ISLANDS TO ICE

THE MERCURY

Antarctica on Show

The magic of the frozen south comes to Hobart next month with the opening of a permanent Antarctic display at Hobart's Tasmanian Museum and Art Gallery.

Islands to Ice: The great Southern Ocean and Antarctica is a new permanent gallery, featuring the region south of 40˚ latitude.

It will open to the public on March 8, the 94th anniversary of explorer Roald Amundsen's announcement from Hobart to the world of his successful expedition to reach the South Pole.

The display is about Tasmania's backyard; the wild Southern Ocean, our neighbours the remote sub-Antarctic islands and the icy expanse of Antarctica.

The connections between Tasmania and the far south have been strong for centuries: from the Tasmanian Aboriginal perceptions of the icy lands incorporated into dreaming stories, through the heroic era of exploration at the turn of the 20th Century to the recent position of Hobart as the home of major Antarctic and Southern Ocean research organisations.

The exhibition brings these usually inaccessible regions into focus through real specimens and artefacts. It follows a journey narrative that highlights the elemental nature of the environment.

- ***Wind or air,*** encapsulate the wild seascapes of the Southern Ocean where the latitudes are named almost poetically as the roaring forties, furious fifties and screaming sixties.
- ***Earth,*** the sub-Antarctic mid oceanic ridge of Macquarie Island declared World Heritage for it's geological features.
- ***Fire,*** Australia's only active volcano on Heard island, another sub-Antarctic island.
- And ***Water,*** the frozen expanse of the Antarctic continent that holds 70% of the world's fresh water.

For gallery visitors, their experience takes them on a journey through time.

An intimate multi-media space tells the stories of the region before it was charted by Captain James Cook in 1772-5, a time of Aboriginal dreaming, Polynesian navigators, ancient Greek hypothesis and European utopian imaginings.

Later in the exhibition we learn what motivates people to go south, what the whalers found, what the explorers charted and claimed – and what the scientists have revealed.

It's about what it is like to live and work in some of the most inhospitable climates on earth.

It is a varied exhibition that brings the humanities and sciences together; an exhibition that can be explored by people of all ages.

Five key themes

The educational programs run by the museum are based around five themes. Whilst the gallery offers almost limitless numbers of themes, these five have been chosen for their breadth of coverage, linkages to curriculum and general appeal to students.

TASMANIAN MUSEUM & ART GALLERY
ISLANDS TO ICE
THE GREAT SOUTHERN OCEAN & ANTARCTICA

TASMANIAN MUSEUM *and* ART GALLERY

Photo: Andy Baird

Life in the Freezer

Antarctica and the Southern Ocean provide an ideal setting for an interdisciplinary study, bringing together elements of history and adventure, biological uniqueness and climatic extremes, human endurance and frontiers for new knowledge.

Life in Antarctica is governed by the interactions with the Southern Ocean and only in a few ice free areas on the continent does terrestrial life exist, and even then it is not independent of the ocean.

This is a landscape that is the driest, coldest, windiest and highest of all the continents. Terrestrial life clings to the 2% of the continent that is ice free – regions such as the Antarctic Peninsula and the Vestfold Hills.

In the sub–Antarctic the remote and scattered islands are refuge to huge numbers of species, particularly birds and seals. Such areas provide all important breeding grounds. Yet the influence of the Southern Ocean is felt throughout the region.

In habitats as diverse as the ice cap, on the sea ice, in the various depths of the oceans and on the islands, animals have made unusual adaptations.

Emperor penguins, the only penguin species to breed on the ice in winter, survive temperatures as low as minus 40˚C. They have unique adaptations whereby they can stand for months on the ice.

Most of the animal diversity however is in the ocean, with the smallest species, including the Protozoa, microscopic invertebrates, making up a total biomass orders of magnitude larger than the more recognisable animals such as the whales, seals and penguin.

Satellite image: NASA

Photo: Wayne Papps, AAD

Photo: Australian Antarctic Division

Apples in Antarctica: Humans in the ice box

The human story in Antarctica is one of heroic tales of endurance, farcical tales of trial and error and clever application of science.

Since the first circumnavigation about the Antarctic continent by Cook's expedition in 1772-5, the technology that humans have brought to the region has been integral to their success. Amundsen's usage of skis, dog sleds and furs, contrasted with Scott's reluctance to use these technologies.

Modern Antarctic clothing is not a story of simply developing new and 'better' materials, but in fact a re-evaluation of older tried and tested fabrics. The 2006 Australian Antarctic Division field issue includes using natural fibres such as wools and cottons because of their hard wearing and insulating properties.

New developments have come more in managing human impacts on the environment. For example, there is now a recognition that clothing can be a vector in carrying weed seeds onto sub-Antarctic islands. Expeditioners to Heard Island in 2004 found new incursions of the plant *Leptinella plumosa*, possibly carried on clothing from Macquarie Island. New clothing design has eliminated the use of Velcro.

Shelter on the ice and the islands has ranged from sealing shacks and prefabricated huts such as that built for the first wintering party in 1898 to major permanent bases with streetlights such as at McMurdo base which houses up to 2000 people in summer.

The Australian Antarctic Division uses prefabricated igloos, also known as 'apples' because of their shape and red colour, as well as modified plastic water tanks. The three permanent Australian stations in Antarctica; Davis Casey and Mawson have all had a history of renewal and renovation, Mawson base is one of the longest continuously operating stations in Antarctica, yet it is at the forefront of sustainable energy usage developments.

From Whaling to Wilderness?

Issues today, such as ethical considerations, the intrinsic rights of animals, the way we use limited energy resources, have undergone some major shifts over the last 50 years.

The Southern Ocean and Antarctica are at the crossroads. It's all there; that romantic location of wilderness, that purity of landscapes typified by penguins unfazed by humans, that sense that there is still more to be discovered. That huge wealth of food resource in the Southern Ocean, that potential mineral minefield where coal seams gleam exposed to the naked eye, that place where 70% of the thirsty world's fresh water is 'locked up'.

It's also a region which has seen human responses at their best and worst. Massive collapses of industries, where sealing and whaling almost wiped out whole regional ecologies, fool hardy installation of a nuclear reactor to power a base, the establishment of international treaties based on cooperation of scientific discoveries, protocols protecting natural environments, and a whale sanctuary stretching all the way around Antarctic waters.

Today it's all back in the news. Japanese whalers and Greenpeace activists recently battled it out in icy waters. Australian Navy ships gave chase to illegal fishing boats catching Patagonian Toothfish. And looming over the horizon is the deadline for the end of the Madrid Protocol banning mining in the region.

In the 19th century, over exploitation meant that by the early 1800's Tasmanian and New Zealand coasts and islands were virtually cleaned out of seals, and the water closer to inhabited land of whales. In 1810 Campbell Islands and then Macquarie Island, one of the richest sealing locations was discovered. Once the fur and elephant seals were exhausted, the hunters moved onto the penguins.

Whaling also eventually collapsed with the advent of new technologies such as explosive tipped harpoons, chaser boats and factory vessels increasing the catch to unsustainable levels.

But with the decline of some industries, new ones emerge. Tourism in the Antarctic region is increasing dramatically with around 30 000 people visiting last year. Whilst this is primarily ship based tourism to the Antarctic Peninsula, new areas are opening up annually, including new ventures out of Hobart.

Frozen Oceans and a Land of Ice

70% of the earth's freshwater exists as ice in Antarctica, yet it is the driest continent on Earth.

The Antarctic ice cap contains a frozen record of global climate change over the last 100, 000 years and it still influences our climate today.

If there is one topic we must come to terms with it is global climate change. Not only is the evidence sometimes scientifically complex, it is also politically charged and goes to the heart of how we live.

'Climate Change', until recently termed 'Global Warming', has become a hot topic. Indeed some scientists are advocating the term 'Global Meltdown' as being more in tune with the seriousness of the issue.

Ice cores drilled deep into the Antarctic ice sheet reach back thousands of years and trapped within the ice are tiny bubbles of gases from those times. By studying the gas composition scientist have determined that there has been a measurable build-up of heat-containing or 'greenhouse' gases in our atmosphere – such as carbon dioxide and methane. There has been a 37 percent increase in atmospheric carbon dioxide concentrations since the 1700s, rising to unprecedented levels today.

The ice that covers Antarctica, and in winter much of the Southern Ocean as well, is one of our planet's best indicators of global climate change.

It affects our planet in three major ways:

- Changes in the vast Antarctic ice sheet, which holds two-thirds of the planet's fresh water, have a profound effect on world sea levels.
- Sea ice – for much of the year covering millions of square kilometres of ocean – significantly affects air and ocean temperatures.
- The melting of Antarctic ice into the Southern Ocean controls the mixing of surface and deeper waters that ultimately affects the health of all the world's oceans.

There's another factor. Carbon in our atmosphere is the main culprit in the 'greenhouse effect', preventing solar heat from escaping back to space. The stormy surface waters of the Southern Ocean, unlike other ocean waters, absorb more carbon than they release back to the atmosphere.

The Antarctic ice sheet is huge, much bigger than Australia, ten times the size of the next biggest ice sheet (on Greenland). A big ice sheet has big implications for the world's sea level. If Antarctica's ice cover were to melt away completely, the sea level around the world would rise by about 55 metres, submerging most populated parts of the world.

Something big happened in 2002, on the east coast of the Antarctic Peninsula. A 10,000-year-old ice shelf named Larsen-B took 35 days to disintegrate into thousands of icebergs, most of which are slowly drifting away into the ocean. That underlined a significant warming around the Antarctic Peninsula over the past 50 years, emphasised by a 2005 finding that nearly all the region's glaciers are retreating.

Computer modelling predicts that Antarctica's ice shelves will disappear within 200 years.

Background photo: Graham Robertson

Underwater Wonderland – Biodiversity in the Southern Ocean

500 million tonnes of Antarctic krill live in the Southern Ocean. If we over harvest this resource what will happen?

Southern Ocean life is often represented simply by a food web that features the characteristic megafauna: those large animals like whales, seals, penguins and giant squid that fascinate us all.

In truth it is far more complex. It is a story of nutrient flows, temperature exchanges, massive productivity in some areas and scarcity in others. Of tiny diatoms and unusual fish species, phytoplankton blooms and sea birds.

It is also increasingly a story of human harvesting. When other fisheries of the world collapse, there is an increasing focus on the Southern Ocean for new fisheries.

Australia saw it in recent years with the rapid expansion and subsequent decline of the Orange Roughy industry. This fishery provides a good case study for the need to understand the biology of new resources before their exploitation endangers their sustainability.

Illustration: Pingala Walsh

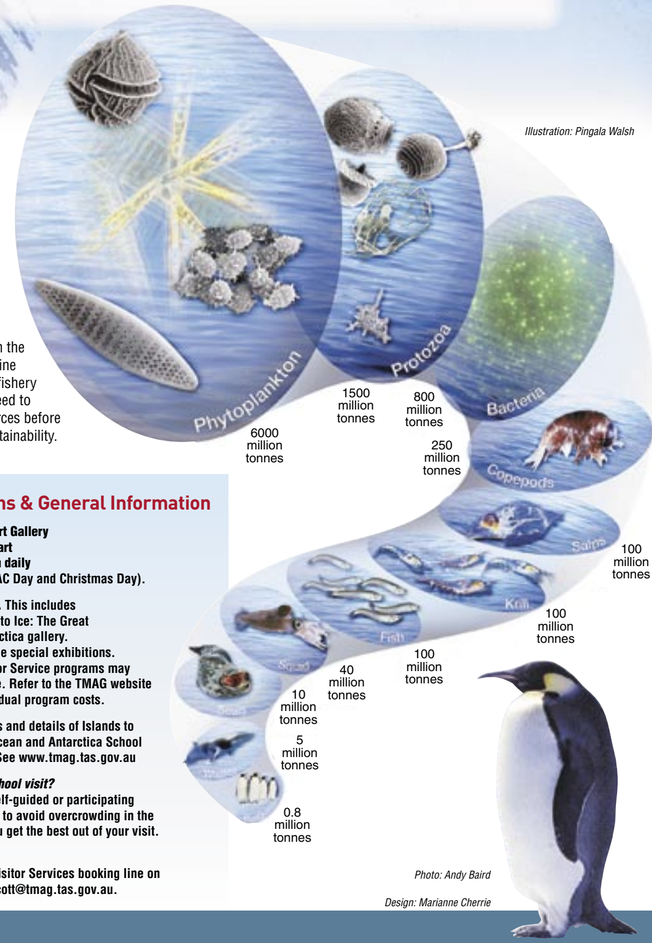

Photo: TMAG collection

School Excursions & General Information

Tasmanian Museum and Art Gallery
40 Macquarie Street, Hobart
Opening hours: 10am–5pm daily
(except Good Friday, ANZAC Day and Christmas Day).

General Admission is free. This includes entry into the new Islands to Ice: The Great Southern Ocean and Antarctica gallery. Charges are made for some special exhibitions. Some Education and Visitor Service programs may have an associated charge. Refer to the TMAG website Education pages for individual program costs.

Further teaching resources and details of Islands to Ice: The Great Southern Ocean and Antarctica School Program are on the web. See www.tmag.tas.gov.au

Do I need to book for a school visit?
Yes, all groups whether self-guided or participating in a program need to book to avoid overcrowding in the exhibitions and ensure you get the best out of your visit.

How do I book?
Contact the Education & Visitor Services booking line on (03) 6211 4189 or Sally.Scott@tmag.tas.gov.au.

Photo: Andy Baird

Design: Marianne Cherrie