

## Frozen solid: recent archaeological work at Shackleton's Cape Royd's hut site (1907–1909), Ross Island, Ross Dependency, Antarctica

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*In January and November 2005 the writer was privileged to be involved in further archaeological work on Ross Island, Antarctica under the auspices of the Antarctic Heritage Trust (AHT). This paper outlines previous work since 1960 and specifically addresses the archaeological removal for conservation purposes of 290 case-lots of deep-frozen provisions stacked beside Shackleton's (1907–1909) polar expedition hut at Cape Royds. The latter work was done in two periods in 2005 in accordance with the Conservation and Implementation plans for the hut.*

The Ross Dependency is the New Zealand administered part of Antarctica, a huge area encompassing 450,000 sq km but only representing about three percent of the total Antarctic land and ice mass (14 million sq km; Fig. 1). But within the Dependency are some of the most significant historic places, a legacy of the great period of polar exploration now known as the Heroic Era (1895–1917). Not only are the sites more numerous here than on other parts of the continent, they are unique within the context of global exploration, and include the expedition base camps (large wooden huts and outbuildings), remote rock huts and shelters, supply depots, middens, camp sites, message posts, cairns, memorial crosses and a grave. They are remarkable links with a time when expeditions in the quest for national glory and geographical and scientific knowledge ranged over wide expanses at the polar extremes of the globe. Some sites, such as the supply depots placed on the Ross Ice Shelf by expeditions between 1902–1912 and by E.H. Shackleton's Ross Sea Party in

1915–1916, have not been seen since they were established (Harrowfield 1995).

The expedition base huts have been the main foci of preservation work over the years. Four huts remain plus the remnants of another. At Cape Adare, the first over-wintering hut in Antarctica was erected in 1899 by members of the British Antarctic Expedition (1898–1900) led by Carsten Borchgrevink (born in Oslo in 1864 of a Norwegian father and an English mother). Thirteen years later, in 1911, Campbell's Northern Party (of Scott's British Antarctic Expedition 1910–1913) erected another hut nearby. Six hundred and fifty kilometres south of Cape Adare, bigger huts were built and occupied at three locations on Ross Island by the Scott and Shackleton polar expeditions during the period 1901–1917. Scott's men erected the 'Discovery hut' (National Antarctic Expedition, 1901–1904) on Hut Point in 1902 (Fig. 2); at Cape Royds the 'Nimrod hut' (Fig. 3) was erected by Shackleton's

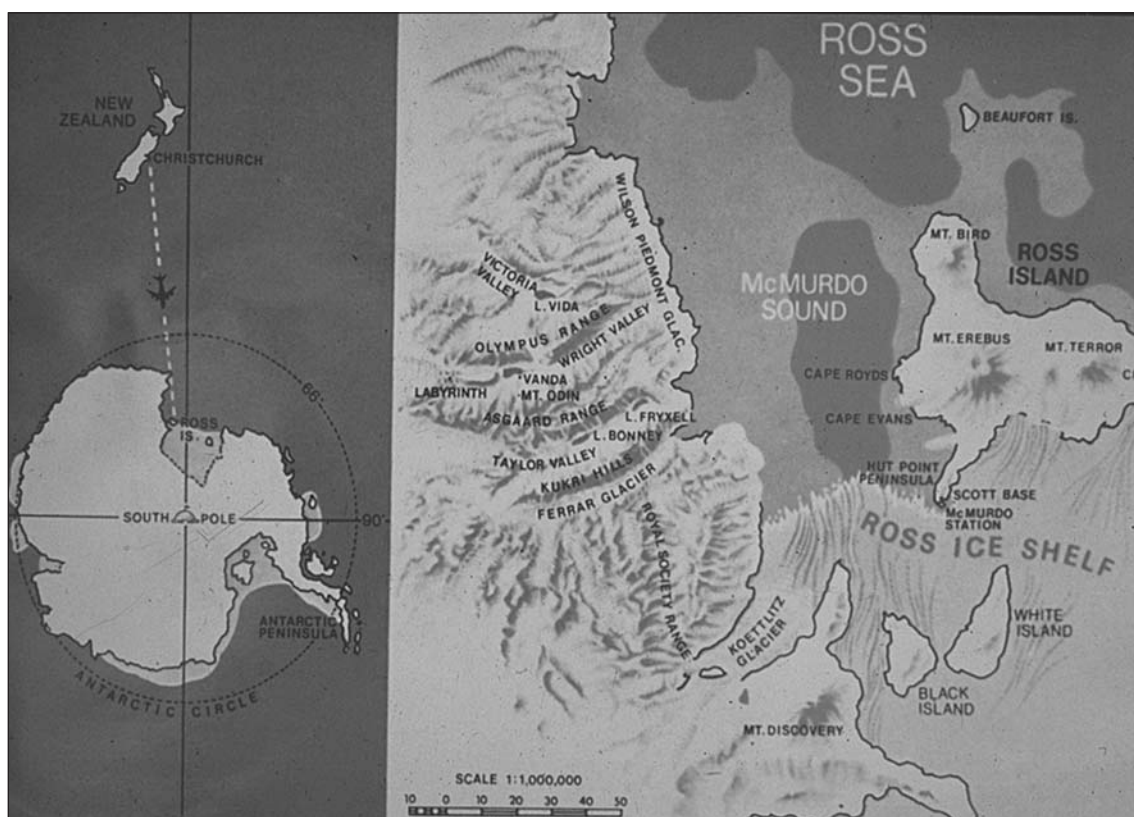


Fig. 1: Map of the Ross Sea Region.



Fig. 2: Scott's Discovery hut, Hut Point, Ross Island (1901–04). US McMurdo Station in the background.



Fig. 3: Shackleton's hut at Cape Royds (1907–09).

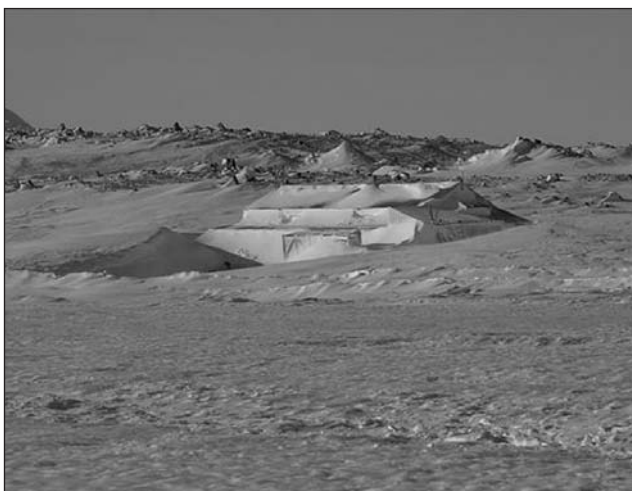


Fig. 4: Scott's Cape Evans (1910–12) hut under heavy snow. Photo N. Ritchie, November 2005

party in 1908 (British Antarctic Expedition, 1907–1909), and Scott erected the largest of all the huts at Cape Evans (Fig. 4) in 1911 (British Antarctic Expedition, 1910–1913). The latter was also occupied by the Ross Sea Party of Shackleton's Imperial Trans-Antarctic Expedition 1914–1917 (Harrowfield 2004:8).

## 1957–1970 THE ICE REMOVAL PERIOD

After the Heroic Era was over the huts were abandoned to the elements. They were not to be seen again until the late 1940s when US Navy personnel made the first visits. The first 'preservation work' at the Ross Island huts was undertaken by sailors from RNZN *Endeavour* and personnel from New Zealand's Scott Base in 1957–1959; the emphasis being on making the huts accessible and weather proof. Essential repairs were made and some snow was removed from within the huts at Cape Evans and Cape Royds. The sailors also collected and burned 'rubbish' at the two sites. By this time many artefacts had been removed to museums or souvenired since the huts were first revisited in the late 1940s.

At this stage, the early 1960s, ice almost filled the seldom visited and remote Borchgrevink expedition hut on Cape Adare, and on Ross Island only Shackleton's hut at Cape Royds was ice-free. In contrast the two huts further south at Hut Point and Cape Evans were almost filled with ice. This was considered by New Zealand Antarctic authorities as detrimental to the historic structures, hindered maintenance required within reason by the Antarctic Treaty 1959, and prevented access to visitors. For these reasons the decision was made to remove all of the ice (Harrowfield 2004:8)

In 1960 historian Leslie Quartermain (then Information Officer Antarctic Division (DSIR), sought Northern Hemisphere advice on the best means of extracting artefacts from ice, but when the work was done at Cape Evans no records were made of where the hundreds of artefacts were located (other than trying to put things back in the areas they were found) and only a small photographic record was compiled. According to Quartermain, 'it soon became apparent that the ice concealed a great quantity of material of potential interest and value; a surprising quantity in fact...' (Quartermain 1961). The ice removal was done with picks and shovels considered the only practical method of tackling the job at the time. Some damage, mainly to canned provisions, occurred in the process. To some extent this was unavoidable because 'many shelves had collapsed under the weight of snow [and] what had been on them, was in a jumbled mass on the floor and now embedded in solid ice' (Quartermain 1961). Artefacts were extracted then left outside to allow the ice to melt.

In January 1964, a New Zealand field party, again using picks and shovels, removed the ice and snow that almost filled 'Discovery Hut' (after Scott's ship *Discovery*) at Hut Point. By today's standards only brief records including one floor plan by architect Rodney Smith and a few photographs documented the work (Gibbs and Smith 1964) but this does not detract from their achievement. In those early days systematic archaeology was not considered necessary or even thought about. Furthermore field parties had limited time to complete the work and were under pressure to get the job done. By comparison at that time the only work involving systematic excavating of ice on historic sites had been confined to a few sites in the Arctic (Harrowfield 1996).

In 1971, ten years after the ice was removed from inside the Cape Evans hut, a large midden associated with the Ross Sea party (1915–1917) was cleared from outside the main entrance. Everything from sledging, scientific and photographic equipment to clothing and empty cans, had been tossed out the door. The midden had the potential to provide information on the privations and activities of the marooned men, but the field party had a directive to clean up the area and while some photographs were taken and over 100 artefacts collected, no further recording was done apart for listing the 'good finds' and placing them in Scott's hut.

For a more detailed account of the early 'historic huts



restoration work' on Ross Island refer Harrowfield (2004:11). By today's standards the early work leaves much to be desired but at the time it was a genuine effort by dedicated people using accepted practices to save the structures and much of their contents for future generations (Figs 5, 6).



Fig. 5: Galley of Scott's hut at Cape Evans, January 2005.

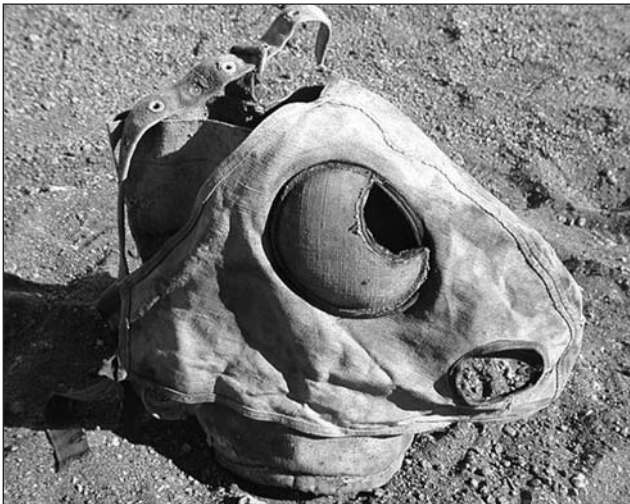


Fig. 6: Unique improvised pony head protector excavated at Cape Evans, January 2005.

## LATE 1970S: CONSERVATION COMES INTO FOCUS

By the late 1970s, it was becoming increasingly apparent that a more systematic and scientific approach was needed to preserve the huts and their contents long term. In particular it was recognized that there was a need to involve conservation specialists and to elevate the summer programme above often ad hoc activity. This new approach was championed by people such as David Harrowfield, then Antarctic Curator at Canterbury Museum, and Gerry Turner, then Secretary of the Historic Sites Management Committee which had been set up by the New Zealand Antarctic Programme c. 1975 (Turner 1978).

David Harrowfield made the first of his many trips to Antarctica to work on the huts in December 1977. Now recognized as one of the leading Antarctic heritage historians, he was the first to apply archaeological skills (learned while employed as Antarctic Curator at Canterbury Museum) to the issue of recovering and documenting artefacts in ice and

perma-frosted ground. At Cape Royds and Evans he experimented with using heavy black polythene sheeting to try and absorb heat and thereby increase the rate of melt underneath. While he proved the method worked, the slow thaw rate precluded its use for major excavations in the short window of opportunity for ice excavations (a couple of months in summer) (Harrowfield 1978a, b).

In 1981 Turner and the first professional conservator Jack Fry (from the then National Museum, now Te Papa), visited the Ross Island huts. Although few of Fry's recommendations were able to be implemented at the time, some were incorporated in the first management plan for the huts (Turner and Harrowfield 1984). Among a range of issues it advocated the use of 'specialist historic archaeology techniques' in the course of any further ice removal work and the need to properly document the location of artefacts and stratigraphy and seek advice on appropriate conservation measures.

## THE PROFESSIONAL ERA

Following the experimental archaeological work by Harrowfield (1978a, b), professional archaeologists Neville Ritchie and Alexy Simmons were invited to visit the huts in the summer of 1986–1987. Their report identified 20 major management issues that minimally needed to be addressed if the huts and their contents were going to be preserved long term (Ritchie and Simmons 1987).

Coincidentally the Christchurch, New Zealand-based Antarctic Heritage Trust (AHT) was established in 1987 superseding the quasi-government Historic Sites Management Committee. Within a year the AHT had established a Conservation Advisory Group (CAG) to produce a new and much more specific Ross Island Huts Management Plan (Cochran 1990). The modern conservation management era had begun albeit seriously under-funded until recent times.

On the archaeology front, the initial visit by Ritchie and Simmons (1986–1987) led to the first major systematic archaeological excavations by Neville Ritchie and Nelson Cross at Cape Evans (Bowers' annex and stables) in 1987–1988 and 1988–1989 (Ritchie 1988, 1989a) during which new technological advances were introduced; notably the first use of air heaters, heat guns, a chain saw and a Dynadrill for archaeological excavations in ice. These techniques and an evaluation of their pros and cons were outlined in two published papers (Ritchie 1989b, 1990). Since then the tools and associated methodology have become established procedures for polar archaeological work (Fig. 7).

During the summers of 1989–1990 and 1991–1992 Roger



Fig. 7: Using Dynadrill to free frozen provision cases.

Fyfe undertook further ice excavation in the stables at Cape Evans (Fyfe 1990, 1992). Although most of the ice was removed from the stables many ice-bound artefacts (particularly in stable bay 1) were left *in situ* on the premise that with the bulk of the ice removed the remaining ice would melt away. That did not happen and further water ingress has ensured that the remaining artefacts are firmly ice-bound.

In January 1995 Ritchie and Fyfe returned to Ross Island, at the request of the Antarctic Heritage Trust to excavate and remove an 'unsightly frozen jumble of food cans and residues' located between the Cape Evans cold porch door and the latrines, as well as a deposit of mixed food cans near the annex door to improve drainage from the south side of the hut. They also excavated the last 'old ice' within the hut, a relatively small deposit under the acetylene generator in the small

entrance porch (Ritchie and Fyfe 1995:9-10).

With the notable exception of excavations in the Cape Adare huts in 1990 (Harrowfield 1991) since the mid 1990s ice excavation in and around the Ross Sea huts has largely been limited to removing ice and snow (most years) from the 'ponding area' behind the south wall of the Cape Evans hut and other small deposits which have found their way into the structures during the intervening year. During the 2004 season the field team opted to excavate the ice and snow from behind the south wall in the form of a long narrow tunnel adjacent to the hut wall. Although the ends of the tunnel were blocked off with snow or ice blocks, with the wisdom of hindsight this action (i.e. leaving a snow-covered cavity against the hut wall) may well have contributed to the flooding in the hut in late 2004.

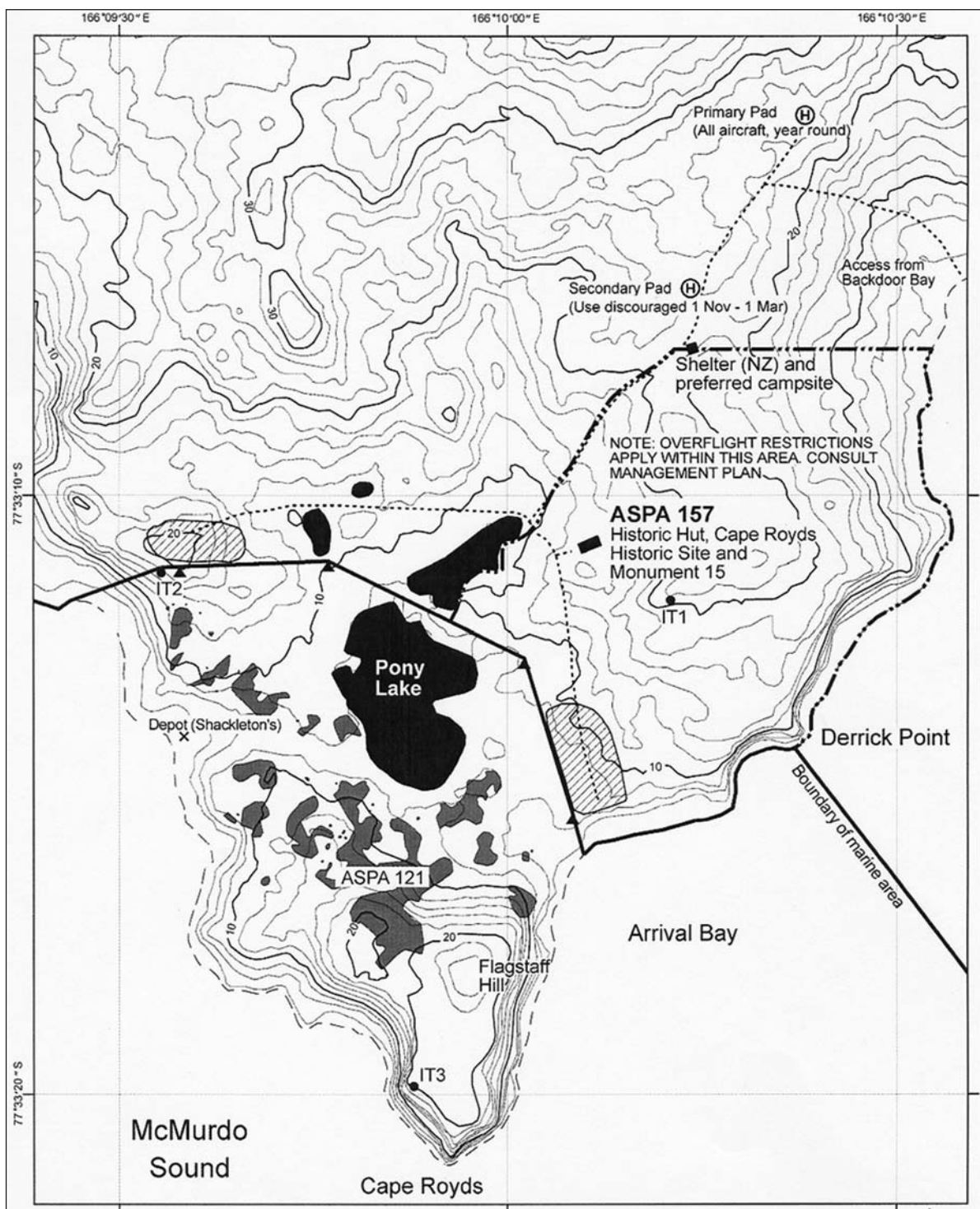


Fig. 8:  
Site plan,  
Cape Royds.



## ARCHAEOLOGICAL WORK AND METHODOLOGY: CAPE ROYDS 2005

From about the mid 1990s until 2004, the New Zealand-based Antarctic Heritage Trust has been working steadily towards the funding and implementation of major conservation programmes on the huts, their contents and their environs. As part of this process conservation and implementation plans have been completed for all the Ross Island and Cape Adare huts incorporating the skills and knowledge of a wide range of specialists including conservation architects and carpenters, archaeologists, polar historians, collection managers and materials conservators and Antarctic logistics personnel (Antarctic Heritage Trust 2003, 2004a, b, c).

For various practical reasons it was decided that the conservation work would begin with a three year programme on Shackleton's hut at Cape Royds (Fig. 8). To achieve specificity and consensus on the multi-year work plan at Shackleton's hut, as detailed in 'Shackleton's hut Implementation Plan' (Antarctic Heritage Trust 2004d), the Antarctic Heritage Trust convened a major planning workshop in November 2004 to finalise the 'Artefact Collection Management Plan' (ACMP) and reach consensus on specific work tasks, methodology, deliverables and reporting lines for the 2004–2005 Ross Island field event. The proposed work included a major archaeological component involving the documentation, removal, condition assessment, packing for removal and ultimately conservation of all the provisions (food boxes and cans) stacked along two sides of the hut.

In 1961 Quatermain reported: 'The heterogeneous mass of food cases lying everywhere was sorted. The better preserved cases and tins were used, as originally, to give protection to the hut and walls, while the badly rusted and deteriorated tins, along with general rubbish, were burned' (D. Harrowfield email 13/11/04). This statement corroborated by study of photographs taken at the time indicates much of the stockpiled provisions (especially against the east end of the hut) were an artefact of the Quatermain party's work, although they were tidying up and attempting to replicate what was there during the Shackleton era; i.e. bulk provisions stacked against the south and east walls (Figs 9, 10).

The Shackleton Hut Conservation Plan included a summary of the present situation:

Venesta cases containing canned foods and jars of salt are stacked along the south and east walls of the hut. The cans have deteriorated from corrosion and the contents are leaking from many of them. The Venesta boxes have delaminated. Moisture entering the jars of salt has caused discolouration of the labels, freezing and some breakages. The deteriorating provisions constitute an environmental hazard to local wildlife [skuas and Adelie penguins]. Some vulnerable items have been moved to the AHT container at Scott Base. In recent years there appears to have been acceleration in the rate of decay to the point where, despite their interpretative value, the provisions are becoming increasingly unsightly and detract from the appearance of the hut (and they may be causing damage to the adjacent lower walls). Furthermore as the packaging has deteriorated there has been an increasing incidence of the food cans being wind-driven some distance from the hut, often spilling food residues in the process. (Antarctic Heritage Trust 2003:47)

Faced with this situation, a large mass of increasingly uncontained provisions and the likelihood of damp and ice damage to the adjacent hut walls, doing nothing was not an option. Consequently the Antarctic Heritage Trust signalled its intention to begin removing the stores from the east wall in



Fig. 9: Cape Royds, south side before stores removal.



Fig. 10: Canned provisions inside hut before conservation.

January 2005. It would be the first phase of a programme of work that would see the removal and conservation of all the remaining external stores and artefacts around the hut.

The work was done over two field seasons. In January 2005 the stores behind the east wall of the hut were removed and during another stint in November–December 2005 the much larger cache along the south wall was removed. The removal and initial documentation of the stores involved two specialists working together—Neville Ritchie (archaeologist; assisted by Al Fastier in November 2005) and Robert Clendon (conservator). In practice Ritchie took responsibility for the *in situ* recording and identification of the provisions and their recovery (removal and/or excavation), while Clendon undertook the condition assessment, packing and stockpiling of the excavated items. During the stores removal process, Ritchie was also responsible for the collection of food residues and box wood samples for study by the University of Waikato School of Bio-Sciences. The second field season saw a further specialist, Doug Rogan of International Conservation Services (ICS, Australia) added to the team. Rogan oversaw the detailed documentation of the artefacts in preparation for transit by tracked vehicle across the sea ice to Scott Base, a distance of 40km. In conjunction with Antarctica New Zealand a conservation lab has been established by the Antarctic Heritage Trust at Scott Base and a team of three conservators are currently over-wintering (winter of 2006) and working on the artefacts. A total of 3309 artefacts were removed for conservation, made up of 2551 from the external stores and 758 from inside the hut.

The excavation and removal of the much greater volume of stores along the south wall in November 2005 was completed in nine, sometimes gruelling, working days due to the hardness of the perma-frosted gravel. The cases in the two lowest tiers were locked in fine basaltic permafrosted-gravel with a hardness and consistency like concrete. Each case took on average 2.5 hours to extract. Where possible the cases were removed with considerable adhering ice and gravel which was left to solar-thaw and slough off to minimise damage to the case sides. The permafrosted gravel on the south wall was much finer than that surrounding the boxes along the east wall and was much harder and more difficult to break out. This was reflected in considerably more wear and tear on the Dynadrills. The methods and technology used a combination of percussive tools: Dynadrill, hammer and prying tools (jemmy bars, hive tools, steel wedges, a ‘hammering spade’ and a heavy crow bar to break the ice bonds); heat (provided by a Desa-Master diesel-powered air heater and electric heat guns) and limited use of aerosol de-icer (Figs 11, 12) (Prestone windscreen de-icer) have been used previously and were described in detail by Ritchie (1990, 2005a, b).

The condition of the cases and their contents varied considerably. Virtually in every instance the metal edging which held the six plywood panels together, making up each case, had deteriorated to the point where it was just a rusty stain or fell away during the recovery operation. This necessitated tying each case-lot together as it was uncovered. Most of the cases in the upper tiers had two to three sides missing (usually the lid and front end) or they had substantial fritter damage. Even before removal it was evident that many of the cases exhibited moisture penetration and freeze-thaw damage in the form of delamination, splitting and corrugation of the plywood layers; the latter often interlocking into the sides of an adjacent case. The corrugations made separating adjacent boxes without further damage very difficult. In some instances (even in the lower tiers) ‘complete cases’ had



Fig. 11: Use of de-icer.



Fig. 12: Removing ceramic jars behind east wall Cape Royds hut.

obviously been created by someone placing ‘any old lid’ on top of an open crate for stacking purposes.

Most of the cases in the lower tier were complete case-lots. The cans and bottles (all salt jars), where visible, were still wrapped in their original white paper wrappers and frozen in their original sawdust or wood shaving packaging. In some instances the cans in a single crate appeared to be in similar condition; in others the cans varied from being in relatively good condition to condition 5, in very poor condition or too far gone for conservation (or worse). About 80 cans were discarded during the course of the recovery operation. They were ‘too far gone’ and either disintegrated or were just fragmentary remnants not worth retaining. The removal of the stores over the two seasons generated 21 plastic crates of ‘rubbish’ consisting of leaked food residues, packing sawdust, penguin moult and intermixed gravel, plus three crates of wooden box and Venesta case fragments and metal case edging.

A fuller account of the wider heritage management issues and their interplay with prevailing Antarctic policy and their contemporary social context is beyond the scope of this paper. It will suffice to say that each of the historic huts in the Ross Dependency are within Antarctic Special Protected Areas (ASPA) which have rigid protocols and operational restrictions controlling any sort of intervention within them. Those requiring further information are referred to the preamble in Antarctic Heritage Trust’s Conservation and Implementation Plans. Good insights into the numerous practical problems and conservation issues with regard to maintaining cultural heritage in Antarctica can be found in Barr and Chaplin (2004), e.g. the papers by Hughes, Pearson, Farrell et al., and Ashley and Mackay.

### Supplies taken by the Discovery, Nimrod and Terra Nova Polar Expeditions

The removal for conservation of the large volumes of unused provisions from around Shackleton’s Cape Royds hut reflects the huge volume of supplies which were needed to sustain a polar expedition. Most expeditions took food supplies for three years so they had at least one year in reserve in case their relief ship could not reach them.

Being British Expeditions most of the supplies were of British manufacture, but they also include Dutch Vezet tinned cheeses and Hoogenstraaten canned asparagus, Danish Beauvais pemmican, American pemmican, Heinz beans and sauces from Pittsburgh, USA, and French (Rodel Fil Freres) sardines. In addition canned beef, mutton carcasses, butter and other products were obtained (both purchased and donated) in



Australia and New Zealand en route south. The supplies of British origin included over 30 different types of Moir & Son canned meats and pates, Gillard and Co meat pastes, Brands Soup, condensed milk, Hugon's Suet, Rowntree's Cocoa, Griffiths and Macalister dry foods (calavances, dates, sultanas etc), McDoddies dried vegetables (several types), and Hunter's Oatmeal. Among the cans uncovered during the 2005 excavations were three types which are not present in the hut.

An analysis of over 150 different types of packaged provisions acquired by the Discovery, Nimrod and Terra Nova expeditions (Scott and Shackleton) and their selection is the subject of a forthcoming paper (Ritchie in prep). While the documented accounts of the foodstuffs taken are a valuable record, it is often difficult to determine the exact range of products taken on a particular expedition, because of factors such as generalised references, e.g. 'canned fish' (which might include a range of different types); additional supplies were taken off the expedition ships or taken down on the relief ships; and additional supplies which were acquired in Australia and New Zealand en route to the Ice. From an archaeological perspective there are other complications; some provisions were entirely consumed and their packaging either burnt or discarded (possibly on to the sea ice) leaving no trace, while others still exist in various conditions and in quantities ranging from minute to large volumes. In many instances, recovered cans are in relatively good condition but they have lost their labels, so can only be assigned a non-specific categorisation. Supplies were often moved between the huts by later expeditions which complicates the picture. Furthermore, it is clear from the early hut caretakers reports that considerable volumes of fragmentary and broken food containers (glass and cans for the most part) were discarded during 'clean-ups around the huts' during the period 1960 to 1985. But not withstanding these factors the large volumes of remaining polar provisions and stencilled case labels (both inside and outside the huts) together with discarded containers in middens and historic information about the provisions acquired and taken south represent a unique resource allowing insights into the increasing manufacture and adoption of canned and bottled foodstuffs by the turn of the nineteenth century. Some of the companies who supplied the polar expeditions remain in business today. Without 'preserved provisions' (some of them donated), the quest for the South Pole and exploration of Antarctica in general would have been even more difficult and arduous since the only available food resources on the continent were seals and penguins and limited fishing, all restricted to the coast (although refrigeration was not a problem!).

## ABBREVIATION

RNZN *Royal New Zealand Navy*

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## TRIBUTE TO JUDY BIRMINGHAM

I first made contact with Judy Birmingham sometime in the mid-1980s after I became aware of the existence of ASHA and became its first New Zealand member. In 1988 my wife and fellow archaeologist Alexy Simmons and I attended our first ASHA conference in Canberra. While there we met Judy for the first time and were immediately impressed by her knowledge, energy and enthusiasm. At the time she was President of ASHA. She took a special shine to the 'Kiwis' and was keen to expand ASHA's horizons to New Zealand. At a conference a few years later (1992) in Sydney Judy seconded my resolution to the ASHA AGM to change the name of ASHA from the Australian Society for Historical Archaeology to the Australasian Society for Historical Archaeology (the membership was keen to retain the acronym ASHA). It was the beginning of an enduring relationship between historical archaeologists in Australia and New Zealand, and led to some of ASHA's most memorable conferences, by general acclaim, in the latter.

Following the Canberra conference, Judy invited us to stay over at her fine old home in Woollahra, Sydney. For several years we enjoyed short holidays and Judy's fine meals, good wines and lively discussions on our visits to Australia to attend the ASHA conferences. After Judy retired, little did I expect that I would follow in her footsteps as ASHA President, but I was delighted to be involved in the awarding of Life Membership of ASHA to Judy for her contributions to the field. She was the founding mother of historical archaeology in Australia through her courses at the University of Sydney, the establishment of ASHA and her influential academic papers and research. Her graduates went on to establish other strongholds of historical archaeology at many of the leading Australian Universities while others are leading archaeological consultants in Australia today. It is my pleasure to contribute a paper in this volume honouring Judy—she richly deserves this accolade for her contribution to the development of historical archaeology in Australia and New Zealand.