

RECONNECTING SCIENCE AND ART IN AN AGE OF GLOBAL CHANGE



Threatened Treasure depicts a sea-butterfly whose shell is made of calcium carbonate.

The disciplines of art and science are often considered disparate and even hostile to each other. Yet during the Renaissance period the two disciplines worked together, resulting in significant scientific discoveries and inspiring art — such as the works of Leonardo da Vinci and Galileo Galilei. During the last century the two disciplines diverged, largely due to the specialisation of our education systems. However, science still uses the artistic medium of literature to disseminate its results in scientific papers and through popular science.

Science and art have much in common. At the broad level both pursue truth, knowledge, and work for the betterment of society — and both relate to and are inspired by the natural world. Both solve and reveal problems, experiment with ideas, arrive at and interpret a result, and publish or exhibit the work for critical review.

They differ, however, in their techniques, the way in which they communicate, and their outcomes. Science observes and interprets our world, whereas art expresses and provides experience of our world. During the last century these differences led to misunderstanding between the two disciplines and dismissal by each of the other's value. However, these differences can complement each other, leading to increased social and political influence.

Artists and scientists can engage each other in three main ways. Firstly, art can document and describe science — often for public relations purposes. Secondly, artists can use scientific methods, materials and concepts to pursue their own agenda. And thirdly scientists and artists can share a common ideology and actively collaborate, combining concepts and methods from each discipline to further their own practise.

In the Antarctic, several nations provide berths for artists to travel to Antarctica to facilitate wider education about the Antarctic continent and their nation's activities. The Australian Antarctic programme's vision is that Antarctica be 'valued, protected and understood'. It could be argued that science provides the factual understanding, art promotes social understanding and valuation, and both can lead to protection.

Through my artwork I aim to expose the beauty and diversity of microscopic marine life in an effort to educate people about these organisms and their role in our environment. I use microscopic patterns and forms in my wearable artworks to promote comment and conversation, and I use language to arouse curiosity and to make people stop, think and question their current knowledge and perception about our natural world. For example, my work *Threatened Treasure* begs the question, what is the treasure and why is it threatened? The accompanying description to the work explains that it depicts a sea-butterfly whose shell is made of calcium carbonate. These shells are being eroded by ocean acidification, caused by increasing amounts of dissolved carbon dioxide. The survival of these creatures is threatened, with unknown consequences for life in our oceans.

This series of work is most literal in its depiction of organisms, to directly engage with and educate the audience. However, the message in other artworks may not always be immediately obvious, and is often dismissed through a lack of understanding or effort to identify with the work. One needs to be taught to read an artwork in the same way one reads a book or scientific paper — you can't fully appreciate what it is saying by just looking at the cover. Artworks dealing in abstraction and distortion can often be more powerful than literal art, but also more challenging for both the artist and the audience, as the interpretation is influenced by the viewer's personal perceptions.

My next project is to create compositions, building on works such as *Climate Change in our Backyard*. This work explores our perception of scale in both a physical sense (bringing an iceberg down to a size that can fit on a finger) and a social sense (highlighting the scale of climate change). I aim to combine jewellery, sculpture, digital photography and other mixed media to create art that invokes a personal awareness of environmental processes, allowing people to connect and find meaning within the science that is, by its nature, objective and devoid of emotion.

My work will be exhibited at the Bay Discovery Centre in Glenelg, South Australia, in June-July 2007 to coincide with World Environment Day and the International Polar Year (IPY). The IPY brings together a variety of disciplines to understand the effects of climate change on the polar regions. Australia's involvement in the IPY via the Census of Antarctic Marine Life provides a prime opportunity for Australia to be innovative in publicising its science by collaborating with artists to interpret and portray the value of Australia's scientific research on a global scale, but also at an emotional level.

KARIN BEAUMONT

Karin is a former scientist of the Australian Government Antarctic Division, and has completed a PhD on microzooplankton. She now holds an honorary research position with the School of Zoology at the University of Tasmania, and runs her own jewellery business, *Oceanides*.



Karin sampling plankton in Antarctica.



Climate Change in our Backyard explores perceptions of scale, physically and socially. The artwork includes a haiku poem which reads, 'tip of the iceberg, melting signals global change, it's in our backyard'.

Surveying Sector 58

One of the most comprehensive marine ecosystem research projects undertaken by the Australian Government Antarctic Division concluded on the 28th February 2006, 10 years after it began.

The Baseline Research on Oceanography, Krill and the Environment-West (BROKE-West) voyage, aboard the *Aurora Australis*, surveyed 1.5 million km² of ocean between 30° and 80° east, in a region designated by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) as Division 58.4.2 (see map). The survey aimed to describe the marine ecosystem of the region and determine krill distribution and abundance — to help calculate precautionary catch limits for the krill fishery in the region.

BROKE-West followed in the footsteps of BROKE which, in 1996, conducted a similar survey of the adjacent 4.7 million km² CCAMLR Division 58.4.1. Together, the two surveys stretch around one third of the Antarctic coastline, adjacent to the

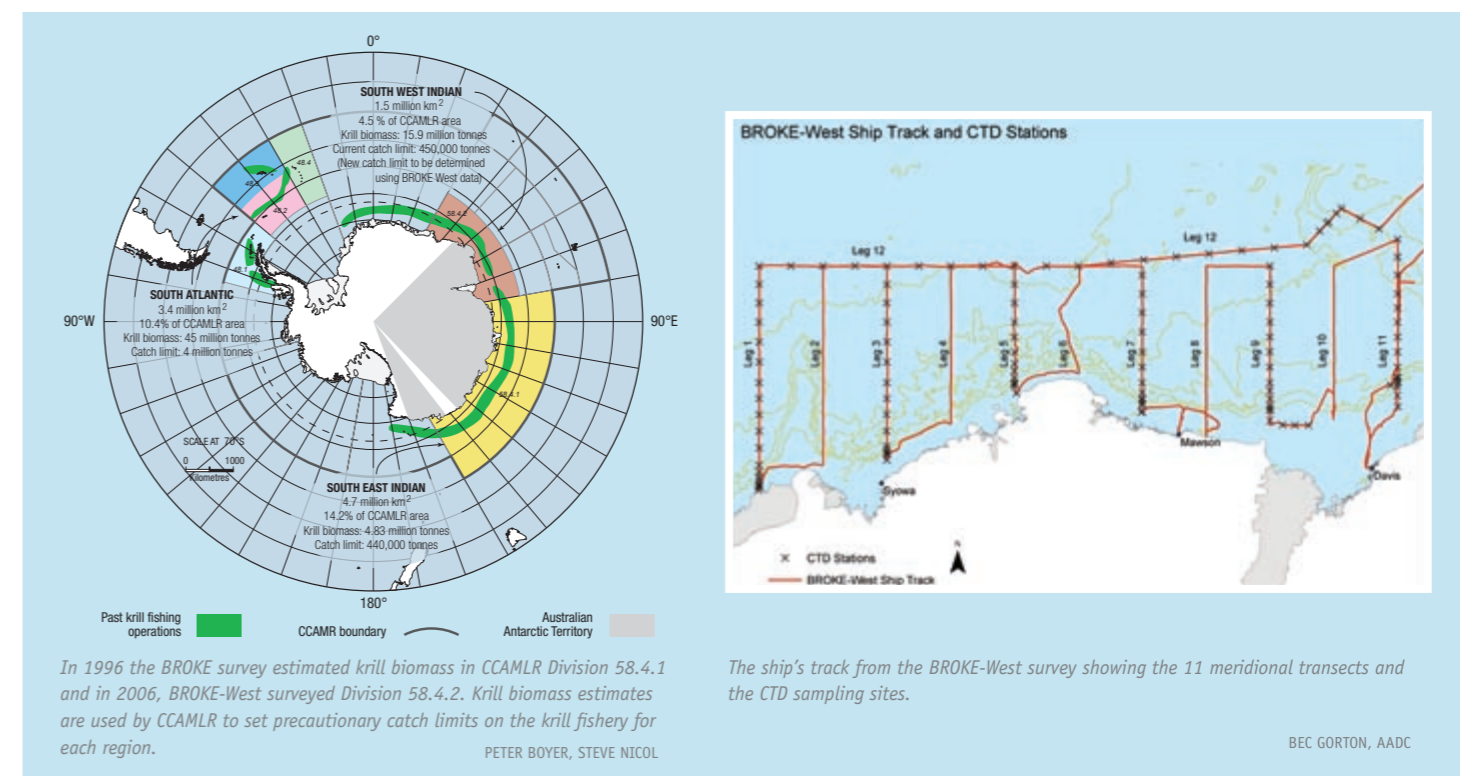
Australian Antarctic Territory (*Australian Antarctic Magazine* 8:12).

The BROKE-West survey involved using a vast array of sensors whilst the ship was moving, together with information from satellites and samples obtained from Conductivity Temperature and Depth (CTD) probes and from nets. The CTD probes were deployed at 118 sampling stations and instrumented nets were lowered into the water 125 times. This concerted sampling strategy aimed to squeeze the maximum amount of information out of the ocean in the limited time available, and to use this information to build up a picture of the marine environment in this little-studied area. So what did we achieve?

Somewhat surprisingly we surveyed 50% more area than we thought we were attempting. We now have oceanographic and ecological information for this large region, which is compatible with information from BROKE and from a survey in the South West Atlantic — where four ships surveyed 2 million km² in 2000. We are now in a position to piece together the ways in which Antarctic marine ecosystems function in summer.

The vast amount of data collected will take years to analyse. So far though, some of the results have been presented to international meetings: the International Whaling Commission, the Scientific Committee on Antarctic Research and CCAMLR. The results of the krill biomass survey were presented to CCAMLR's Working Group on Ecosystem Monitoring and Management in July and the group recommended that the biomass estimate (15.9 million tonnes) should be used to calculate a precautionary catch limit on the krill fishery in this area.

STEVE NICOL
Programme Leader, Southern Ocean Ecosystems, AGAD



In 1996 the BROKE survey estimated krill biomass in CCAMLR Division 58.4.1 and in 2006, BROKE-West surveyed Division 58.4.2. Krill biomass estimates are used by CCAMLR to set precautionary catch limits on the krill fishery for each region.

The ship's track from the BROKE-West survey showing the 11 meridional transects and the CTD sampling sites.

PETER BOYER, STEVE NICOL
BEC GORTON, AADC