexe area than the previous year. This necessitated two days of unanticipated snow shovelling before the excavation project could commence.

The plan was to remove the collapsed wall of provision cases (in the process salvaging the Colman's Flour boxes which formed the wall), then systematically record and recover any objects below the fallen wall, and finally excavate shallow trenches to drain meltwater away from the structure. In addition, open provision boxes (with mixed contents) were to be removed from an area adjacent to the wing wall protruding out from the SW corner of the hut, to facilitate the drainage pattern. Judging from post-restoration photographs, the wing wall and boxes were placed there in the early 1960s (in the vicinity of the now non-existent short corridor which original connected the annexe to the hut; see later comments re the annexe roof).

The job prescription was quite straightforward in theory but proved a bit more difficult in practice. After clearing the ice and snow off the boxes we them to be tightly packed and virtually welded together with ice (the annexe wall had obviously fallen in a single event). Furthermore the box wood had in effect freeze-dried and become very brittle, so that it was extremely difficult to remove the boxes without breaking them, despite working slowly and methodically and using all the techniques and technology at our disposal. In the end we had to resort to taking many the boxes apart (board by board) and reassembling them. A more detailed account of the excavation techniques is in preparation (Ritchie in prep.).

The fallen (flour box) wall lay on top of a wind blown gravel/ice matrix about 35cm deep, In several places, the ice-grit matrix contained clusters of food cans (and food residues) which had fallen out of the provision boxes when the wall collapsed. The wall was constructed of full provision boxes initially, but c. 30% (about 12) of those excavated, were found to contain nothing but a solid block of ice. Presumably the 'missing' provisions had been consumed or are among those on the shelves inside the hut. The contents of the boxes are detailed in Appendix 1. As only a small proportion of the boxes actually contained flour it appears they were either packed in England with assorted provisions, or that Bowers repacked them at Cape Evans for quick access to specific items.

The fallen boxes, their stencilled expedition number (if it was legible), and contents were recorded as each box was exposed in-situ or as they were removed (see App 1). The location of the fallen boxes and other artefacts were recorded on a plan (Fig. 1b). Rather than a formal grid system, each item was plotted relative to its distance from the boxes which form the base of the wall. These boxes are solidly frozen in the ground and were left in-situ.

Beneath the ice-grit there were two discontinuous layers of plywood provision cases which are unlikely to have been touched since Scott's men placed them there. We removed the upper layer and formed drainage channels. Lack of time prevented us from removing the lower layer, which remains solidly frozen in the ground.

The Colman's flour boxes used to construct the annexe wall were well suited for the purpose, being very solid, of a consistent size (53.5cm x 28cm x 28cm), and having virtually no gaps between the panels. The excavation revealed that the two basal tiers were in-situ, with discontinuous remnants of the third tier in place at eastern end. The rest of the third tier and what had constituted the fourth and fifth tiers (the uppermost) had collapsed in one catastrophic event into the interior of the structure (fig. 1b). Remnants of the rubberoid material (used for weatherproofing the roof of the annexe), secured by broad-headed clouts, covered the outside faces of the fifth tier of boxes and extended halfway down the fourth tier.

The annexe was roofed for the most part with a large wooden panel (one of the sides of the crates used to transport Scott's Wolseley Motor Sleighs, see photograph in Harrowfield 1981:50). The panel in question is studded with clouts and rubberoid remnants similar to those found on the fourth and fifth tier wall boxes. Sometime after 1961 the panel appears to have been removed from the ruins of the annexe, presumably by one of the early caretaker crews, and re-erected as a wing wall in an attempt to prevent snow building up near the hut door. On the authority of the Director of the Antarctic Division, the wing-wall was removed in 1969. Its erection has not prevented snow from building up near the hut door, and it has hindered free drainage.

4.1c Recovered Artefacts

Many types of canned and a lesser range of bottled provisions were uncovered during the excavation (see Apps. 1 & 2). All were air-dried. None of the recovered provisions were in pristine condition, but some were relatively sound. Those in good condition or rare were added to the displays in the hut. Cans, of which there were a large number of the same type (e.g. Moirs Marrow Bone Fat, and Tru Egg tins), were placed in the NE end of the stables for temporary storage. Among the more unusual recovered items were tins of Sanitary dubbin (2 sizes), a small wooden box containing pieces of pitch individually wrapped in brown paper, a tin box of candied orange peel (a similar labelled tin box is located on Richards' bunk in the hut), a Very pistol cartridge, 25 7mm Mauser cartridges, and a crude bracelet made from the tin plated ferrules which hold the bristles on fine paint brushes. The latter item, which was found in solid ice c.25cm below the fallen wall, almost certainly dates from the Scott-Shackleton era. It is the only item (from the huts) which was bought back to New Zealand. It has been handed over to Mr D Harrowfield, the Executive Officer of the Antarctic Heritage Trust, for further research.

4.2 Cape Evans: Recommendations Concerning Structural Work

4.2a The Stables and Cold Porch

The urgent need for snowproofing of the stables and the front cold porch in order to improve the conservation climate in the hut is generally recognised. Snowproofing can only be achieved by completely stripping and recladding the seaward wall of the stables (the cold porch requires comparatively little recladding), repairing and re-sheathing the roofs where necessary, and associated sealing. The required work has been

itemised by Cochran (1988:13-14). As stated by Cochran (ibid.) this work is seen as the number one priority for the 1988/89 summer but it is imperative that further photographic research is undertaken (during 1988) to ensure that the highest standards of restoration and replication are achieved.

During examination of the seaward wall on the stable it was found that the light interior matchlining (1cm thick) used to form the wall (in the western bays only) was the same as that surrounding Scott's cubicle, each length being 40 cm. It was also noted that the boards in question had not been previously nailed and were secured with galvanised nails. Furthermore no additional nail holes are visible in the uprights. This heightens the need for additional research before replication of the stable wall proceeds.

While the recladding work on the stables is underway, the ice masses should be removed from within both the stables and the cold porch. According to Harrowfield (pers. comm. 1988) this task has never been completed before, so an archaeologist should be involved to record and assess items as they are exposed.

It is understood that matt grey butynol sheathing has already been acquired or donated for recovering the roof sections of both the stables and the cold porch, and eventually the hut itself. We have strong reservations about the application of large tracts of butynol sheathing because it conflicts with one of the important tenets of building conservation, ie. the maintenance of historic integrity, and (in the case of butynol), its impermeability may lead to further conservation problems through heat retention in the structure. The butynol applied to the latrine roof a few years ago appears to have lasted well but it does not provide an adequate test bed because the latrine structure is open to the elements. Harrowfield (pers. comm. 1988) has stated that the idea of applying painted canvas over the butynol is impractical, because it has been found from previous experience that paint will not readily adhere to the canvas. This point is debatable. The roof of the hut is presently covered with painted canvas tarpaulins and despite whatever difficulties that were encountered in applying the paint, there are few visible adhesion problems. According to D Harrowfield (pers. comm. 1988) the last coat of paint was applied in 1977, which indicates it has lasted very well considering the harsh conditions to which it is exposed. Furthermore the canvas on the roof of the hut itself is still in remarkably good condition and does not warrant immediate replacement. If butynol is applied (presumably secured battens as well as adhesives) during the 88-89 summer, its application should be in accordance with a detailed brief and strictly limited to the roof of the stables, where it will be least visually obtrusive, and where the material itself and its effects can be monitored.

The 87-88 conservation team was cautioned of the possibility of contracting anthrax while handling contaminated straw etc within the stables. If there is any possibility that the anthrax is present and can survive in Antarctic conditions, and that conservation team personnel might contract the disease whilst working in the hut or stables, they should be warned accordingly, told how to identify the symptoms, be advised of preventative measures, and be advised of medical treatment for the disease.

4.2b Reinstatement of Bowers' Annexe

Reinstatement of this structure by replication is seen as a lower priority structural conservation measure but one which should be addressed within the next two-three years. As stated by Ritchie and Simmons (1987:9) the conservation benefits of replicating the structure are twofold. It would create a buffer to protect the exposed SE wall of the hut and reduce, if not eliminate, the ice-frost margin which exists along both the interior and exterior of the hut wall, and it would provide an extra storage area. It would, of course, also recreate one of the original elements of the hut, but as the annexe was a 'historical afterthought' which most visitors are unaware of, and its reinstatement would require a considerable amount of intervention (i.e. complete rebuilding and replication of the flour boxes which make up the wall), the cost of its reconstruction is hardly justified on purely historical grounds. A detailed study of historic photographs which depict the annexe would be an essential precursor to any replication strategy. N. Cross, who specialises in building restoration, sees few technical problems in replicating the Colman's flour boxes to original specifications. The boxes could be prefabricated and artificially aged in New Zealand, prior to transport to Cape Evans in CKD form, and nailed together on site.

4.2c Completion of Annexe Excavation

As noted earlier, the excavation within Bowers' annexe was not completed within the 87-88 season. The remaining frozen in-situ deposit will probably not effect the drainage of meltwater away from the structure, but its excavation will be necessary if the annexe is to be replicated, remaining artefacts recovered, and to expose the base of the wall so that any gaps in the cladding can be sealed.

4.2d Snow deflector

The 87-88 conservation team considered the merits and disadvantages of erecting a snow-deflecting structure in the vicinity of the southern dump. The objective of the exercise would be to reduce the big snow buildup which occurs annually along the SW wall of the hut and around the hut door. The snow build-up and meltwater retention in these areas has created internal dampness problems, which we have attempted to reduce by removing the trough-like structural debris of Bowers' Annexe and excavating shallow drainage channels. The situation should be monitored for a year or two. If there is noticeable decrease in snow retention behind the hut and an improvement in the drainage of meltwater away from the hut itself, other options, such as a snow deflector, have to be considered. Such a device (made perhaps from the surplus railway sleeper-like timbers stacked behind the Cape Royds wannigan) would need to be portable so that the best location for the structure could be ascertained by trial and error over a few seasons. D. Harrowfield (pers. comm. 1988) has recently informed the writer that he has been researching the airflow pattern around the hut and that the results of wind tunnel experiments are awaited. The results of his study may reduce or eliminate the trial and error element. However, in the final analysis

the visual impact of any snow barrier or deflecting structure has to be weighed against its effectiveness in reducing the snow build-up behind the hut. The installation of a barrier is worth considering in the medium term but it is of low priority when compared with the immediate need to weatherproof the stables and cold porch.

4.2 Deformation Monitoring

G. Falloon, of DOSLI, carried out the annual survey of the beach profile at Cape Evans. After discussion, about the utility of the exercise, it was felt that the establishment of permanent reference points on the latrines, cold porch, and main hut would possibly provide more useful information. Sighting points, made from 2.5 x 2.5 cm squares of copper, were attached with galvanised clouts as follows: main hut - 3 on the seaward side, 3 on the SW side and 3 on the cold porch. Latrine - 2 on the seaward side, 2 on the SW side. Falloon will report independently on this matter.

4.3 Cape Evans: Comments Concerning Artefacts

4.3a Cape Evans: Artefact Conservation Recommendations

Long term conservation of the artefacts at Cape Evans (and Cape Royds, and to a lesser extent, Discovery Hut) is without doubt the major conservation problem associated with the Ross Islands Huts. Structurally they are remarkably sound and their longevity can be assured (barring fire) by a structured long term programme of replication, restoration, and maintenance work and the establishment of historic precincts. However, maintenance of presentable artefact displays in the huts, probably the most interesting aspect to most visitors, will require a much wider multi-faceted approach to the problem because it will be expensive and a large range of special inputs will be required. A detailed artefact conservation strategy is required as part of management plans which should eventually be produced for all the huts and their environs. A detailed artefact conservation/retention strategy is still a few years away, but certain things can be done now towards that objective. As these matters are common to all the huts they are detailed in section 8.

4.4 Disposal of Dangerous Chemicals

The 87-88 conservation team was requested to dispose of the following dangerous items at Cape Evans- magnesium flares in the darkroom, ether in the laboratory, and ammunition outside the corner of the hut. The following actions were taken. The contents of the two bottles of ether were not disposed, for the same reasons as stated in detail by Ritchie and Simmon (1987:6), viz. we were to remove the tapered glass stoppers from the bottles, and the chemicals in question appear to be stable. We could not find magnesium flares in the darkroom.

During the course of the excavation of the annexe, the following cartridges were recovered (in the main, they were uncovered outside the SW corner): an 8 gauge signal cartridge, 25 7mm Mauser cartridges, and a .38 WRA revolver cartridge. Seven of the cartridges were damaged. These were disposed. The other ammunition were assessed by N. Cross who has

expertise concerning guns and ammunition, to be safe. They were placed in a container on a shelf above Wilson's bed in the hut. In this location we had previously located a jar full of .22 cartridges and a single .303 calibre cartridge.

5.0 Cape Royds

5.1 Relocation of Stores

The relocation of the stores which were originally stacked by Shackleton's men against the south and east wall of the hut (further items were added later-Quartermain 1963:77) was scheduled as the main task to be undertaken at Cape Royds during the 87-88 field season. The objectives of the exercise were two fold: to minimise moisture retention against the hut by relocating the stores away from the walls, and to enable an assessment of the condition and variety of the products. It was proposed to grade the provisions into stacks based on their condition, so that unique, rare, or otherwise significant specimens could be identified, brought back into the hut, or recommended for conservation. Provision boxes which were falling apart were to be together with metal strapping; equipment and materials for this purpose (kindly loaned by Gerrard Strapping Ltd) being specifically taken to the site. It should be appreciated that the stacked stores and their original venesta plywood boxes have now deteriorated to a point where they are considered by some to be an eyesore which should be totally removed. However, despite their initial negative visual impact, they are worthy of retention for as long as reasonably possible, because the majority of the provisions (predominantly canned) are in relatively sound condition, and are an important component of the site. They provide a graphic impression of the volume and variety of provisions needed to sustain polar expeditions, and materially add to the historic aura of the hut.

When confronted with the situation on-site in January 1988, the conservation team considered that the proposal needed to be principally to avoid double handling the cans, and additional damage which might have resulted from greater exposure to the elements once they were stacked from the hut walls. It was also apparent that only a few of the plywood provision boxes were still serviceable. Consequently, it was decided to defer moving the provisions for at least one season and recommend the following course of action.

There is a need for permanent indoor storage of the best condition stores presently stacked outside the Royds hut. The various storage options were listed by Ritchie and Simmons (1987:17). The 87-88 team firmly favours using Mawson's lab for the purpose, although it would require snowproofing, and some minor carpentry work, including the erection of shelves (see Cochran 1988:20-21 for details). Although use of Mawson's lab for provision storage is 'historically incorrect', most visitors do not enter this area or give only cursory attention this part of the hut. It is anticipated that once the stores are moved from their present location, many of the plywood provision boxes in which they are contained will fall apart completely. The relocated stores should be

properly recorded and shelved in groups based on box contents. Their original packaging should be documented. The provision boxes could be replicated, but limited funds are probably better spent elsewhere, e.g. artefact conservation.

The major disadvantage of not moving and assessing the stores in 37-88 season, is that we do not have an accurate indication of the volume of outdoor stores which require shelved indoor storage, or of the ratios in varying conditions. Assuming that Mawson's lab is modified for provision storage, the following course of action is recommended. The removal and assessment exercise planned for the 87-88 season should be undertaken as soon as possible (89-90 season?). The assessors should be mindful of the numbers and types of 'surplus' provisions already stored in graded stacks in Shackleton's bedroom, and in canvas rapped packing case in the main room of the hut (these provisions have been listed by Ritchie and Simmons 1987:36 and in App. 3 of this report). The new storage shelves in Mawson's lab should be filled to capacity with outdoor stacked provisions deemed most worthy of storage. All the cans brought inside should be thoroughly dried and recorded before storage, and efforts should be made to minimise double handling. Cans which are still intact but 'too far gone' for indoor storage should be stacked in orderly stacks to the south of the hut. Obviously, their days will be numbered.

In the event that additional storage is needed, consideration should be given to replicating Wild's store room which originally existed on the south side of the entry-way into the hut. However, replication of Wild's store would be a major intervention (in conservation terms) and constitutes an expense which is not justified unless there is a real need for additional storage. Such a need will not be apparent until the outdoor stores are removed, graded, and Mawson's lab is filled to capacity. In the (probably unlikely) event that additional space is needed (provided by replication of Wild's store), the re-construction work must be thoroughly researched and specifications drawn up so that the hut's visual and historic integrity is maintained.

The 87-88 team undertook the following work with regard to the stacked provisions. All the stores stacked for a linear distance of 3 metres from the SW corner of the hut were removed, as was a linear metre near the midpoint of the SW wall. This was done to enable a thorough examination of the lower part of the wall. This revealed that despite freezing and surface dampness the timbers were quite sound. It is considered desirable in the long term to expose the timbers, but it is not urgent.

The removed provisions and their boxes were examined, assessed, and replaced in a tidy manner. The whole stack was tidied by grouping and more careful placement of many of the loose cans which now litter the stack amid chunks of scoria placed to stop the wind lifting items. Eight bags of semi-decomposed cans and their contents were helo'd to Scott Base for disposal. Most of the cans in question were so far gone, that little could be gained from attempting to record their type or contents. Two rolls of Gerrard metal strapping and a box of strapping clips were left in a corner of room for future box binding (i.e. the special crimping tools will still need to be taken to the site).

The provision cans in the canvas draped packing case in the hut (placed there by Fry in 1982) were examined and found to be deteriorating, although the packing case was quite dry. Many of the cans had active rust particularly around the rim and base (possibly attributable to lack of air or wiping after being brought into the hut and prior to storage). The cans were regraded using the general criteria applied to the cans in 86-87 (see App. 3) and added to the various stockpiles which were established then.

5.2 Cape Royds: Recommendations Concerning the Structure

Recommendations concerning future structural work have been itemised by Cochran (1988:21-22). Work is required at Cape Royds but it is definitely of lower priority than that at Cape Evans. If historic and visual integrity is to be maintained, it is essential that detailed specifications and plans are drawn up for each task. With regard to the stables and garage area, maintenance of the status quo is favoured. That is, there should be no major restoration of missing elements, just maintenance of what is there now by minor stabilising work and replication of the provision box walls when they deteriorate.

6.0 Hut Point

Workwise, Hut Point was a low priority during the 87-88 season. An up to date condition assessment, and structural work programme for the next few years has been outlined by Cochran (1988). Most of this work is of a minor maintenance nature. Other structural matters are discussed below.

6.1 Hut Point: Recommendations Concerning the Structure

6.1a Roof Repairs

It is understood that a proposal has been mooted to cover the existing wooden roof of the Discovery hut with Butylno1 as a means of totally weatherproofing the structure (i.e. preventing meltwater dripping into the interior). As noted by Cochran the roof timbers are sound and moisture appears to gain access through gaps (maximum width 8mm) caused by cross grain shrinkage. Leaks can probably be prevented by sealing, and this should be tried before more expensive options are actioned. While cladding the roof with Butylno1 may solve the leak problem, its installation on the present roof surface would be totally incompatible with the maintenance of historic integrity and the visual appearance of the hut. If sealing the roof does not produce the desired effect, options which are more compatible in terms of maintaining historic integrity should be evaluated and implemented. Direct application of canvas tarpaulin type coverings (secured by battens) have already proved their worth on the Evans and Royds huts and blend well with the original fabric. Butylno1 has established itself as an effective moisture barrier and may well be the best material to re-sheath Discovery Hut, when it becomes necessary. However, if it is used it should be covered, either by removal and relaying of the existing surface layer of roof timbers on top of the butylno1 (which is likely to prove quite

difficult), or by replicating the original timber surface on top of the butylno1. Obviously both these options are expensive. Neither should be pursued until it is clear that sealing is not effective, and then each side of the roof should be addressed separately. There is no sense re-covering the entire roof, if leakage is limited to one side. In 86-87 there were three wet areas on the floor of the hut in the NE and SE quadrants. In 87-89 there were no visible wet areas.

6.2 NW Veranda Snow Accumulation Problem

The tendency for snow/ice to build up under the NW veranda of the Hut Point hut is well recognised, and its removal will probably have to be an annual maintenance chore. This year the build up was considerably less than in 86-87 (about 1/3 of the volume and it stood only a metre high over about 2/3 of the area of the verandah). The reduction, in part, appears to be attributable to the removable (by the 86-87 team) of the panel covering the western end of the verandah, facilitating more rapid ablation, if not a reduction in accumulation. Consequently, it is recommended that the panel stays off in the meantime and the situation is monitored annually. The shallow drainage channels excavated in the 86-87 season may also have facilitated the drainage of meltwater, but again the pattern will have to be analysed over a few years. The accumulated snow was shovelled out and dumped over the seaward bank.

6.3 Monitoring of Levels

The probability that the Discovery Hut is settling in an uneven manner is also a recognised problem and a programme of deformation monitoring has been underway for a few years. It is too early to draw any conclusions as to the trends (there do not appear to be catastrophic movements), but the leveling should be continued annually for the present. The DOSLI surveyor, G Falloon, had difficulty reading some points on the veranda. Fourteen copper nails were used to mark new reference points. We believe Mr Falloon reports his results independently.

6.4 Observation Hill Cross

The Antarctic Treaty historic site plaque which is loosely chained to the base of the cross is an absolute eyesore and source of frustration for those wishing to photograph the cross. The historic plaque should be properly secured nearby in a relatively unobtrusive location.

6.5 Repairs and Re-erection Vince's Cross

Sometime during the winter of 1987 Wince's Cross was uprooted and broken in the vicinity of the cross member. The cross was repaired by Scott Base carpentry personnel prior to our arrival on the Ice. On the 27/1/88 we went over to Hut Point to help advise on a new site because the knoll the cross stands on is being continual eroded by the sea. Options are limited. In the end the cross was re-erected a few metres from where it stood previously. The base was secured to a concrete foundation pod which is buried below the ground surface.

6.6 Historic Precinct: Hut Point

The urgent need to establish precincts to maintain the historic setting of the huts was stressed last year together with the provision of maps outlining possible precinct boundaries (Ritchie and Simmons 1988). It is understood that the Director of the Antarctic Division is pursuing this matter through the Treaty organisation.

This summer it was encouraging to hear that Ron Le Count (USARP) supports the establishment of a 'special zone' around the Discovery Hut. We understand he initiated an on-site meeting to discuss this issue with the O.I.C., Scott Base. K281 was also invited to this meeting which was held on 27/1/88. Le Count was not present but had arranged for the Chief Engineer ANS, and senior NSF and Navy Construction representatives to be present. Issues discussed included the long term objective of removing the pumphouse, fuel tank and associated piping; re-routing the pipeline which presently is routed below the tank (and is the closest intrusion upon the hut), painting the tank and pumphouse, reducing the width of the road to a single lane, shifting the galvanised snow poles, painting the anchor chains and bollards which presently surround the hut, and lowering and covering the transformers adjacent to the pumphouse. We also discussed a landward boundary if a historic precinct was established (roughly the point where the fuel pipes pass under the road). While the Americans were quite sympathetic about eventual re-siting the pumping equipment (the main stumbling block is funds), the Navy representative was strongly in favour of maintaining vehicular access across the transition via the route adjacent to the hut. He argued, at times it was the only available route. Clearly the passage of heavy vehicles within a few metres of the hut is not desirable from either a conservation or a historic aura point of view and it is a matter on which there is little room to compromise. In the final analysis, the withdrawal of American facilities from around the Point within a reasonable time frame (the next decade), is most likely to be achieved by New Zealand persuading the Treaty nations to recognise and establish historic precincts (in the same way as recognise special protected faunal areas) and by bringing international pressure on the Americans through the Treaty organisation.

7.0 Butter Point Depot

The Butter Point depot (a provisions cache) was established on Scott's instructions in January 1911, the provisions being unloaded from the 'Terra Nova'. Earlier depots had been established in this area during the 'Discovery' (1901-04) and 'Nimrod' (1907-09) expeditions, all with the same of objective, to resupply western parties.

"We had plenty of food at the Butter Point Depot, which we reached that evening (Feb. 1912)...The depot had been blown over and wrecked generally. We took some pemmican, butter, and chocolate, and the next day proceeded south..."

from 'Scott's Last Expedition' (1913:286)

The remains of the depot, located on the relatively low seaward margin of the Bowers Piedmont glacier, were gradually buried under snow and seemingly forgotten until October 1985 when members of the drilling team and Antarctic Division personnel discovered the cache about 300 metres from their camp following ice ablation. At that time, and subsequently, many of the provision boxes were smashed open, and the contents scattered, pilfered, or consumed. Fortunately, some photographs were taken when the cache was first exposed, and a list was compiled of the provision types (reproduced in Harrowfield, Turner, & Skerton 1986, App. 2). Examples of about half the products were collected and brought back to New Zealand (ibid. App. 3). These provisions are understood to be in cold storage at the Antarctic Division's Harewood store. It was noted at the time that the cases were disintegrating, and that many of the tins were in poor condition.

Following reports that the remains of the cache were in bad shape and pilfering was continuing (in the interim the nearby Butter Point camp has been removed), K281 was specifically requested to inspect the site and bring back to Scott Base anything which was worth salvaging. It is anticipated that the margin of the glacier will break off within a few years and any remnants of the cache will be lost. On arrival at Butter Point (26/1/88) we were confronted with a scene of devastation. The remains of the Depot consisted of two haphazard heaps of smashed provision boxes and damaged provisions scattered by human fossickers followed by the depredations of skuas. The latter had eaten most of the exposed chocolate and candles and defecated all over the boxes. The whole sorry mess was lying in and around a meltpool which had formed in the rapidly ablating and rather treacherous glacier surface.

Visiting Butter Point was a bitter sweet experience. There is no doubt that if the 1985-86 or 1986-87 historic conservation teams had been given the opportunity to visit the site much more could have been gainfully salvaged. As a consequence of the inexcusable three year delay much more damage has been caused to the provisions in the cache and an unknown amount of historical information has been lost. If other caches are exposed in future, historic conservation personnel should be among the first taken to the scene, rather than called in to mop up the mess.

The two scattered heaps contained a total of 25 plywood and 10 wooden provision boxes plus a Hornelite fuel drum. In addition, two 1 gallon fuel cans (now known to have been part of the Depot) were found in the Butter Point wannigan. The contents of the cache are recorded in App. 4. No clear evidence of further buried tiers was apparent but the possibility cannot be totally discounted. As requested we sorted through the cache and returned to Scott Base with c. 350 kg of assorted provisions. The following day was spent removing all the cans from their boxes, air-drying the, and recording all of the items (see Apps. 4 & 5). We were given the use of an old plywood wannigan for this purpose. We were also instructed to return a sample of the recovered items to New Zealand for Antarctic heritage Trust publicity purposes. These specimens are listed in App. 6.

A notable feature of the cache, which was established during Scott's 1910-13 expedition is that it contains products which are not present now at Cape Evans (or any of the other huts). These products include cylindrical cans of Tru Milk, Fry's Caracas Chocolate, Keen Robinson Pearl Barley, a box of dates, 2 boxes of block butter, and Francis Martin (French) sardines. Other products such as J.D. Beauvais Pemmican are represented at Cape Evans now by only two cans which are in very poor condition.

The question of what to do with the recovered items needs to be addressed. Although none are in pristine condition, many are certainly in better condition than some of those in the huts. Consequently, some could be used for replacement purposes, the pemmican cans mentioned above, are a case in point. If any items are used as 'replacements', the origin of the cans (i.e. the Butter Point Depot) should be clearly marked on their base. The rest of the products make an interesting display in their own right and should be retained as one entity. A suitable repository would be in a Ross Island museum which should be established at either McMurdo or Scott Base. This proposal is discussed further in Section 8.3. In the interim, the items from the cache should be maintained in a unheated structure such as the wannigan where they are presently laid out.

8.0 The Ross Island Historic Huts: General Matters of Concern

8.1 Selection of Conservation Event Personnel

It is generally recognised now that the long term maintenance of the Ross Island historic huts, artefacts, and environs will be an on-going and exercise and one which will require considerable organisation of resources, both human and material. These needs are recognised, in part, by the establishment of the Antarctic Heritage Trust (A.H.T.) and the employment in recent years of people with site management and conservation skills.

However, despite these encouraging developments, parts of the conservation programme need more co-ordination. An area where of co-ordination is apparent is with regard to the selection of each year. It is important that some sort of continuity is built into the programme, given that it takes one season to familiarise with the sites. Continuity does not mean that the people are asked to go back year after year, but does accept that it is necessary for persons doing conservation work to have first hand experience of the conditions and the site or artefacts before they tackle major restoration or conservation jobs. The system the surveyors use seems a good model. The head surveyor one season trains a colleague who will succeed him in the following year, and so on.

The following selection process is offered for consideration:

1. The members of AHT and Ant. Div personnel receive the previous year's report(s), examine the recommendations and priorities, and develop an idea of what they see as being feasible or fundable.
2. AHT/Ant Div. call a meeting to which selected conservation/site management advisors are invited (this could be achieved by nominating an informal advisory group of 2-4 people) to discuss the issues and advise on suitable personnel. If possible, the potential event leader for the following summer should also be invited. The group would look at the recommendations and decide what expertise is required, who is available, and their selection priority. These people are then approached and their availability confirmed. In this way, the best team for the job can be selected, and after discussion everyone at the meeting will know the strengths and weaknesses of potential candidates. This does not stop people putting themselves forward for a particular job, but it will enable them to be compared with other people (possibly better suited) who may be available but have not approached the AHT.

8.2 The Need for a Small Technical Advisory Group

It is understood that the A.H.T. is opposed to the establishment of a formal advisory committee (akin to the old Historic Sites Management Committee) principally as a cost saving measure. While cost saving is a laudable objective, the A.H.T. should appreciate that few of its members have formal training in conservation or site management skills, so it is essential that the Trust obtains feedback from people who possess such skills (and are familiar with the sites), so that Trust members can make informed decisions. Consequently, it is recommended that an informal advisory group is established on whom the Trust can call for advice. Ideally, the composition of such a group include persons with skills in

the following areas: artefact conservation, archaeology, site management, conservation architecture, and historic buildings ion. It is envisaged that such people could be requested to provide a report to the A.H.T. on specific matters, or invited individually or together to discuss matters of concern at A.H.T. meetings.

8.3 Artefact Conservation: Towards a Conservation Strategy

As stated earlier in this report the long term maintenance of the artefacts in and around the historic huts (especially those at Evans and Royds) is undoubtedly the most pressing conservation problem. The structures themselves are in remarkably good condition, and the environs (although beleaguered in the case of Hut Point) can be maintained and enhanced through promoting an acceptance and gradual restoration of historic precincts.

While the structures, their environs, and the artefacts are important elements of the sites, the latter are arguably of predominant interest to visitors and they have special scientific and historical values. The need to maintain the artefacts (or a good proportion of them) has been recognised but because of the costs and technical difficulties the means to achieve this has never been defined except in rather general terms, e.g. as presented in the Corporate Strategic Plan for the Ross Island Historic Sites (Turner and Harrowfield 1984).

Maintenance of the present artefact in (and to a extent around) the historic huts has been regarded as a key tenet of the artefact conservation philosophy, because they (i.e. the provisions and expedition equipment) are the props which really create the special historic aura and an illusion of stepping back in time.

Unfortunately, over the last decade or so it has too apparent that the conditions in the huts are not suitable for long term artefact preservation, and despite further snowproofing and the implementation of a number of preventative measures the conditions are unlikely to be improved to anything approaching optimum conservation conditions. Consequently, if the present management strategy is continued it will at best eke a few more years out of a diminishing resource. One effect of the maintenance of the present policy is that certain artefact types (those most prone to decay) will be substantially reduced or deteriorate to the point where they become shameful eyesores. The tinned provisions (and their labels), which constitute a major visual component of the hut displays, are the prime example. Their reduction (in numbers) and visual deterioration ('rust never sleeps') is well underway. The quality of the display, has to some extent, been maintained by weeding out deteriorating specimens. Obviously, with a finite resource, this attrition cannot be sustained.

To decrease the rate of deterioration and hopefully reverse the trend hopes have been pinned on the employment of professional conservators who it is anticipated will apply modern conservation techniques to the various artefact types and magically resolve the problems, albeit at considerable expense. This is not necessarily the case. The long term success of remedial conservation treatments is in large part due to the

fact that the treated artefacts are then housed in a building, such as a museum or art gallery, in which the atmosphere and other conditions are controlled in order to prolong the longevity of the artefacts. Given this situation is it possible to maintain artefact displays in and around the Antarctic huts in the long term? The answer is a qualified yes but it will require the adoption of a much broader approach to their preservation.

Accepting the situation outlined above three courses of action should be pursued (the tin cans are used to illustrate the points):

Transfer Selected Items to Controlled Atmosphere Facility

It should be recognised that even with the application of modern conservation techniques, it is not possible to preserve the tin cans (and their labels) indefinitely in the uncontrolled atmosphere in the huts. Given this situation, it is imperative (for scientific and historical reasons) that representative examples of all the artefacts (provision cans in this instance) are removed to locations where long-term preservation is possible, viz a museum type building with adequate climatic controls and regular monitoring. At present there is no such facility on the Antarctic continent. If some A.H.T. funds were allocated for this purpose (i.e. to build a controlled atmosphere museum in the Scott Base-McMurdo area) it would be a major step towards maintaining a representative range of the early expedition artefacts for posterity. Their placement in a combined museum-interpretation type facility would also enable much greater numbers of Antarctic visitors to see and appreciate them (and encourage people to further fund the A.H.T.)

Conservation Treatments

Despite the gloomy comments expressed above about the longevity of conservation treatments, it does mean that they should not be attempted. But they do not offer a magic solution. A lot of research and experimentation will have to be done by conservators on each artefact type and the long term efficacy of the treatments (i.e. their ability to withstand the atmospheric conditions in the Antarctic huts) will have an inherent trial and error factor. Hopefully some will prove themselves over time but it possible that they will only prolong the life of the treated cans a few years. Another difficulty with tin can conservation is stabilising each specimen at a particular level. Each can should have a historic patina rather than a conserved or brand new appearance. This is not always easy to achieve or maintain.

Replication

If conservation treatments will not work, or prove to be an uneconomic option, replication is the only means of maintaining certain artefact-types in the huts. Replication, if it is to be done to a high standard, is not a cheap and easy option either, but since new materials and modern preservatives etc can be employed, replicas should have an acceptable lifespan before they in turn need replacement.

If the appropriate dies and can making machinery are available in New Zealand, replication is an attractive choice as far as tin cans are concerned, but further research is necessary and obtaining comparative costings. The predominantly English-origin cans in the huts are thicker and have other structural differences compared with modern cans and those in use in New Zealand during the same time period.

However, these technical difficulties can probably be resolved and high standard replicas manufactured which the casual observer would not be able to distinguish from an original. It is anticipated that the unit cost of reproducing tin cans is likely to be more favourable compared with the cost of conserving or stabilising large numbers of deteriorating cans from the sites. From a purist conservation (and many conservators) point of view replication is the less preferred option, with regard to the bulk of the tin cans it will be the only feasible option in terms of unit cost. That is, is it more practical and cheaper to replicate 100s, if not 1000s of cans and labels and paint and artificially age them, as opposed to conserving the equivalent number of original specimens (which will probably involve removing the label from each can and treating it separately, emptying each can, applying a specific conservation treatment after the appropriate technique has been determined, repainting, and putting the components back together). Looking ahead, with regard to the tin cans, it is probably more a matter of when rather than if replication should be implemented.

Three concurrent procedures have been recommended to enable long term retention of artefacts in the Antarctic environment:

1. remove a of vulnerable artefacts from the huts and house and display them permanently in a controlled facility. Ideally this would be on Ross Island and be in the form of a museum-interpretive centre at Scott base/McMurdo.
2. it is necessary to provide the facilities for an on-going conservation programme for materials from the huts. The provision of such a facility and a means of implementing the work are addressed in the following section.
3. replication should be investigated forthwith for particular artefact types (such as some of the tin can types) if it appears to be a more practical and cheaper option than total reliance on expensive (and possibly unproven) conservation treatments.

8.4 Establishment of a Conservation Facility in Antarctica

I recently addressed the members of the N.Z. Association of Professional Conservators on artefact conservation problems in Antarctica. The objectives of my slide presentation were to inform them of the nature of the nature of the problems and outline how they are being tackled. I also sought their views on various conservation matters and aimed to find out which individuals or institutions had skills which would be useful to the Antarctic hut conservation programme. I did not get all the answers I had hoped for, but did get some useful feedback on some matters.

A major issue on which I sought opinion was whether a conservation facility should be established in Antarctica or whether it was more practical to bring artefacts back to New Zealand for treatment. The conservators were almost unanimously of the opinion that considering the volume of artefacts to be conserved, the conditions they are exposed to, and the need for a long term programme, it made good sense to establish a conservation laboratory on Ross Island, preferably adjacent to Scott Base.

The members of K281 are of the same opinion. As we have previously

indicated to the A.H.T., we believe the conversion of either A or B blocks of the old Scott Base into a conservation laboratory would not only be a practical use for the old building but also help retain an important historic structure in its own right. Converting one of the buildings into a lab for conservation purposes would not involve a great expense. The main requirements are a comfortable and secure space in which to work, the provision of electricity and water, work benches and a cold store (i.e. an unheated store room), shallow troughs or tanks for electrolytic and chemical treatments, and a fume cupboard. More specialised equipment would be brought from N.Z. as required.

The establishment of a conservation lab at Scott Base would open a range of operational options, e.g. conservators could be taken down to the Ice in the season, look at a problem first hand, return to N.Z., assemble the necessary equipment for a specific job, and return to Antarctica for a specified period to undertake the conservation work, or they could be taken down for a reconnaissance in January, on the understanding that they will be geared up and available to do a specific job the following summer. A wintering-over conservator is another option if the right person was available. Trained conservators could also set up the procedures for particular conservation jobs which could then be turned over to a technician (or Antarctic Society volunteer?) trained for the purpose. Obviously, in view of the large numbers of artefacts to be treated it will be necessary for the conservators, after initial experimentation, to establish a cost-effective 'production line' methodology. Each conservation job should be set up as a formal contract, i.e. there must be a clear understanding that a certain amount of conservation will be completed on a particular type, in return for support, provision of the basic equipment, and salary.

8.5 Conservation Priorities and Roles

A conservator's job is to advise on technical difficulties with regard to conserving various artefact types, to outline the pros and cons of various conservation treatments and implement conservation programmes depending on their conservation speciality. In the normal course of events they do not select which items should be conserved. This is usually the job of an archaeologist, who among other things, specialises in assessing the cultural significance of artefacts particularly as they relate to a particular site or group of sites, assessing artefact conservation priorities, and the determining aspects such as the level of conservation or whether the appearance of an artefact is acceptable after a particular treatment.

Until some further experimentation is done, it is difficult to determine how effective conservation on specific artefact types will be. However, the work priorities are clear. The major artefact types requiring urgent conservation work are the tin cans and their labels, and cast iron and steel artefacts. The paper on bottles and other paper artefacts also need attention.

8.6 A Possible Source of Funding for Artefact Conservation

The Cultural Conservation Advisory Council (C.C.A.C.) has been

established to identify and set national priorities for the conservation of items of material culture (i.e. portable artefacts). It also assists the Minister of Internal Affairs in deciding allocations of funding for conservation purposes. Financial support from the Council will generally be in the form a subsidy based on contributions in cash or kind. It is not certain whether C.C.A.C., has authority to allocate funds for work in the Ross Dependency, but judging from the statements in its recently circulated policy statement I believe an approach from the A.H.T. for a specific and well planned artefact conservation project would be viewed sympathetically.

9.0 Priorities for 88-89 Season

The No. 1 priority for the 88-89 field season should be the snowproofing of the stables and cold porch at Cape Evans. A schedule of the tasks has been presented by Cochran (1988). As this work is proceeding, the ice mass within the stables should be removed and artefacts in the area recovered and recorded. Further discussion is needed on the timber requirements and other items which will have to be obtained soon if the job is to be completed in the 88-89 summer.

It seems unlikely that an artefact conservation programme will be able to be organised and funded during the 88-89 season. However, some urgent decisions need to be made soon, along the lines of those suggested in section 8 of this report, to ensure work can get underway the following year.

10.0 References

- Anon, n.d. Preserving Antarctica's Heritage. Promotional pamphlet produced the Antarctic Heritage Trust.
- Cochran, C. 1988. Conservation of Historic Huts, Ross Island. Report to the Antarctic Heritage Trust, 24pp.
- Cross, N L. 1988. Ross Island Historic Huts. Report to the Antarctic Heritage Trust, 7pp.
- Harrowfield, D L. 1981. Sledgin into History, MacMillan, Auckland.
- Harrowfield, D L, Turner G A & Skerton. 1986. Event Report on Ross Island Historic Sites, 27pp.
- Quartermain, L B. 1963. Two Huts in the Antarctic. Antarctic Division, DSIR, Christchurch.
- Scott, R.F. 1913. Scott's Last Expedition. The Journals of Capt R F Scott (arranged by Leonard Huxley), Smith Elder & Co Ltd., London.

- Turner, G A. 1979. A Strategy for the Preservation and Management of Historic Sites in the Ross Dependency, Antarctica. Dept of Lands & Survey, Wellington.
- Turner, G.A. & Harrowfield, D. L. 1984. Corporate Strategic Plan for the Ross Island Historic Sites, Ross Dependency, Antarctica. Report prepared for the Historic Sites Management Committee of the Ross Dependency Research Committee. 25 pp. 2nd edn.

Appendix 1 Contents of Provision Boxes in Collapsed Wall, Bowers
Annexe, Cape Evans Hut

Assigned No.	BAE Expedition No.	Contents of boxes	Condition of provisions
19	?	12 16oz cans Beach's Jams	poor
20	?	8 red painted, hole in cap, hermetically sealed, cylindrical food cans. Ht. 12.4, Dm. 10.4 cm. Probably John Moir & Son meats.	poor
21	1875	Empty	
22	1874	Empty	
23	1911	Empty	
24	?	Empty	
25	?	Empty	
26	1870	Empty	
27	1864	Empty	
28	1964	Empty	
35	-	Large wooden box with handles.	
36	1878	Bird's Concentrated Egg Powder n=12. Circ. Flanged lid cans, Ht 14.3, Dm. 7.8 cm Griffiths McAlister green glass mixed herb bottles, Ht. 11.9. D. 6.3 cm, n=2.	poor no labels
37	1818	Empty, pistol bullet under box	
38	1866	Griffiths & McAlister dried foods 6 square tins wrapped in paper.	poor
39	1908	Same contents as #38.	poor
40	1942	6 tins of Tru Egg or Tru Milk Pdr Ht. 12.8 x 9.0 x 9.0. Rect. tins with circ. press top lid Dm.7.0cm.	poor
41	1824	smaller wooden box inside contained pieces of pitch individually wrapped in brown paper.	
42	1813	Empty	
43	1944	6 tins of Limmer's Self Raising Flour Ht.19.1cm x 15.0 x 15.3.	poor
44	1877	rect. tins of Tru Egg Pdr, same as Box #40	v. poor
45	1929	6 tins of Griffiths & McAlister dried foods. Some lentils.	poor
46	1908	Empty	
47	1901	10 tins of Moir & Son Beef Marrow Fat. no labels, red painted. Ht 13.9 Dm 10.4	poor
48	1863	same content as Box #47. n=6.	good
49	1905	same contents as Boxes #47 & 48. n=9.	
50	1840	Griffiths & McAlister dried foods, n=6. some Pearl Sago Ht 10.3 x 15.3 x 15.3.	good

51	1860	Empty	
52	1884	Circ. Press top tins of Dubbin 1/2lb Ht 6.4, Dm 7.7. n=6	good
53	1877	6 rect. tins of Tru Egg, same as boxes 40 & 44.	poor
54	1916	Griffiths & McAlister's lentils n=3. Ht 10.3 x 15.3 x 15.3.	good
55	1875	12 Ideal Milk cans. Ht 8.5 Dm. 7.5	poor
56	2365	Plywood case containing 42 cans of Tru Milk powder, same contents as Boxes 40, 44 & 53	poor

N.B. Boxes 1-18 are still in-situ

Appendix 2 Items Recovered During Excavation of Bowers's Annexe
Cape Evans

The items listed below were loose, as opposed to those in boxes listed in App.1. The majority of the artefacts were in good condition and have been placed in appropriate locations within the hut.

Item	No.	
Griffiths McAlister Malt tin	1	
G M green glass herb jars	3	
red painted marrow bone fat cans	10	
iron primus key	1	
key		
orange skins (candied)	c.30	inside their rusted out box
Sanitary Dubbin 1/2 lb cans	12	
Sanitary Dubbin 1 lb cans	12	
conical glass measuring vial	1	base broken from top section
box of pieces of pitch	c.40	each wrapped in paper
bracelet made of tin ferrules	1	returned to NZ
Griffiths McAlister 'Hops' (tin box)	5	2 in good condition.
G M Bicarbonate of Soda bottle	1	
Cerebos Salt can	1	
Rising Sun Yeast bottle	1	
soda bottle gas cylinder	1	
1 tin box containing fish hooks	c.100	
7mm Mauser rifle cartridges	25	semi jacketed
8 gauge signal cartridge	1	HEB & Co, III

Appendix 3 List of Food Cans Removed from Packing Case in Royds Hut, and added to Graded Stacks established in 1987.

Grade Definitions

- A Cans and labels in good condition, odd specks of rust
 B Can has greater deficiency than A (usually rust)
 (added to stacks in Shackleton's bedroom)
 C Cans/labels have rust patches, abrasions etc, but cans are sound
 (placed in the right hand end of the packing case)
 D Cans have extensive rust. Labels are in poor condition
 (placed in the left hand end of the packing case)
 E Cans and Labels are in very poor condition, leaking or threatening
 to, often no label (these cans were stacked outside approximately
 in the position of Joyce's store).

Brands M = Moirs

<u>Product Brand & Type</u>	<u>No. of each grade</u>					
	A	B	C	D	E	
M standard meat cans			2	13	25	No labels
M kidney soup			1			
M mullagatawny soup			1			
Birds's egg powder				3	1	
Huntley's Oatmeal					1	
M minced collops			2			
M bacon rations				1		
M boiled mutton			3	4		
M army rations				1		
M Irish brawn		3	2	4		
M roasted mutton				2		
M stewed kidneys		1		1		
M minced steak		1		2		
M tripe and onions		1		2		
M Aberdeen marrow fat		1	3			
M boiled fowl						
M chicken & veal pate (oval can)			2			
M chicken & ham pate (oval can)		1	1			
M pate				4	1	No labels
McDoddies' Brussel Sprouts				1		
McDoddies' Celery				1		
McDoddies' Cabbage (tall boxes)				2		
Brand & Co Oxtail soup			1			
Lyle Syrup			1			
Rowntree Cocoa				6		
Hugons Beef Suet				4		
M Kipperred herrings			2		1	
M Findon haddock			1			
TOTALS		9	23	51	29	

Appendix 4 Butter Point: List of Provision Boxes and Contents

* = taken back to Scott Base. The boxes which were left at the depot were badly damaged.

<u>Wooden Boxes</u>	Dimensions (mm)			
	L	W	Ht	
Hugons Atora Beef Suet*	570	360	215	
DP Dates*	470	280	250	Contents dehy'd
Robinson Keen Pearl Barley*	390	350	355	Tin plate liner
'NZ produce' Lily Brand & crest (reg'd # 1880, Hamilton) butter*	410	285	315	contents solid
J D Beauvais Pemmican (Danish)*	780	400	280	100 cans per box
J D Beauvais Pemmican (Danish)	620	400	150	40 cans per box
Butter box, 'N.Z. Produce' (reg'd # 1880, Hamilton, Pure Creamery Butter)*	415	285	320	
Belmont Stearine Candles*	570	382	255	6", 21lbs
box containing grain husks only (originally contained bacon wrapped in cheese cloth & packed in barley husks)	670	390	215	
2 unlabelled wooden boxes	735	510	520	Both empty
 <u>Plywood boxes</u>				
Limmers Flour n=4*	480	210	330	1 unopened
Limmers Self Raising Flour	480	210	330	Remnants of boxes
Lyle's syrup *	500	205	240	Label handwritten
Tru Milk*	560	355	255	3 tiers, 120/box
Oatena (Hunter's Oatmeal)*	485	320	250	Shore Party # 75
Fry's Caracas Chocolate*	470	315	220	Interior lined with zinc
(6 internal wooden boxes each * holding 12 bars)	C290	225	65	Wood 3mm thick
Tate sugar box	420	335	245	Only ½ box
Atora Suet boxes n=2	730	325	220	
Box of tea in cloth bags	595	310	145	
Hunters' Oatmeal n=2	450	305	240	6x7lb tins
Tate Sugar n=2	420	390	245	
Empty box 'Stow from Boiler'	425	420	290	
Box with illegible lettering	560	330	190	
Fry's Cocoa boxes n=2 *	595	405	200	24 1lb cans in 2 inner boxes
Unlabelled plywood box	740	330	210	Empty
'Huntly and Palmers' biscuits	745	330	210	Empty
Box containing mass of suet wrapped in a tin foil liner	735	330	235	

Appendix 5Butter Point Provisions Removed To Scott Base
(now stored in plywood wannigan)

N.B. the box dimensions are recorded in App. 4.

1. Tru Milk 'Full Cream' prepared Trufood Ltd, Wrenbury, Cheshire. cream coloured paper label , blue writing with red crest
Ht 7.0, Dm. 6.6cm. Press top lid Dm 5.5cm.
N=88 in original case (it originally contained 120 cans)
45 still in original packaging (wood shavings), corrugated cardboard placed between the 3 tiers. 16 cans have intact labels (slight rust marks), 4 have perfect labels. 23 have no labels and varying degrees of light surface rust-including 2 specimens exposing tagger seal embossed 'Cut Open With Pen Knife'.
construction: hole in cap (actual on base, i.e. cans were filled through the base). cap dm 3.5cm, machine soldered, side seam, top and base lapped.

2. Fry's' 'Caracas' chocolate box ihed in app.4).
box contains 6 internal wooden boxes L 29.8, W 21.9. Ht. 6.3cm.
top surface stencilled 'Fry's Chocolate' By Appointment Makers to Hm the King, Hm the Queen, and HRH, the Prince of Wales, 300 Gold Medals and Diplomas. On side stencilled Fry's Chocolate, Manufactured in England. On other side 'Fry's Caracas Chocolate'.
Label: red & yellow
12 ½ lb cakes per box.
On end of box: red paper label with black writing "Fry's Caracas Chocolate, 6lbs in ½ lb cakes, No. 33". Packed 2x4 vertically, 1x4 horizontally.
One end of each of the boxes described above had been severely damaged by persons breaking into the boxes. Further damaged by skuas eating the exposed chocolate.

3. Keen Robinson 'Finest' Pearl Barley.
Packed by Keen Robinson & Co Ltd, London. case which originally contained 48 cans.
N=39, of which 35 have labels, 3 have no labels, 1 has ½ of label, and one has a loose label.
5lb tins crossed out to read 11b.
circ. flanged lid tin. Ht 10.5cm Dm 7.7cm.
Lid dm 7.7cm, depth of flange 1.3cm.
tagger inner liner embossed 'To Open Cut Inside the Circle'.
label white with black lettering
construction: machine soldered, crimped base, 5mm recess, soldered flange.

4. opened wooden box full of dehydrated dates. Recorded in App. 4.

5. J D Beauvais, Copenhagen, Denmark 'Preserved Provisions' (Pemmican) polychrome paper label, yellow background, red, gold, blue (dark and pale).
remnants of 2 cases as outlined in App.4.
n=57, of which 19 are in original sawdust packaging; 31 are in reasonably good condition (some surface rust on can & label); 70 have tatty labels, 10 have no labels, 2 have part labels. hermetically sealed can. Ht 12.3cm, Dm 7.4cm.

12mm soldered side seam, crimped, crimped ends, top & base.
Impressed on top '5 crown impression K, 200, 3780'

6. Tea tins n=4

remnants of labels state '(Pure) India Tea, Specially Packed for Expedition by (Co)oper and Cooper, London, England'. Ht 10.8 x 10.8. rect. flanged tin. Lid has 13mm flange. single folded side seam, not soldered, base attached with single crimp, impressed 'Made in England' in a circular impression in dm. Base has slight recess around the inside rim. 2 opened-contents dry, free running. 2 unopened, 1 tin has remnants of label on 2 sides, other tin has remnant of label secured by string. the labels are very black but appear to be green with black writing.

7. Lyle's Golden Syrup. Product name in handwriting scrawled on side of box. Box was unopened when found, but was opened to assess the condition of the contents and dry them. contents 20 cans, 5 x 2, 2 tiers. 10.3, Dm 9.6. Press top cans 8.5cm, lid has an internal recess. impressed on base 'U, S.O.I.B. Co, London (Barling?)' label: polychrome litho. in gold, green, white black featuring a sleeping lion (virtually identical to the modern label). Label states 'micro-organisms cannot live in this syrup'. All cans have an off-white paper wrapper printed in blue 'Lyle's Golden Syrup'. Red ribbon label across top reads 'Caution please see label is unbroken'. machine soldered side seam, lapped, single crimped end seams, on to sides. cans have surface rust but are generally sound.

8. Cerebos 'Nutritive' Table 4 cans and 5 lids

3 full cans, 1 empty. standard litho'd can Ht. 13.5cm, Dm. 8.5, Lid dm. 7.7 cm. folded side seam. raised disc on base 3.8cm, ends crimped on to sides. 2 litho's in poor condition, 2 adequate.

9. Tru Foods? Egg Powder?

N=13, 5 in 6/10 condition, 8 in 4/10 condition. circ. press-top cans, Ht 12.7, Dm 9.7, lid dm 8.4, depth machine soldered, crimped side hole in cap cans (hole in base, ie. filled through base) base plate dm 5.7cm internal tagger cover embossed 'To Open Cut Round Sunk Line in this Soft Lid with a Pen Knife'. all cans virtually labelless now.

10. F. Martin sardines (Douarenez, France). n=3 condition 6/10. product name impressed on surface in circle dm. can dimensions 10.8 x 7.8 x 3.2cm. key opening 'sardine' can with soldered on tag securing the eye of the Key. The key fits into a key shaped recess impressed into the top surface. Base impressed 'FRANCE'. Remnants of greaseproof type paper wrappers. copper foil makers label embossed 'Francis Martin, F M, Sardines A L'Huile Extra, Nantes, Douarenez, France'. originally there were many more of these cans in the Depot. Many have been pilfered.

10. stearine candles n=3 (loose)

Ht 14.5, Dm 3.1cm

in good condition, slight abrasions on surface.

wooden 'Belmont Stearine' candle box described in App .4. c.40 skua eaten and otherwise damaged candles were left at the Depot site.

11. Hugons Refined Atora Beef Suet cans in original box (see App.4).

n=33, 11 without labels & keys, 6/10 condition; 14 without keys, 5 with all or parts of labels, 1 with label, key and plain wrapper with underlying recipe sheet; 2 complete loose labels, & 4 partial recipe sheets. Circ. hole on cap cans (4 cm dm), key opened below rim, cans japanned, lid machine soldered on, crimped side & end seams. Label blue on white. Reads- "Hugon and Company", Pendleton, Manchester, 15 Gold & Silver Medsals, Awarded 1894-1908, Sole Manufacturers'.

12. Large biscuit tin (soldered tin box). Ht 23.9, W. 21.5 x 23.0, pull tab on surface. shreds of label. Huntly and Palmers biscuits?

13. Fry's Pure Concentrated Cocoa. 1 box of 12 standard cans with gold on white printed labels. Condition 3/10. In light wooden box 385 x 287 x 180mm. Stencilled on lid 'Fry's Cocoa, Makers to H.M. The King, H.M. The Queen, H.M. Queen Alexandra. 300 Gold Medals and Diplomas. Stencilled on 1 side: Fry's Cocoa Manufactured in England & purple stencil '911'. On both ends: Fry's Pure Concentrated Cocoa 12 llb tins No.227. Inside top of box there is a blue, yellow & gold paper label stating 'Makers to His Majesty the King. Fry's Pure Concentrated Cocoa, 300 Gold Medals and Diplomas awarded to the firm, also a complimentary coronation scene postcard.

14. 4 cases of Limmers' Self Raising Flour. See App.4 for box measurements. Plywood generally in good order except for pick marks. The paper labels on the tin cans all had minor tears and abrasions from prior removal and replacement in to the boxes. Condition variable 3-7/10 Box 295 unopened, left that way. Box 337 top had been ripped open, open can exposed Boxes 285 & 339, opened what was left of the sides. Cans removed & dried. Sides and labels rusty.

Limmer Flour Tins (6 per box) Ht 19.2, W. 14.8 x 15.4cm, soldered lapped seams. Made from 4 separate pieces of tin plate as follows: 2 piece sides plus top and base plates. Top has hand soldered 12.2cm dm circ. disc Labels: black and red on white "Limmers.' Self Raising Flour* in circle, and Great Northern Granary in small print. On opposite side. 'Full Directions for Use'. n=26, labels 9 front, 8 back, all in poor condition- very rust stained.

Loose labels: 1 front and 3 back. The tally does not include 12 tins which were not removed from two of the boxes.

15. Tate and Sugar box. Details in App.4.

16. Hunter's Oatmeal (2 varieties in tin boxes of slightly different sizes). larger size Ht 22.4 x 15.3 x 1 case of 5 (originally 6 tins). Hunter's 'Oatena'. Product name 'Oatena' written on label in pencil. Labels: dark blue on light blue print. Main wording 'Hunter's Famed Edinburgh Oatmeal. Prepared Special from the Finest Midlothian Oats.' 71bs nett.

smaller size, also 71bs nett. same label but stamped 'Coarse'. Ht 20.3 x 14.2 x 14.2. n=3, 1 complete with labels, rusty on 2 sides.

Construction: 2 pieces of plate form sides. top & base separate sheets (i.e. 4 piece construction. Crimped side seams, flanged base seams. Top flanged and soldered. Top covered with square of tin plate 13.0 x 13.2 on 'Coarse' tins. The tin plate covers a press top lid embossed 'Hunters' Oatmeal'.

17. fragment of green canvas, hand stitched to 10mm rope. May have covered depot originally. Large brass 'eyes' 2.2cm int. dm. Ext dm 4.5cm. Length of rope= 126cm.

18. Henry Tate & Sons Sugar wrapper. Nett 14lbs. London and Liverpool. Presumably same as specimens in Vape Evans kitchen. Ht 16.0 x 22.0 x 22.0. Wrapped in heavy fibre reinforced 'tar' paper (4 paper wrapped 'cubes' per box).

Damaged Cans & Other Items left at the Depot Site

	#	
J D Beauvais Pemmican	29	
Cerebos Salt	4	
Fry's Cocoa	18	
Hugons Suet	5	
Egg Powder cans?	12	cyl, press top Ht 128. Dm 98.
Beach's jam can?	5	Ht 120, Dm 96mm.
Robinson Pearl Barley	4	
F martin sardines	5	
Tru Milk	3	
Limmer flour tins	2	
Candles	28	denatured, skua damaged
Canvas bag (improvised)	1	remnant only, very smelly

Appendix 6 Items in the Butter Point Depot which were forwarded to the Antarctic Division, N.Z.

<u>Product</u>	<u>No. of items</u>	<u>Comment</u>
J D Beauvais Pemmican	3	
Tru Milk	4	
Robinson Keen Pearl Barley	2	1 with loose label
Lyle & Son Syrup	2	1 w outer wrapper
Fry's Cocoa	2	
Tru Egg?	1	
Candles	1	
Francis Martin Sardines	1	
Hugon's Suet	2	1 without label
Cerebos Salt	1	
Cooper & Cooper Tea	1	no label
Hunter's Oatena	1	
Hunter's Oatmeal (coarse)	1	label poor cond'n
Fry's Caracas Chocolate	1	wooden inner box, Originally contained 12 bars, contents & labels ravaged by skuas

N.B. The specimen selected for forwarding to NZ were not necessarily the best condition examples. They were selected and forwarded as 'typical examples' rather than the best examples.

Appendix 7 Visitor Numbers

The monthly totals for Cape Evans and Cape Royds (from c.1950 until January 1987) were listed by Ritchie and Simmons (1987: 34-38).

The totals then were:

Cape Evans 4326
Cape Royds 4859

Additional 1987 figures

Cape Evans (to 31/12/87): 266 including 17 ex World Discover
 9 ex Greenpeace
 (to 19/01/88): 25

Cape Royds (to 21/01/88): 55 (14 in old book, 41 in new book).

In 1987 there was no visitors book in the Discovery Hut. One was put in this season, but the number of entries was not recorded.