minus six degrees of separation
Adam Wild, conservation architect, Auckland, New Zealand

There is an analogy that compares the architectural process to the rings of an onion. The centre of the onion equates to the essence of the concept and the rings encompassing the centre represent the development of the idea. I also quite like the image of a stone cast into a pond as an equivalent analogy. This reflects the dynamic nature in the architectural process of considering a problem and the variety of responses and solutions to it. This is an action of potential infiniteness: how big a splash; in how big a pool? The more developed the ripple the richer the solution. The process of expansion leads to more fully considered solution. The process is not necessarily a straight line from A to B. Each extension affords a wider scope from which to consider appropriate and ethically derived decisions. The journey from A to B, direct or otherwise, should engage multidisciplinary science with each expanding ring or ripple.

The Antarctic Heritage Trust's Ross Sea Heritage Restoration Project is charged with the care of the heritage of the Heroic Era located in the Ross Sea region of Antarctica. The expansion of the project's "ripples" has embraced an even broader, and for it richer, view and response to the task at hand. For me the journey in this case has resulted in a collaborative phenomenon. Something introduced to me as "the Antarctic way". Where everyone was interested in what everyone else was doing. Where help could be offered it was, freely; it is a place where every door can be opened.

The expansion of the project's "discipline" seems at times serendipitous. In this paper I call it: *minus six degrees of separation*.

minus one degree: in the beginning
As a very young boy my father would read to me tales from *Winnie the Pooh.* I especially enjoyed the one entitled *In Which Christopher Robin Leads an Expotition to the North Pole*:

> *'…. That's what an Expedition means. A long line of everybody. And we must all bring Provisions"*
> *"Oh!" said Pooh happily. … And he stumped off.'*[1]

As a very young boy, going out always became an 'expotition' of one sort or another.

In 2001 I was visited by a project manager whose brief it was to find an appropriately qualified conservation architect to join the Antarctic Heritage Trust's Heroic Era Hut's project team and, in response to his own sense of practicality, find someone "fit enough" to pull him out of a hole in the ice and "young enough" to see the job through." The opportunity of being a member of an international team responsible for the conservation of the huts associated with the Heroic Era of Antarctic exploration, their context and for the *spirit* of what these places have come to mean was clearly going to be something pretty special. That all this was to happen in that most enigmatic of continents, the Antarctic, seemed all too much the stuff of dreams. Our response to the invitation was successfully enthusiastic!

[1] Milne, AA *The Complete Winnie-the-Pooh* 1991, Dean, London, p111-112

minus two degrees: north

Any project can have an air of the unconventional and unexpected. Having been engaged in the conservation of the Heroic Era Huts' conservation project I found that my first steps towards the Antarctic were northerly in direction and serendipitous in consequence.

In December 2001 I found myself at the top of New Zealand House in London, at the international launch of the project. Being in London also gave me an opportunity to meet with the project's international peer reviewer, Michael Morrison. We found we were able to discuss in person the processes ahead and the objectives outlined. Something struck me about the value of meeting and working with Michael before getting underway. This was a twist to the conventional relationship of author and reviewer. What I believe Michael and I achieved by our meeting before the project started was establishing a relationship that facilitated and encouraged dialogue and collaborative thinking. Collaboration across disciplines has become a very real consequence of the team *spirit* in this project.

London was followed by an invitation to Cambridge and the Scott Polar Research Institute (SPRI). There I was met by its archivist and curator (now retired) Bob Headland, who I was to meet again on Ross Island a few years later. Again, convention seemed to dissolve as Bob's welcome came with a glass of wine and a piece of Christmas cake! Through Bob, I was also introduced to a number of "Antarcticans", including Alan Carroll. Alan and I have maintained a correspondence that has revealed two fascinating opportunities for extending our understanding of the Ross Island Heroic Era Huts.

The first was an introduction to a descendant of Harry Dunlop, Shackleton's *Nimrod* carpenter. Dunlop's diary and photos recording the construction of the hut at Cape Royds had been never been released by the family before this time and it was as a direct consequence of our correspondence with Alan that this information could be reviewed. Alan's second "lead" in the quest to better understand Shackleton's Cape Royds hut came from the chance discovery of an extant example of a prefabricated hut equivalent to that used by Shackleton and manufactured by the same Humphrey's Limited, Knightsbridge. These huts were, after all, catalogue buildings and were part of an existing history of prefabricated structures.

Almost as far away from the Antarctic as I could physically get, yet "acclimatising" as my father-in-law called it during Christmas 2001 in Lincolnshire, it became clear that the project had very much begun.

minus three degrees: South

The stories of Scott and Shackleton are well known. So too are some of the continent's essential statistics: the driest continent; containing 80% of the earth's fresh water; the coldest continent; and, the windiest place on the planet.

It is this paradox which has been credited with slowing the decay of the timber huts and associated materials left behind by these early explorers. However, this extreme and remote environment presents its own technical and logistical challenges including: high relative humidity; temperature change; chemical degradation; high ultra violet light levels; and, strong Katabatic winds, which are composed of a thick layer of "heavy" cold

air that slide down the polar icecap towards the coast under the influence of gravity. These winds vary depending on location, but are generally worse in coastal regions. Wind speeds of up to 150 km/hr with gusts up to 200 km/hr are not uncommon.

While operating "in the field" in these conditions it is risky to venture too far from the safety of a tent or the huts themselves; testament indeed to these "temporary" buildings. Scott wrote in the *Voyage of the Discovery*, July 1902[2]

> *'…for one brief moment the eternal solitude is broken by a hive of human insects; for one brief moment they settle, eat, sleep, trample, and gaze, then they must be gone, and all must be surrendered again to the desolation of the ages.'*

Despite the ravages from the environment and the "desolation" of the past 100 years, these places have somehow survived against expectation.

In combination these factors present some unique challenges to the conservation of the huts, their environmental context, and to the working team. The particular and often severe effects of the Antarctic environment can be exacerbated by the unique topographical contexts of each of the huts and their construction systems. Each of the huts has particular and distinctive contexts which inform our understanding of their significance and the process towards their conservation.

Discovery Hut (1901-1903) stands on the path of every journey from the Ross Island Heroic Era huts across the Ross Ice Shelf to and from the Trans Antarctic Mountains and the glaciers that lead to the polar plateau and the pole. It is beginning and end to each 'push' South and, 'home' to each returning party. It tells a haunting story of desperate survival and stands as testament to the Heroic Era expeditions and their spirit of Antarctic exploration and science. Today it shares a strangely incongruous modern context with the neighbouring McMurdo base.

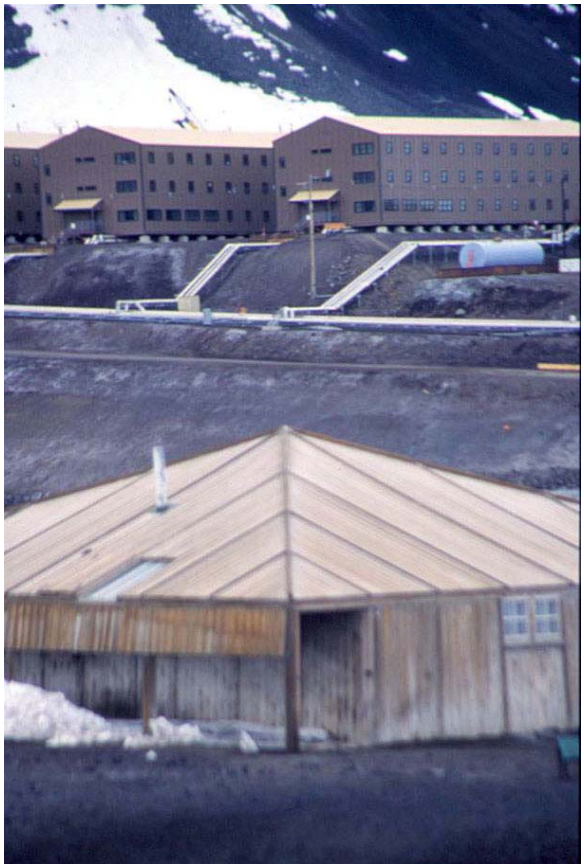

Figure 1: Discovery Hut and MacMurdo Base. Adam Wild 2001

[2] Scott, RF *The Voyage of the Discovery*, vol 1, 1913, Smith, Elder & Co, London, p259

The majority of the building conservation work on **Shackleton's Hut** at Cape Royds is now complete. An environmental clean-up around the exterior of the hut has been done. The focus continues on the artefact collection associated with the site.

The work at Cape Royds has engaged a range of disciplines and, through them, acknowledges layers of significance that refer to the distinctive values of this place.

After the experience of the Australian outback hut erected at Hut Point, which proved too cold to occupy for more than short periods during the Discovery Expedition, various attempts to insulate the later huts were made. At Cape Royds, Shackleton used granulated cork within the interstices of the wall. Over the years, the cork has been shaken out like grains of salt from a salt shaker. Scott's attempts at insulating the Cape Evans hut were equally inventive. The timber frame was lined with six layers of material. On the inside face of the framing there are two layers of vertical tongue-and-groove boarding with insulation between, while on the outside face there is one layer of tongue-and-groove boarding then insulation then finally weatherboards. The insulation consists of layers of shredded seaweed sandwiched between linings of Hessian, known as Gibson Quilting.

Figure 2: Details of Insulation, Cape Evans Hut. Adam Wild 2001

Alan Carrol wrote to me regarding the Humphreys-built "Shackleton" hut he had found in the UK and its insulation:

> *"Insulation? - we British folk didn't hold with such sissy stuff back then!. Even the prefabricated 1943 'Spitzbergen' hut sent to Lockroy only had sheets of foil-backed Sisalkraft paper tacked on the studding. We were men, back then, I tell you (or is it that which made me what I am today. There's a thought.)"*

In a more temperate climate, the strengths and the weaknesses of the Cape Evans hut would be more apparent. Sited on the foreshore it commands views to sea, punctuated by the terminal "tongue" of the Barne Glacier. However, the hut straddles the contours of a natural watercourse which, even in Antarctic time, channels snow, ice and melt water beneath the hut in a natural path to the sea. Proximity to the sea, even in the frozen Antarctic, has an effect on the fabric of the huts. This appears, in combination with abrasion from wind driven ice and scoria, and the effects of ultra violet light, as a

chemical degradation of the fibres of the timbers. Without the cleaning effects of rainfall or washing, the timbers become saturated with salts which affect the cellular structure of the wood resulting in the defibration of the timber.

There is a distinction between the sustainable patina of building fabric over time and the consequences of environmental effects that otherwise threaten the historic place. At Cape Evans there is a subtle example of this in the patina on the glass panes in the windows of the science lab area. These have been exposed to the prevailing southeast winds for 97 years and their consequent opacity allows the transmittance of a rare soft light into the space adding directly to the qualities of the space.

The effects of freeze/thaw cycles and the chemical degradation on the fabric of the hut and its contents are real and ever present. It seems too easy to accept the generalised clichés of the Antarctic environment (cold, dry, windy) and not examine the specific and particular nature of the local environment for each hut. As a conservation architect it is often my task to find a balance between the disciplines engaged on the job. The balancing comes from having a range of disciplines to draw from and knowing how to comprehend them by encouraging the dialogue.

minus four degrees: science

The evolution of international conservation Charters and their expanding analysis and reference to contexts and disciplines within which a place or object should be read enable the appropriate conservation of the cultural significance represented by that place or object. William Lethaby (1857 – 1931) wrote of putting on the complete 'garment' of a place so as to properly 'see' it. This seems to me to embrace the multiplicity of stories [the expanding ripples or rings that I began with] that stem from the many hands of its creation and from those who had contributed to it in use or knowledge. Lethaby recognised a connection of object to land and to people, forming a sense of place 'profound and mysteriously human'.

I first met Roberta Farrell and Bob Blanchette at Scott Base over a conversation concerning our respective and separate projects. While we were all associated with work on or around the huts we were not collaborating in the consequence of our work or the research behind it. I recall the epiphany of understanding at just what a resource was sitting across the table and how directly their science could add to our understanding of the huts, their fabric, their environment, the factors that are affecting them, and our conservation response.

The biological decay of the timber has been slow, but the huts are not free from this form of deterioration. The key factors that influence the rate of biological decay are temperature and relative humidity. Specific research undertaken jointly by the Universities of Minnesota and Waikato, show average relative humidity levels in the Cape Evans hut in the summer months to be high (72-82%) and that they can climb above 90%. In association with temperatures as high as +5°C, such levels of humidity can create an environment well within the limits for fungal growth, and active fungal growths (including, I understand, some unique to the Antarctic) have been observed.

The measurable effects of climate change, even in the Antarctic, gives rise to concerns for maintaining a watchful eye on these factors. I remember listening to the evening

round of scheduled radio reports from field sites one evening while based at Cape Royds and hearing a report come in from the Dry Valleys that it was raining.

Figure 3: Wind scoop, Cape Evans Hut. Adam Wild 2001

The Cape Evans hut presents its long southeastern face to the prevailing wind, and over time this has presented a barrier to the wind driven snow, which has built up against this wall. The consequence of this build up of snow is still to be fully understood.

On one hand the super-cooling effects of snow banked up permanently against the southern wall are of clear concern for both the interior building fabric and artefact collection; while on the other hand it represents a kind of natural aerofoil, dissipating the effects of the prevailing wind over, rather than against, this long exposed elevation.

When rediscovered in 1947, it was noted that the hut appeared somewhat disorderly after the buffeting of 35 winters. The frozen carcass of a dog stood on four legs as if it were alive. Seal carcasses, from which fresh steaks might have been cut, lay about. Scattered about the cabin were cartons of provisions, still good to eat. The extent and survival of artefacts adds to the evocative richness of the Cape Evans hut. From the stove and the iconic mess deck table to the most fragile of the scientific equipment, there is the sense of the immediacy and liveliness of this history.

The dog is still there, but like any dog, it has got tired and has laid down for a quiet nap.

This year marks the 50th anniversary of the first International Geophysical Year and the 50th anniversary of the establishment of Scott Base by Sir Edmund Hillary. The distance, in time, between Hillary's A hut at Scott Base and those of the Heroic Era becomes relative and, it seems to me, increasingly irrelevant.

I'd like to conclude this fourth negative degree of separation with a brief description of what might come next in our process of conservation and collaboration, by way of technology and our ability to embrace it.

My colleagues and I are using laser scanning technology in New Zealand and making much of its application in building conservation. This is a subject that is gaining increasing coverage internationally and deserves its own paper. Rather than begin that paper here I'd like to describe its applications on a current project and wonder how, with

this technology, we might better survey, understand and conserve the very imperfections that give places of particular value their distinctiveness.

Figure 4: Smithy. Wagener Subritzky Homestead (1862). Archifact ltd 2004

The scanned model describes a pioneering family's smithy built as part of a homestead dating from 1860-62 in the far north of the North Island of New Zealand. The original and surviving timber structure is cobbled from a variety of at hand materials (much like the stables at Cape Evans) and has been left intact.

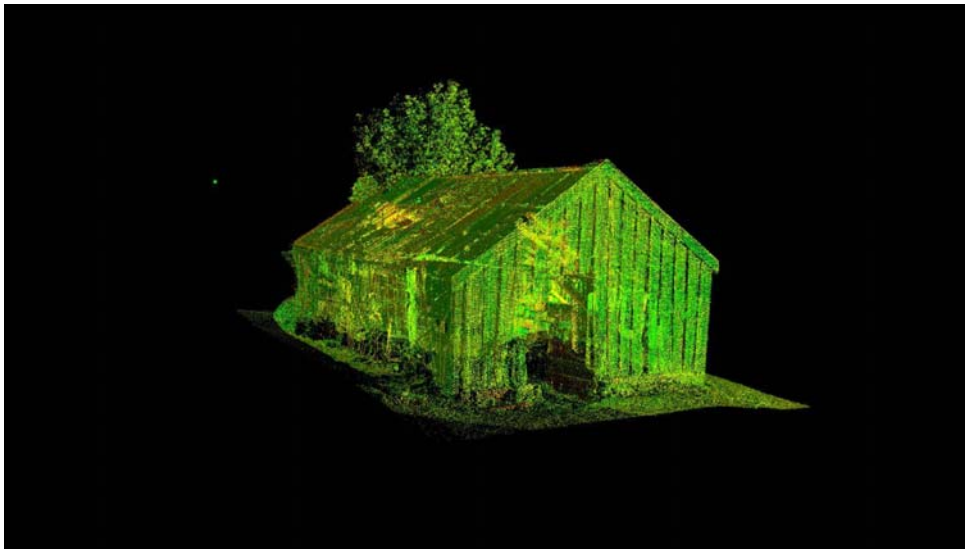

Figure 5: Laser scan of the exterior of the Smithy, Wagener Subritzky Homestead. Image courtesy of Geometria Limited 2007

The furnace and its bellows are still in place as are many of the tools used and products resulting from the work of the smithy. In 1969 the family, having retired the homestead to the role of a museum, erected an ingenious outer shell to protect the original structure

until they could find a way (and a means) of repairing the original building. Our model clearly shows the two structures, provides detail of the fittings and surviving equipment and gives important record to the imperfections, the *spirit*, of this place so we can now make informed and appropriate responses to its conservation. The model also gives opportunity for the virtual visitor as this is a place whose fragility means that public access is impossible.

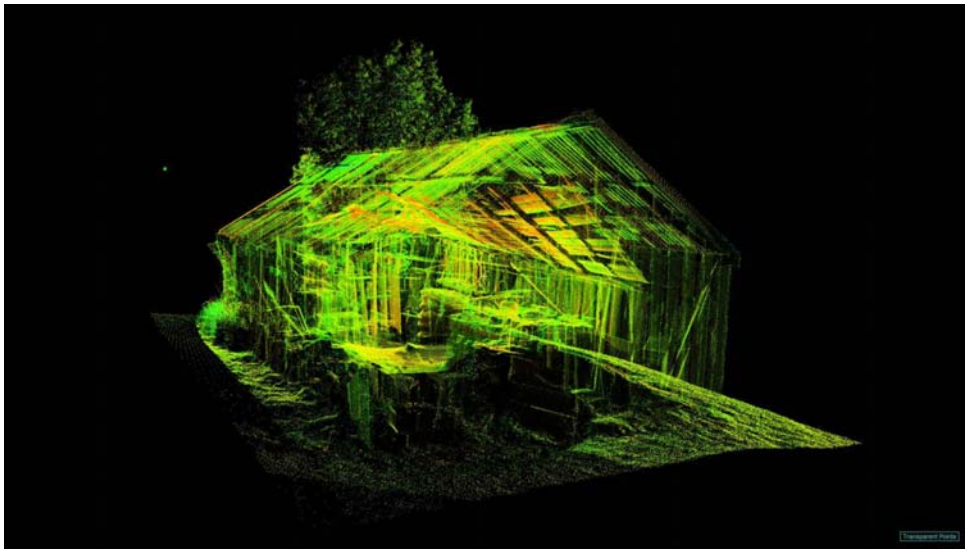

Figure 6: Laser scan of the Smithy showing interior detail. Wagener Subritzky Homestead. Image courtesy of Geometria Limited 2007

The combination of time and memory combine to create histories. The prompting and retrieval of these memories offers vision and may reinforce myth. These memories are not complete truth, not complete vision and not the whole story. Each process of revealing truth acknowledges parts otherwise lost or dismissed. The patina that speaks of Ruskin's "voicefulness" of age presents a vision of truth and myth. Truth has past, present and future readings.

minus five degrees: interpretation

The interpretation and the sense of truth behind the reading of a place of cultural heritage significance can, like truth, become a casualty of the nature of perception and interpretation. Perception can be loaded with the vagaries and nature of humanity; or limited by them. Consider the nature of 'whose' truth. Truth and its interpretation can be both an absolute and an abstract: the truth and nothing but the truth; or in Orwellian terms: that some truths may be more true than other truths.

The interpretation of the Heroic Era huts has given rise to debate over the layers of occupation associated with each of the huts, today's witnesses, and the value (or otherwise) in replicating lost elements. Truth and interpretation can be conditional on the breadth of perspective of readings, interpretations and the understandings of histories observed, investigated and revealed. The visitor is of concern in the interpretation of these projects. Visitors may be a physical presence or a virtual phenomenon. Virtual access can lead to questioning context as much as the logistical constraints of conservation in remote places. There is a balancing of historical and physical contexts. There remains an ethical question linked to interpretation and

context: to what extent can our conservation determine interpretation and can we avoid interpretation even if we don't want to?

The Heroic Era huts are necessarily physically remote; this is part of their spirit. The deterioration of some of their historic context, such as the stored materials around the hut, the fabric of the huts themselves, and the deterioration of the environmental context is part of the truth of the sites and is not separable. Place, and its truth and significance are irrevocably linked to this context.

The interest in the everyday world of a place and a time is not a fixed one; our sense of value can shift. Context is recognised as vital to a place. Time and its effects 'connects forgotten and following ages with each other, and half constitutes the identity', or so Ruskin believed. Conservation in this context is about a sense of space, a sense of material, the 'spirit' of the place. We can, we have done, and we must continue to use disciplines outside our own to better understand these essences. Context has a context; that's the political bit. Ultimately it is the acceptance of the broadest contexts that help challenge predetermination.

The relative dryness of the environment at Cape Royds has meant that over time the vertical tongue and grooved cladding has shrunk and the joints between each board have opened. The nature of the dry snow (as fine as corn flour or talcum powder) means that it can penetrate any cavity, thaw and refreeze forcing open the joint further. The work at Cape Royds has been blessed with the engagement of an especially skilled carpentry team led by Gordon McDonald and Charlie Brentnall.

Figure 7: Gordon Macdonald and Charlie Brentnall at Cape Royds. Gordon Macdonald2006

To address this essential issue of the external cladding and its weather-tightness Gordon devised a special routing blade, which could be worked up the inside face of the tongue and groove joint without (it was hoped) having to remove the board from the wall.

The concept then was to slide a flashing up the joint and effectively seal the interstices of the wall from further snow ingress. This was discussed between the team and prototypes of the tooling trialled and mock ups tested. The malleability of the proposed flashing lead to considering thin strips of copper.

We had seen however that previous use of copper and copper alloy were inclined to patina and as a consequence stain the historic fabric. An alternative flashing in a clear, ultra violet resistant product called 'strata glass' commonly used as canopy "glazing" in the boat building industry was proposed. The product can be pre-cut by computer to the specified widths and as single lengths (without joints), rolled ready for insertion in the newly cut joint. It is scratch resistant, clear, stainless, and reversible. Implementation of this on site has proved successful and that success has direct potential for applications at the other huts.

minus six degrees:

These degrees of separation are about time and place and people and science and technology coming together. Being in Barrow represents a further "expotition": a long line of people and their provisions perhaps; certainly another ring of the "onion". For me the project expands to engage more of you, more time, more science, more technology, greater understanding and strength through partnership. Being together over these days is an important and all too rare opportunity to share and collaborate from pole to pole.

Figure 8: IPY IPHC conference delegates and the conservator team at Scott Base via video link.
Photo courtesy Chris Finkler.

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I would like to thank the Brian Lintott, Chairman of ICOMOS New Zealand, David Reynolds of the Northern Regional Office of the New Zealand Historic Places Trust, and George Farrant, Heritage Manager, Auckland City Council for their support.

I would like to acknowledge the anniversary of the International Geophysical Year, the establishment of Scott Base and the commitment of Antarctica New Zealand to 50 years of science in Antarctica.

I have also been asked to record that in presenting this paper I am neither representing nor presenting on behalf of Antarctic Heritage Trust New Zealand, I would however like to acknowledge the team and work associated with the New Zealand Antarctic Heritage Trust in conserving the heritage associated with the Antarctic's Heroic Era.