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*Science with Personality:*

*Reality Science*

*The Future of Science Communication*

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## *Declaration*

I certify that this sub thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma at any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except when due reference is made in the text.

Catherine Bell

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Jacques Cousteau: my inspiration! This was my path to Science. My stereotypical ‘scientist’ was Cousteau: an old man – sure, a bit crazy – maybe, but he was real. He was my reality science.

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## *Abstract*

In this sub-thesis I introduce the idea of Reality Science. Reality science involves the telling of personal stories, such as with autobiography, biography, mentoring, documentaries, profiles and public lectures. The importance of reality science in shaping positive stereotypes and perceptions of science is discussed and ways of approaching reality science is given.

Reality science can be used to encourage, inspire and inform people of the various roles scientists play and the diversity of science, breaking down stereotypes and normalising science and scientists.

Reality science gives us insight into the minds of the scientists and the nature of the science. They inspire people, inform people and create controversy. Reality science is a tool the contemporary scientist can use to encourage new scientists into their field, inform the public about their research in a less typically scientific manner, and inspire their colleagues to do the same. Reality science can contribute to creating a more accurate public perception of science, as more and more realities will create more relevant stereotypes and bridge the gap by creating dialogues; dialogues between author and audience, and between third parties, depending on the type of reality science used.

To demonstrate reality science, an artefact is included. This artefact is in the form of a book, and is entitled *Colours of the South*. This shows how reality science can be used to break down barriers, create new perceptions and encourage engagement with science.

*Science with Personality: Reality Science - The Future of Science Communication.*

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## Introduction

This sub-thesis will show how potential, current and non scientists can experience the reality and diversity that is science and scientists by:

1. Addressing what constitutes reality science and why reality science is important;
2. Discussing how perceptions and stereotypes develop and addressing how reality science can be used to change those perceptions and stereotypes; and
3. Presenting an artefact showing how personalising science can be used in science communication to positively change perceptions and stereotypes.

The artefact, *Colours of the South*, is in the form of a book. Designed to be an illustration of how reality science can provide inspiration to potential, current and non scientists, *Colours of the South* is the journal of a modern day scientific voyage. This journal aims to encourage girls to engage with science, contribute to changing negative public perceptions of science and scientists and encourage other scientists to personally share their experiences.

This sub-thesis as a whole aims to show that reality science challenges stereotypes, enhances engagement and provides inspiration for scientists to express themselves and their work, which in turn inspires potential scientists and increases public engagement.

## Format

What you are about to experience is a non-traditional sub-thesis: an artefact with supporting literature review is used to establish the benefit of reality science in creating positive stereotypical views of scientists and science, expelling cliché and encouraging engagement in accordance with the ENGAGEMENT model of science communication.

How perceptions and stereotypes surrounding science and scientists are formed were reviewed. Ways of personalising science as a viable engagement tool and for positively changing the perception of science and scientists are presented, through literature review and in the artefact, *Colours of the South*.

## Literature Review

### *What is Reality Science?*

*“When one man, for whatever reason, has the opportunity to lead an extraordinary life, he has no right to keep it to himself.”*

Jacques Yves Cousteau

‘Reality’ has always had an audience, whether it is the fascination with the famous (Harrison, 2006), the desire to find out the secret of success, or the need to pass on family history or traditions. And so it is with reality science: from the age of heroic science to contemporary science, there is a different story that appeals to different audiences. Whether it be, as it is for me, tales of scientific voyages (for example Burns, 2001; Chipman, 1986; Darwin, 1962; Mawson, 1915; Shackleton, 1919; Whitehead, 1989) or some other branch of science, you will find a published work to represent it; be it traditional book or web based. Reality science involves the telling of personal stories, such as with autobiography, biography, mentoring, documentaries, profiles and public lectures. In traditional media, reality science has been in the form of autobiography, via the confessional book or memoir, a full account of one’s life or career or as journals and diaries. In the age of technology, reality science appears in film and online, as a documentary or diary-style blogs, possibly even as one line ‘tweets’ and ‘status updates’. Oral histories can also provide an avenue for reality science; in cultures with a spoken history, it is such stories of self that are passed on to new generations, shaping the culture.

The use of reality is a way of revealing the human aspects of science, sparking interest in science by bridging the traditional gap between scientists and the public (Carneiro, 2007). Carneiro (p. 5) suggests that in particular:

*“Biographies of scientists can contribute to the effectiveness of the results of science communication because they are able to reach a certain kind of audience, focusing on emotional and humanistic aspects, and also because biographies could bring the image of scientists closer to the public, thereby helping to break down barriers and resistance to the usefulness of knowledge, even amid cultural differences. ”*

Reality science, through ‘stories of self’, can be essential in the formation of positive stereotypes and can affect cultural changes (Eisenhart, 1995). Cultural change is an ongoing process, greatly influenced by stories of self (Eisenhart, 1995), suggesting that reality science could positively shift the image of scientists and science in mainstream culture towards more varied and appealing images. Barman (Barman *et al*, 1997) supports the use of reality science to humanise science and scientists and shift the image of science away from negative stereotypes by making science dynamic, accessible and relevant. In addition, story telling has been shown to increase science literacy, as people tend to retain information for longer when it comes from a narrative as opposed to a fact sheet (Negrete, 2003).

In the absence of direct contact, it is media models which influence perceptions and attitudes (Barns, 1989; Steinke, 2004). Limited social contact with scientists as children means that media portrayals of scientists become the greater influence on creating a stereotype (Long & Steinke, 1996; Steinke, 2004) and children’s television has been shown to be influential in forming stereotypes (Long *et al*, 2001; Long & Steinke, 1996; Steinke *et al.*, 2007). As media influence can be so powerful, it is important that the images represented in the media reflect reality (Losh, 2010) and not clichés (Haynes, 2003; Lackie & Normington, 2009). Reality science is about true stories, not fiction, and about real people, not characters.

In order to understand the diversity and power of reality science, the following sections explore the different forms available and their effectiveness in science communication. The following sections use examples reflecting the theme of the

artefact, *Colours of the South*. There are, of course, examples to be found to represent all areas of science.

## Books

Autobiographical and biographical science books have always had an audience. Perhaps they sold because they captured the non-traveller's imaginations of far off places, places many would and could never go and in ways beyond the abilities of most. Perhaps they inspired other adventurers to travel and explore.

Roald Amundsen, Douglas Mawson and Ernst Shackleton all published journals written whilst on scientific voyages to Antarctica (Amundsen, 1912; Mawson, 1915; Shackleton, 1919). Charles Darwin also published an account of his scientific voyage aboard the *Beagle* (Darwin, 1962). Each of these historical accounts is available online as free e-books ([http://www.gutenberg.org/wiki/Main\\_Page](http://www.gutenberg.org/wiki/Main_Page), search to find each book).

The age of heroic science voyages has past, as has the image of the male-dominated arena. In modern times, women are adding their voices to the collection of scientific voyages (Burns, 2001; Chipman, 1986; Land, 1981; Lester, 2005) by sharing stories and cementing women's scientific presence in a previously male-dominated field (Burns, 2001; Chipman, 1986). The book by Whitehead (1989) also demonstrated this change from the male-dominated hero-age to the modern science voyage, where women increasingly and more noticeably take part and heroics are no longer an element. It documents logistical, political and emotional challenges relevant to modern scientific voyages. His book takes reality science into the style of novel, inspiring to the potential marine biologist.

These books highlight the gender stereotype that has surrounded science, and for many has been a barrier in their engagement with science. They also increasingly demonstrate and encourage diversity in science, by showing both genders and a variety of scientific fields.

## Web-based

Web-based options for reality science include blogging, social networking, interactive media and profiles. The avenues for self expression online are many and varied, the examples provided here are not exhaustive, but are widely used and are easily accessed.

Blogging, short for web-logging is keeping an online diary or journal. The interactive aspects of blogging create a link, for example, between scientist and student. Another positive effect of accessing blogs is that students are becoming critical thinkers, rather than ‘regurgitators’ of knowledge (Salleh, 2005). In responding to a blog, a student evaluates it and forms an opinion. The blog opens itself to a dialogue, allowing interaction between entities, for example, this can be mentoring interactions, between scientist and potential/upcoming scientists, or it can be peer interactions, where connections are made with like-minded individuals, boosting self esteem through peer support. It also allows for debate, heated or otherwise, to develop between individuals from different backgrounds.

Web-based reality science through blogging and other interactive media such as ‘You Tube’ (YouTube, 2009) or social networking sites (such as Facebook), allow scientists to communicate with people in their social network (‘friends’ on Facebook for example) or via a more formal arrangement with their employer (The Australian Antarctic Division, for example has weekly updates from each station (Australian Antarctic Division, 2009)). This type of interaction focuses on human aspects of science, rather than formal publications, and can be used to assist students in classrooms, as well as in their personal pursuits (Salleh, 2005). Of particular note is an online diary written as part of an Australian Antarctic Arts Fellowship which targeted school-aged children (Lester, 2005). In May 2009 the art resulting from this project was displayed at Old Parliament House in Canberra; the artworks were by children who had been inspired by the author of the diary. Whilst this diary was designed to inspire Antarctic-themed artworks, the voyage was a scientific one and the children were exposed to this, and it was reflected in the artworks. Also, science

communication PhD graduate Vanessa Woods maintains a blog and has authored an autobiographical account of her research (Woods, 2009), both examples of reality science communication.

Online biographies have been suggested to be useful in influencing young women and girls into science (Steinke, 2004 p.7):

*“... providing detailed information about the experiences and personal lives of women scientists ... may be useful in countering existing cultural stereotypes of women scientists ... and initiating changes in perceptions needed to narrow the gender gap in science...”*

Short biographies and profiles of researchers and staff are common on websites for universities and other scientific institutions. These profiles are an ideal platform for the scientist to state why they entered their field, what their research interests are and what it is like to be the type of scientist they are. A picture usually accompanies the profile. Designed to help potential and current students, it is apparent that reality science used in this manner can be a powerful tool. A Japanese Scientist Library (Mitsuishi *et al*, 2006) has shown that such profiles are an effective tool for science communication and allow scientists to be expressive.

## Public Lectures and Events

Public lectures and events appeal to those already interested in the topic or themes being presented. During Australia's National Science week, the number and variety of public events means that there is something to appeal to all ages and areas of interest. From mini beasts to outer space, science fiction to science careers, wacky science for kids to pub science for adults... a celebration of science by those already interested and a potential discovery of science by the uninitiated.

Outside of science week, universities, museums and other science organisations have public lectures and open days which are advertised in local newspapers. Usually the public lectures are aimed at adults. These lectures and events are an opportunity for the science to be showcased and for public involvement and engagement, and often involve research that is relevant to the public health and well being or has been recently controversial.

Such events often provide one of the few opportunities for people to meet and hear from real scientists. It is also perhaps one of the few opportunities scientists have of expressing themselves and their passion for science with people outside their field.

## Mentoring

Mentoring has been shown to be an excellent way of encouraging people, particularly girls, into science careers (Feldman, 2001; Steinke, 2004; Thompson, 2008).

Thompson observed that it was the personal stories of female mentors which inspired and encouraged school girls into science, not the knowledge that they shared. This is in line with the move away from the one-way public understanding of science (PUS) model of science communication, where people are receptors of knowledge. The newer ideas of science communication encourage dialogue (Rennie & Stockmayer, 2003), of which mentoring is a personal level experience in science communication. Mentoring is reality science in its most interactive form, so it is little wonder that it is the most inspirational way to encourage new scientists.

Several Australian universities run mentoring programs, usually aimed at high school advanced science students or first year science under-graduates (Donohoe, 2009; Rifkin, 2003). Steinke (2004 p.21) states:

*“...online mentoring may be [a] particularly effective technique for reaching a large number of girls and young women and connecting them with women scientist role models.”*

Online mentoring is via chat rooms and forums on special websites created to encourage girls into science. Mentoring provides role models, creates positive stereotypes and develops a familiarity towards science.

## Popular Media - Film, Television and Radio

### **Film**

Reality science has been represented through film such as the IMAX dramatisation “Shackleton’s Antarctic Adventure” (2001), based on the written work (Shackleton, 1919). “Icebound” (Spottiswoode, 2003) was another film which used biographical techniques to tell the story of a woman facing breast cancer whilst at the South Pole. Both these films address dramatic tales of survival in Antarctica, and are wrapped in scientific cloth – neither adventure would have occurred had it not been for the scientific endeavours surrounding them. The presence of these aspects within the story contribute to the viewer’s knowledge and experience of science and scientists – affecting change in their perceptions and stereotypes (Eisenhart, 1995).

### **Television**

In September 2009 ABC television screened an *Australian Story* feature documentary on marine biologists, Micheline and Curt Jenner (Fleming, 2009). This feature was presented in reality (via interview) format, addressing personal experiences of the couple whilst presenting the science. The story featured such personal aspects as family life and political issues, and how the couple managed their married life and their research. This particular documentary showed that women (married with children) can be scientists, it showed what it is like to be the child of such scientists and it put the research timeline in context. Scientific methodology and process was presented accurately, rather than dramatically as ‘breakthroughs’. Presentations like this documentary can be inspiring, and off putting, to potential scientists because they show a real life experience, albeit an exceptional one.

## **Radio**

According to Merzgora & Coyaud (2002 p. 1) “radio has several characteristics which tend to enhance the sense of friendliness and belonging - essential to any true communication”. However, in their study of radio phone-ins where scientists were guests, they found that arrogant attitudes from science guests resulted in distrust and criticism from callers. In particular the ‘trust me, I am a scientist’ attitude caused the audience to attack, whereas scientists participating in the phone-in who were open and considerate were very well received. It was a case of mutual respect: where both sides felt respected, the discussions were more productive. This mutual respect started with a scientist inviting the audience into their personal space, leading to constructive dialogue. An arrogant attitude is impersonal and closed off the possibility of mutual respect, and conversations were no longer productive. Merzgora & Coyaud (2002 p.6) found that “arrogant science is largely responsible for the poor success in fighting the spread of irrational fears”. As with public lectures, radio phone-ins provide one of the few opportunities for engagement between the public and scientists.

## *Summary*

Having reviewed various forms of reality science, the diversity in science communication is apparent. It has emerged that reality science can influence the stereotype an individual has formed regarding science and scientists. The issue of gender balance in science was briefly addressed, with studies showing that reality science influences girls' choices into science (rather than scientific knowledge).

But why is it important to consider reality science?

The next sections will explore how science communication has changed over the years, and how reality science fits into the current approach of science communication, in particular in addressing the formation and alteration of stereotypes and use of cliché by mainstream media.

## *Why Reality Science is Important*

In the past it was thought that the public were passive receptors of science (Stockmayer & Gilbert, 2002). The communication was a one way model, placing scientists in a superior position to the public (Davies, 2008). Scientists determined what the public needed, and wanted, to know - all in the interest of the 'Public Understanding of Science' (PUS) (Stockmayer & Gilbert, 2002). In 2001, the PUS model was reviewed by the Office of Science and Technology and The Wellcome Trust (2001) and found to be irrelevant and a new model encouraging engagement was needed. In 2003, the PUS model was described as “an outdated concept that implied a one-way communication from the science community to the public” (Rennie & Stockmayer, 2003 p.765). Public understanding was replaced with awareness, a model which focused on “ownership and access through personal experience and exploration” (Stockmayer & Gilbert, 2002 p836).

The awareness model allowed for opportunist engagement with science, such as a response to medical or environmental need (Stockmayer & Gilbert, 2002). Stockmayer and Gilbert (2002) recognised that *engagement* is the key to science communication. Without engagement, without personal experience, science communication is “unreasonable and unrealistic” (Stockmayer & Gilbert, 2002 p.856).

Currently, most science communication is focused on ideas of Public Engagement in Science, encouraging dialogue, openness and accountability (Rennie & Stockmayer, 2003). A BA<sup>\*</sup>/Royal Society Conference in 2004 recognised that successful public engagement in science required the participation of scientists (The Royal Society, 2006). However, as recently as 2006, a survey found that many scientists still felt the need to educate the public, rather than truly engage through debate and genuine dialogue (The Royal Society, 2006).

In February 2010, ‘Inspiring Australia: A National Strategy for Engaging with the Sciences’ was launched during the Australian Science Communicators Conference at the Australian National University in Canberra (*Inspiring Australia: A National Strategy for Engaging with the Sciences*, 2010). It has been welcomed by the science communication community as the strategy aims to encourage engagement rather than understanding, as the title suggests, and considers the importance of the image of science (from p.43):

*“The first program, Pride in Australian Achievement, will enable the Australian Government to present a positive ‘science self-image’ of Australian science to Australians. It will provide inspiration to all Australians by sharing our discoveries, and will encourage young people through stories of frontier research.”*

Of particular interest to this thesis, the Pride in Australian Achievement program will:

*“exploit the new media such as YouTube, blogs and social networking Websites, for telling these Australian stories of scientific development and discovery”* (*Inspiring Australia: A National Strategy for Engaging with the Sciences*, 2010 p.44).

However, during the Australian Science Communicators Conference in February 2010, I observed that the PUS model still resonated in the attitudes of many science communicators. I am not alone in this observation (*Inspiring Australia: A National Strategy for Engaging with the Sciences*, 2010; Lamberts, 2010). For the PUS model to truly end, critical thinking must be developed and encouraged (Long & Steinke, 1996) and scientists must be supported in their endeavours to participate in public communication (*Inspiring Australia: A National Strategy for Engaging with the Sciences*, 2010; The Royal Society, 2006).

Reality science is based on engagement and sharing personal experiences. This level of engagement involves breaking down barriers surrounding science and the individual. Science must be accessible for engagement to occur (Stocklmayer & Gilbert, 2002). The personal experience is essential for engagement of the individual,

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\* British Association for the Advancement of Science (now known as the British Science Association)

as has already been asserted to be the key to science communication (Stocklmayer & Gilbert, 2002). Stereotypes surrounding science have been addressed repeatedly through the draw-a-scientist experiment (for example: Rodari, 2007) and the influence of personal interest, experience and peers on altering stereotypes as been established (for example: Ainley *et al*, 2005; Barman *et al*, 1997; Breakwell & Beardsell, 1992; Donohoe, 2009; Feldman, 2001; Lester, 2005; Losh, 2010; Merzagora & Coyaud, 2002; Rifkin, 2003; Schmidt & Nixon, 1996; Stocklmayer & Gilbert, 2002; Thompson, 2008).

As science communication has evolved from public understanding, through awareness and into engagement, the focus on public image, perception and stereotypes surrounding science has increased.

In the next section, we look at how stereotypes effect the perception of science and scientists and how an individual's perception of science, and scientists, is integral to their engagement with science.

*Science communication has moved from understanding,  
through awareness, into engagement*

*Engagement focuses on dialogue*

*Engaging with scientists requires scientists to be  
engaging – this relates directly to perceptions and image  
surrounding scientists*

## *Creating Realistic Perceptions using Stereotypes*

*“Stereotypes have a profound influence in shaping individual perceptions and identities.”*

*(Steinke, 2004 p.7)*

The Einstein-like stereotype was discussed recently as being alive and well in fiction (Gilbey, 2008). Gilbey (2008) ran an image search using the word ‘scientist’ and found:

*“...archetypal mad scientists - white-coated, bespectacled, mentally deranged characters poring over fuming retorts of ghastly chemicals - or similarly ironic yet iconic images. Of the first 20 pictures in my search, only three were representations of ‘real’ scientists.”*

I ran the same search using Google Image search, finding that indeed the mad scientist image prevailed. The resulting 20 images on the first page could be described in much the same way. Mostly cartoon images, overwhelmingly (iconic) lab-based science represented, mostly males, many mad. Only one of the first 20 may have been a real scientist: it showed a headshot photo of a man who had been made chief scientist. He has glasses, a moustache, is middle-aged, but he is real – and doesn’t look mad.

The image of scientists in film has been classified into seven archetypes (Haynes, 2003): the evil alchemist; the noble scientist; the foolish scientist; the inhuman researcher; the scientist as adventurer; the mad, bad, dangerous scientist, unscrupulous in the exercise of power; and the helpless scientist, unable to control the outcome of his or her work. These cliché archetypes simplify the film makers’ project as well as

the viewer experience. In the UK, a project (Lackie & Normington, 2009) was set up to link scientists with writers to avoid cliché science and scientists in fictional works.

One study of radio phone-ins found that arrogant scientists who tried to appear authoritative generated distrust and led people to become very sceptical (Merzagora & Coyaud, 2002). In contrast, when scientists appear genuine it helps avoid the overbearingly authoritative, arrogant, image (Long & Steinke, 1996). In the US, an individual's image of science was found to be affected by age, education, parents and religiosity (Losh, 2010) and that children's television played a very influential role in forming personal stereotypes (Long *et al*, 2001; Long & Steinke, 1996; Steinke *et al.*, 2007). The PUS model is evident in popular science television aimed at children (Long & Steinke, 1996). Use of popular articles challenges the idea of science as exclusive and difficult, making science more accessible and therefore contributing to cultural change (Eisenhart, 1995). Parkinson and Adendorff (2004) support this idea by suggesting that popular science plays a role in science literacy, particularly at the undergraduate level.

As popular media influence is so powerful, it is important that the images represented are more favourable and reflect a more real image (Losh, 2010). Popular science often represents science from a human, rather than an objective, viewpoint, which can make it easier to relate to. However, the manner by which the scientist is portrayed will shape the stereotype an individual forms (Losh, 2010; Rodari, 2007; Steinke, 2004). When scientists become 'ordinary people' rather than an unknown entity or an arrogant dictator, science becomes everyday. When scientists are portrayed unfavourably, or in a clichéd light, science can be viewed unfavourably. A Japanese study (Mitsuishi *et al*, 2006) has developed a 'scientist library' for scientists to express themselves through an online profile, and found this to be an effective tool in science communication.

Recent studies and reports have recognised that the classic stereotypical (Einstein-like) scientist is still a persistent and strong image (*Inspiring Australia: A National Strategy for Engaging with the Sciences*, 2010; Long *et al*, 2001), but the image is

very dependant on the exposure to different types of scientist (Losh, 2010; Rodari, 2007; Steinke, 2004) and that knowledge of science plays a significant role (Pardo & Calvo, 2006). Personal stereotypes can develop in children as young as age six or seven and strengthen with age (Long *et al*, 2001). The younger people are when exposed to positive, realistic images of science and scientists, the more likely they are to accept science and engage with science. This is because the science will be familiar, safe and associated with good feeling. By around six or seven years old, if a child has developed a stereotype around science that does not resonate well with them, it is much harder to convince them that science is useful, fun or even relevant to them (Long *et al*, 2001). This implies that a child who has been raised in a science-friendly environment is more likely to become a scientist, or at the very least, become engaged with science. Limited social contact with scientists as children means that popular media portrayals of scientists become the greater influence on creating a stereotype (Long & Steinke, 1996; Steinke, 2004). In the absence of direct contact, mass media representations are the most influential in forming public perceptions (Barns, 1989; Steinke, 2004).

Given that stereotypes develop from a young age (Long *et al*, 2001), in targeting young children it is important to understand how they learn and the environment in which they best learn. Student-centred learning techniques are an increasing practise for the teaching profession (Gilbert & Kotelman, 2005; Paulu & Martin, 1991; Taylor, 2004; Vosniadou, 2001). Student-centred learning is about giving the student more control (Gardner, 1983; Mahoney, 2004; Schulte, 1996; Smith, 2002; Stocklmayer, 2005; Thanasoulas, 2005; Vosniadou, 2001; Yager, 1991) and using real-life situations is recommended to promote understanding and thinking rather than teacher-centred learning through memorisation, drill and practice (Vosniadou, 2001). Student-centred learning encourages life-long learning by putting the control into the hands of the students. By incorporating hands-on learning, social participation through group work and co-operation, interactions beyond the classroom and avoiding passive listening for long periods, students are more likely to be engaged. This active involvement allows the student to understand more, feel able to enquire further into a topic and provides students with social skills necessary for being part of a society. Meaningful activities put the learning into a context relevant to the student.

In formal education, for student individual needs and interests to be considered, the learning must provide a relevant setting - a setting that provides real-life experiences (Moore-Hart, 2004/2005). To do this a variety of resources are used: for example, internet-based, drama, popular books, texts. This is supported by a study looking at the choice adolescents made with reading material (Ainley *et al*, 2005). It was found choices were based on personal interest, looking only at titles that sounded compelling and suited their own interests. They would continue reading past the first paragraph only if the content maintained their interest. This indicates that not only the wording but the way information is presented and contextualised is vital to maintaining interest. As such, it supports the established idea that engagement in science relies on personal interest and experience (Stocklmayer & Gilbert, 2002).

One of the key components of the scientific mind is the development of critical thinking. By providing a learning environment where the student has control, the student learns how to monitor their experiences (Mahoney, 2004; Schulte, 1996; Thanasoulas, 2005; Yager, 1991). They are better equipped to plan their own learning goals and reflect on previous experiences. This provides for problem solving skills and critical thinking. It is important that students are given time to digest new information, to restructure prior knowledge and build upon it (Gilbert & Kotelman, 2005; Paulu & Martin, 1991; Taylor, 2004; Vosniadou, 2001). This can be achieved by covering a few topics in depth, rather than many superficially. Studying an engaging topic in-depth, rather than memorizing a little about a lot of irrelevant topics, leads to students gaining understanding not just of the topic, but of the process of learning, which can then be applied to other topics and real-life situations. This transfer and ability to apply knowledge makes learning more meaningful and relevant. The processes involved in developing these skills are essential to scientific thinking.

If science is presented to children in positive and relevant ways, they develop a stereotype of science that is part of their reality, making science real and engaging for them.

By training scientists to communicate via popular media, science becomes normalised. Such training and support is in line with recommendations in the National Strategy (*Inspiring Australia: A National Strategy for Engaging with the Sciences*, 2010) and is essential to the breaking down of barriers that exclude otherwise engaged individuals.

*Stereotypes start developing at an early age*

*In absence of real life connections, mass media influence  
on stereotype formation is great*

*Arrogant attitudes from scientists create distrust and  
scepticism*

*Mass media uses cliché to simplify the experience*

## *Summary*

As science communication changes its approach towards changing public perceptions of science and scientists, reality science in its various forms is providing an outlet for scientists to portray themselves and their science in a more meaningful and realistic light (Davies, 2008; The Royal Society, 2006). Reality science takes form in traditional and online books, blogs and social networking, mentoring, web-based video uploads and documentary. Even a simple biography written on a profile page on a research institute website can contribute to changing perceptions (Mitsuishi *et al*, 2006).

Reality science on profile pages can be the most economical and simple way for a scientist to use this tool. Blogging is also simple but is more time consuming. Outreach programs, such as public lectures, mentoring, and school visits provide another avenue. Designed to reach a wider audience, designed to be impressive, films and documentaries are made for the popular media where the greater influence on stereotypes is found. In the absence of direct contact with scientists, it is the powerful mainstream media that will provide the stereotype forming elements (Barns, 1989; Steinke *et al.*, 2007). Because of this power, it is important that science communicators help scientists to use reality science, to ensure that a more real image of science is presented (Losh, 2010).

## Artefact

The following artefact, *Colours of the South*, is an example of reality science. It describes a modern day scientific voyage, from a researcher's perspective; it includes a personal story and experience, through words and pictures.

At the original time of writing (January – March 2003), the journal was emailed out to a select group on a weekly basis. If it were written today it is likely it would be blogged or posted on Facebook. At the original time of writing it was well received, and forwarded on by those it was sent to. Comments from the readers included: “publish!”, “well written”, “interesting”, “Fascinating”. And “I felt I was there with you”.

Upon my return, informal gatherings to show my photos provided the opportunity to answer questions and discuss the adventure, further breaking down barriers and amending stereotypes.

One reader has been inspired to apply for an arts grant to go to Antarctica herself and create her own science communication product, aimed at children.

Informal chat about my experience helped an early career scientist (a physicist) decide to apply for a research stint in Antarctica and a tradesman consider the opportunity.

The anecdotal feedback supplied from these audiences suggests the power of reality science to create positive perceptions and stereotypes which inspire others to engage with science. For example, the journal challenges the stereotype that science is solely lab-based, by showing field-science in action and shows that science is no longer male dominated. The Journal inspired, as it shows that an ordinary person, someone you

know, can do extraordinary things. This feedback contributed to the development of the emails into the artefact.

The artefact presented for this thesis is edited for presentation as a book.

*Colours of the South:*  
*Journal of a Modern Day*  
*Scientific Voyage*

(attached)

## Conclusion, Limitations and Recommendations

In the absence of direct contact, the media has the greatest power in shaping the individuals perception of science and scientists. When science and scientists are perceived to be ‘like me’ or ‘something I can do’, then an individual is more likely to be comfortable and accepting of that perception (Losh, 2010; Pardo & Calvo, 2006; Rodari, 2007; Steinke, 2004).

In keeping with recommendations outlined in the National Strategy (*Inspiring Australia: A National Strategy for Engaging with the Sciences*, 2010) and in accordance with the move away from PUS and into engagement, reality science contributes to the development of positive stereotypes, bridges gaps and opens dialogue. Realities of scientists, in their many forms, help bring the perception of science and scientists closer to the individual. Just as people vary in their likes and dislikes, science varies in its different disciplines and scientists in their personalities. With a variety of realities available, it is more likely an individual will find one they can identify with.

Reality science is viable as a science communication and education tool. In the past, many scientists used it to justify and encourage finance for their exploration, publications of which are still available today (for example: Darwin, 1962). In the present, reality science is used to contribute to changing attitudes and to document pioneering pathways (For example: Burns, 2001). Reality science gives us insight into the minds of the scientists and the nature of the science. They inspire people, inform people and create controversy. Reality science is a tool the contemporary scientist can use to encourage new scientists into their field, inform the public about their research in a less typically scientific manner, and inspire their colleagues to do the same. Reality science can contribute to creating a more accurate public perception of science, as more and more realities will create more relevant stereotypes and bridge the gap by creating dialogues; dialogues between author and audience, and between third parties, depending on the type of reality science used.

Reality science can be a traditionally published book, an e-book or blog, or a self-printed leaflet. Reality science can be an oral presentation where the language is not formal dry science, but passionate, inspirational and even poetic, followed by discussion. Such an oral presentation could be given at schools or at public lectures; it could be recorded for general viewing on websites such as YouTube (2009).

Reality science can be a photographic journal, with few words, to show the nature of the work, and the scientist at work. Reality science can even be a collaborative work by a team of scientists. A simple paragraph on a profile page, the act of mentoring potential or early career scientists and being interviewed on a radio program are all ways scientists can use reality science to achieve outreach objectives.

The only limitation to the presentation of reality science in science communication is the imagination of the scientist (and perhaps their budget).

Whilst it is considered that all branches of science would benefit from having realities available, as an example, it is considered useful to medical science. In medical science the arrogant image of science is strong, and hence the distrust and wariness from the public is greatest. Reality science, in the blog style, allows many conversations to begin, questions and comments raised and concerns addressed. Such

forums would allow better access to scientifically accurate information, as well as addressing emotional considerations. There are many controversial topics where a more personal approach would be beneficial (e.g. immunisations, maternity care).

Certain issues may need to be addressed in regards to some reality science such as intellectual property, publishing non-peer reviewed results or leaking sensitive information, particularly in online and real time situations. These issues should not, however, prevent or inhibit communication.

Beyond the scope of this sub-thesis, but of interest for further study, is an investigation into the anecdotal evidence supporting reality science. Readers of *Colours of the South* and participants in discussions about the journey used words like ‘inspired’, ‘transported’, ‘fascinating’, ‘publish!’. The anecdotal evidence tells us that at least three people have been inspired to apply for work in Antarctica after reading and hearing about my own experience. The audience for *Colours of the South* has been as young as 10 and up to octogenarians, including male and female, scientist and non-scientist. I have addressed audiences formally (school groups) and informally (dinner table discussions, for example).

Taking reality science to another level, further research in using reality science to deal with important issues (breastfeeding and immunisation are two examples close to my heart) would be informative and relevant to the general public. Such research could investigate various ways reality science can be used to reach target audiences.

As science communication completes the transition from PUS to public engagement and beyond, reality science is a highly recommended tool. It has proven itself in the past, the present and will become vital in the future.

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# Colours of the South

Journal of a modern day  
scientific voyage to the  
Antarctic



Catherine Bell



# Colours of the South



For All That I Am

And All That I Can Be

Thank You To Those Who See What See

For Seeing The Dream

And Making It True

I Couldn't Have Done It Without You

Beauty

The beauty, isolation and vastness of the Antarctic capture the soul.

Senses, colours, and emotions are intensified and deprived.

Isolation

Cabin fever, home sickness, seasickness and boredom compete with some of the most incredible experiences on the planet.

Even a relatively short voyage south leaves its mark on the expeditioner.

Vastness

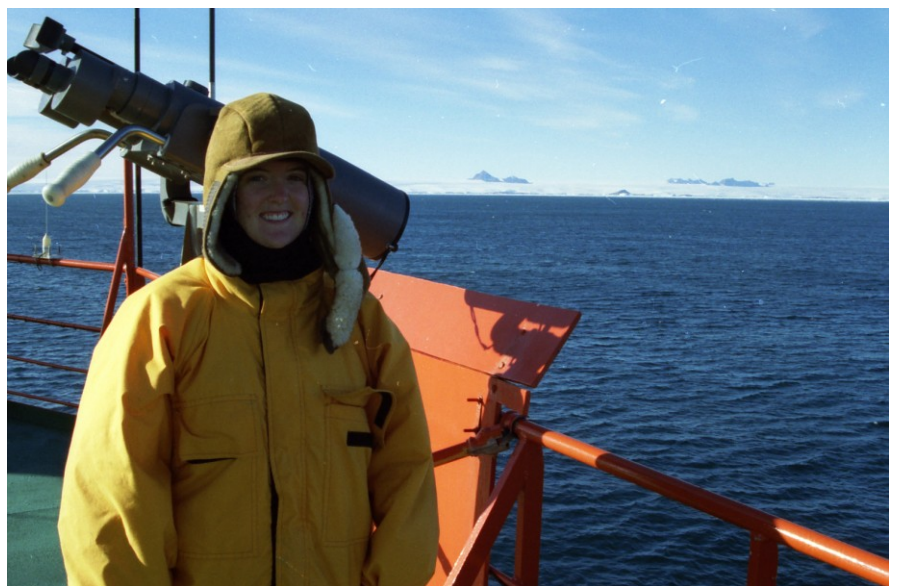
Yet one craves for the familiarity and intimacy of loved ones.

The culture, the society, of the south is unique.

Time and space change, it is as if nothing and no one else exists.

Home sickness

Seasickness



## New Year's Eve 2002

I am told that  
Antarctica  
changes people,  
once it has a hold  
on you,  
you can not escape  
it

It was a hot, muggy day. I had seen the *Aurora australis*, the ship that was to take me to the Antarctic, from the bus on the way into Hobart from the airport. It was hard to miss. It was Orange after all. After dropping off my baggage at the hostel, I went to investigate. The *Aurora* was docked at Macquarie wharf, not far from Constitution Dock, where the yachts that had just completed the Sydney to Hobart Yacht Race were on display. It was all happening in Hobart; Tasmania was celebrating its 'Summer Festival'. The atmosphere was charged. 'Taste of Tasmania', provided lunch with a view of the Derwent River and the *Aurora*. Sharing a table with other festival goers, my thoughts were about what I was about to embark on. It was a dream come true. Antarctica had been calling for as long as I'd known it existed. I am told that Antarctica changes people, once it has a hold on you, you can not escape it. It is the last frontier. One of the last truly wild places on earth. It represents all that is pure. What will it be like? Will I get home sick? What about cabin fever? What if I get sea sick? It is a long voyage.





I was not expecting to meet my research team mates until later the next day, so I explored the festivities on my own. My wanderings found me outside a camping shop having a 50% off sale. A new bag and aluminium drink bottle later and it was back to the youth hostel to repack three months of supplies. Having been told the air was very drying; my baggage was mostly moisturisers and hair conditioners. I had very few clothes packed, three tops and two bottoms and one dress up outfit for a 70 day voyage. I had the passing thought that that was a long time to wear the same thing...

As evening approached, I joined the festivities in Hobart, along the docks and at Salamanca. There were buskers and people in fancy dress. By quarter to twelve I had found a good spot next to a friendly lady and funny lad at the edge of the pier to watch the fireworks. The funny lad mused as to why he was even there, as "Hobart never put good fireworks on...in fact last year they didn't even have any!" At about five to twelve, someone on one of the yachts let off a flare, and funny lad said "well, it's still better than last year. I guess we can go home now." Friendly lady and I laughed. Spot on midnight though, with cheers of "Happy New Year" all around, Hobart was treated to the best fire works ever. Funny lad said he was glad he came, 10 minutes of non-stop huge fireworks.

# New Year's Day

2003

New Years Day found me back at the camping shop, this time buying clothes. My new bag wasn't quite full and the lacking wardrobe got the better of me. So a pair of trousers, a t shirt and long sleeved top should do the trick. I was to meet with the research team at 3pm in the lobby of a hotel. Shannon, one of my fellow whale researchers, who would also be my cabin mate, was arriving at lunch time, so we agreed to meet earlier and check into the hotel together. When we arrived at the hotel, we met Julie and Kate, the acoustic part of the team.

At 3pm, the team rendezvoused in the lobby and were joined by the final two team members, Vic, the leader and Hodda. Over a cuppa we discussed what to expect. Shannon and I are both first timers, so Hodda (a veteran Antarctic explorer on his 7<sup>th</sup> voyage) and Vic gave advice and a few warnings.

January 2<sup>nd</sup>

“so... this is going to be home for 10 weeks? This is going to take us into some of the roughest seas in the world, and then to the remotest continent?”

The team were busy with preparations on the 2<sup>nd</sup>. First Shannon and I needed to be kitted out with Antarctic gear. A freezer suit in bright yellow, Sorrell boots, a sheep skin hat with ear flaps, gloves, socks, wool trousers, a jacket, a scratchy flannel shirt, sun glasses, goggles, a dry suit, thermal underwear. We get to keep the hat, socks and underwear, but everything else gets given back at the end of the voyage. Then it was time to meet the *Aurora*.

The team took the opportunity to set up as much as we could. Vic and Hodda gave us a tour of the ship, assuring us that it would not take long and we would know the ship like the back of our hands. There was something unreal about stepping onto the ship for the first time. I could not help but think “so... this is going to be home for 10 weeks? This is going to take us into some of the roughest seas in the world, and then to the remotest continent?” There will be very limited contact with the outside world during the voyage. Whilst it is a far cry from the original days of Antarctic exploration, it is still a nerve racking thought.

That night, Shannon and I went to the Taste festival where we met up with my parents for dinner. My parents were riding their bikes up the east coast of Tassie, and had timed their holiday to my departure. After dinner, Shannon and I took the last chance to head for a super market for last minute supplies.

Later that night Andrew called, I answered in just two rings, “Hello! Andrew!” It had only been a day since we last spoke, but I was so happy to hear his voice. Today is the last time I will hear it for many weeks. We board the ship tomorrow, a ship that will be home and work place until the middle of March.

# Last Phone Call

with Andrew

“Catherine you’ll never guess - A job has been advertised in Seattle! Should I apply?” were Andrew’s excited words.

“Oh Andrew! That is wonderful; this is the opportunity we have been waiting for. Who is it with?”

“Same company, it would be permanent”

“It sounds perfect, go for it!”

I think back over the past year. I have been hoping to apply to do a PhD based in Seattle, I have a supervisor, but it has been so hard trying to organise it based in Canberra. And Andrew has wanted to live overseas. Just to see what it is like, for something different. It always amazes me how perfect my love with Andrew is. We are very different people, but on the same wavelength. Sigh. I will miss him terribly, but a scientific voyage to the Antarctic will be worth a month or two apart.

January 3<sup>rd</sup>

Departure day dawned hot and muggy. I could feel the excitement building. The day started on board at 8am. All expeditioners attended a meeting to hear about voyage matters and to do emergency drills. Sitting in the life raft was rather daunting...and thoughts of Seasickness were at the forefront of my mind...



*Traditional farewell*

January 13<sup>th</sup>

Rolling all around  
in a boat on the sea  
Roll Roll Roll Roll  
along with me...

Ten days have passed since we sailed out of Hobart and into rough seas with a large swell. And there we sailed, briefly seeing a sea state 8 (the scales goes to 12, 8 is a gale), for the first week. The song in my head - the childrens song -

Rolling all around in a boat on the sea  
Roll Roll Roll Roll along with me...

We plodded towards the Antarctic at a WSW direction, then skirted past low pressure systems by steaming south for a night and a day, before heading westerly again. We saw some fin whales and some unidentified whales during that time. And Yes, I was seasick...from the minute we reached the first swell out of Hobart, 'til 5 days later when my sea legs kicked in. Then, on January 9th, the sea calmed, the swell all but disappeared, and we were able to start a proper watch for whales from the flying deck (or Monkey Island).

Over the next 3 days we saw humpbacks, killer whales, pilot whales and minke whales. We started seeing icebergs, and 'bergy bits', and snow flurries fell lightly. By yesterday afternoon the sea picked up a bit, and the snow started falling more heavily, settling onto the ship.

There is a penguin colony and seal haul out site nearby, and some other fascinating landmarks and wildlife spots, or so I am told.

We are now about 200 nautical miles north of the Shackleton Ice shelf, heading west towards Mawson station. In a few days we will reach "the box", north of Mawson. This is an area for dedicated long-term surveys and data collection, used every year to do similar projects. We will spend three weeks along transects, going back and forth, in the box. The whale team, my team, will be observing whales, the birds the birds. Krill biologists will be collecting samples for various experiments and plankton people will collect data on plankton. It will be a busy time, and hopefully we will see lots of whales.

From the box, we head to Mawson station. In the bay, the CTD (oceanography equipment) will be calibrated. It is highly likely that we will be able to get off the ship for a "jolly" into the station and its immediate surrounds, for a day. There is a penguin colony and seal haul out site nearby, and some other fascinating landmarks and wildlife spots, or so I am told.

After the CTD is ready, we will steam north, almost to the Kerguelan islands, for the oceanography part of the cruise. When we get as far north as we are going, we go east for a bit, then South, into Davis Station. That will take about 3 weeks. We will be able to continue our observations, but there will be lots of stopping and starting to deploy the CTD. The CTD will be dropped to several thousand metres, to take samples and tests at various depths in the water column.

We will stop at Davis to pick up some people who have been there all summer (or longer), to bring home. I am not sure if we will get a chance to get off the ship here, it is all time dependant. From Davis we will steam west along the coast to Mawson. Apparently this is the most scenic part of the voyage, with lots of wildlife and ice. I am told that it is a "good 4 or 5 days" to get from Davis to Mawson. At Mawson we will pick up more people and then head back to Tasmania.

We are due back on March 15th.

There are people  
from 12 different  
nations on board;  
46 expeditioners,  
and 24 crew

There are people from 12 different nations on board; 46 expeditioners and 24 crew. There are many different projects happening. So far there has been one party, a dress up party with games and trivia. I did not go to it though, as the weather was really good, so we stayed on watch. It is wonderful being up on the flying bridge. Yesterday morning the speed of the ship was matched by a tail wind, giving the feeling of stillness on the flying bridge. It was clear viewing (though overcast) and we passed some magnificent old icebergs. I am told the icebergs get better the closer to the continent we get, so they must be absolutely spectacular!



*Passing through loose ice*

January 14<sup>th</sup>

The 14th of  
January was a  
brilliant day!

The 14<sup>th</sup> of January was a brilliant day! It started a 5am. At about that time, we came to the first pack ice (sea ice) for the trip, it was loose pack ice, so no ice breaking, and we still steamed at 9kts and enjoyed the scenery whilst we worked. We saw Adelie Penguins and Crabeater Seals, usually one at a time, but occasionally 4 at once. There was a lot of bird life too (other than penguins.). When we were through the pack ice, which was quite a large area, we started seeing lots of whales. In fact throughout the whole day we tripled our sightings. We saw minkes, humpback and fin whales mostly.

After lunch we headed closer to the continental shelf (off the Amery Ice shelf). Continental shelves are known for large numbers of wildlife, and the purpose of going along it was to find krill. Also after lunch we came into clear skies, the first for the whole trip. It was beautiful – bright blue sky, sparkling blue water, icebergs scattered around us, whales blowing in the distance. I even spotted a large pod of pilot whales in the distance.



*Crabeater Seal, affectionately known as 'Slugs'*

After dinner we crunched through more pack ice, a bit more closely packed, but still loose, and a smaller area. We only saw a seal (crabeater) and a penguin (adelie), but with the clear sky it was marvellous. Ice for as far as we could see. So I took some pictures. We stood on the bow as we crumbled over some ice. Everyone onboard came out to see and take photos. Our shift started as we exited the ice and again it was one whale after another! Some were distant, some were close, mostly in ones and twos. Mostly large baleen whales (but not blues or Southern Rights)



There were many  
ooohhs and arrrhhs  
and it was amazing  
and amusing!

*(right) Adelie Penguin on ice floe*

Then just as we were on last shift for the day (8-9pm) we saw a huge pod of killer whales (it was while I was on watch). Everyone on the ship came out to look and take pictures. Even though there was still a lot of light, we ended after that, only to have another 4-5 sightings happen straight after. One of them was a sperm whale ventilating at the surface, preparing for a dive. They dive deep for an hour or two at a time searching for giant squids to eat, so spend some time resting at the surface taking many breaths, saturating the blood with oxygen, before diving straight down. And right on cue, the animal sounded (dived) right next to the ship and raised its tail. There were many ooohhs and arrrhhs and it was amazing and amusing.

And so ended a  
very special day!

As we had so many sightings, the end of day procedure took a couple of hours, so the sun was setting just as we were finishing (at 11:35pm). We took some photos of it, and saw the 'green flash'. This is a phenomenon seen in the last seconds as the sun slips over the horizon, caused by light refraction.

Then it was time to have a hot drink and go to bed for a few hours. It was a long day, and wonderful. After the sun set it did not get dark. It just ducked under the horizon for a few hours before rising again.



*The Green Flash...I saw it, but to  
capture it on camera, you have to be  
spot on!*

January 15<sup>th</sup>



*(above top and centre) The most beautiful blue I have ever seen  
(above bottom) Algae on floating ice.*

The next day all was quiet. It is overcast again, but still calm and good viewing conditions...just not many whales. There is krill about though, they have been found on the echo locator, so we stopped to trawl for krill.

We went past an area of magnificent icebergs, close together, that may have once been all the one iceberg. They looked like medieval ruins, or even ancient ruins. Some of the bergs had toppled over, and the bottoms were at the surface. And the colours! The purest of whites and the most beautiful blues! Sometimes an iceberg looks dirty, as it has algae on it. This algae is the beginning of the food web, as the iceberg melts and breaks apart, the algae is dispersed into the water. The krill eat the algae.



*'Medieval ruins'*

January 16 - 19

The first day in 'The Box', as we were coming down transect number one (we had already gone up it), a clear blue sky on the horizon revealed the skyline of the continent. I could see the mountains behind Mawson station, 30nm away, grey against a pale blue sky on the horizon, and the cliff face (which must be immense to be seen from this distance) that spreads for miles and miles along the coast.



*View towards Mawson Station.*

The rest of the sky was overcast, so it was just wonderful luck for the clear blue to be at that spot at that time. We were in an area of many icebergs, so amazing, it is hard to describe. One iceberg on our eastern horizon, about 8 miles away, was about 12 miles long and several wide. We saw the long side. And the blues! Some of the icebergs are the loveliest blue you have ever seen. And black.



*The Long Berg, featuring the magnificent blue*

The black icebergs are called Jade Bergs, they are black, or green where ice is highly compressed. Quite amazing. But these are old bergs, I am told. The ancients, the ruins of the icebergs that once they were. When we get to Mawson we shall see the new bergs, the big bergs. We will see 'ice berg alley' which is a popular photo taking spot.

Between January 16th and 19th we saw very few whales, just the occasional whale, with 0-2 sightings a day. A far cry from the 14th! Two of the days were quite foggy, with snow falling, and the sea state lifted to 6. So it was not surprising that we saw not much.



*Jade Berg*

January 20<sup>th</sup>

On January 20th, at 8:30pm ship time, we broke from the transect to head south by 5nm, to the ice edge. The captain wanted to assess the situation, as we are expecting the 'Polar Bird' (a ship that does not have the ice breaking capacity of the AA) to arrive in Mawson in the next week, and we may be called to make a path through the ice for it to get into Mawson. The captain seems to think that the ice is loose enough for the Polar Bird, so fingers crossed we won't be needed. That means we won't lose transect time. The Polar Bird is notorious for getting stuck in ice. Two seasons ago, when the Aurora Australis was doing this same voyage, the science was aborted to rescue the Polar Bird, and that is why we are here on this voyage, trying to get the data that was missed the first time. This was the first time in the trip that we saw the ice edge, and it did not disappoint. The day was beautiful and clear, the sun was in a 'late afternoon' position, and everything was sparkly and calm. I imagine that it must be peaceful and silent, but for the ship noise. We saw a crabeater seal and a penguin in the ice, the captain letting the boat turn in the ice, rather than before it, to the delight of all the expeditioners (it was sea ice paparazzi). After that we headed back to the transect and continued with the science.



*Crabeater Seal*



*Lone penguin*

January 21<sup>st</sup>



*Antarctic Critters*

January 23<sup>rd</sup>

January 21st has been clear and bright, and calm. A perfect day weather wise. There is very little breeze, so it is relatively warm on the flying bridge. We had many sightings (all in a one hour shift!): sperms, humpback and sei whales. The sei group had four feeding animals in it. But, by mid-afternoon the wind picked up, the sky clouded over and it was most unpleasant on the flying bridge. We stopped to do a trawl and CTD after dinner, so our watch ended early. I took the opportunity to join some of the other expeditioners in a game of "Settlers of Kartan". During the game the ship started to roll, and we were told we were in a storm. The swell was big, but not as big as some of the swells we've had. This put an end to the research for the moment, and since then the ship has been effectively at stand still, waiting for the swell to drop and the visibility to increase. From E deck, where the mess is, the water was swirling around the portholes in waves, making them look like front loader washing machines!

January 23rd is looking much the same, still bobbing around, waiting. Apparently if we lose too many days to bad weather some of the science programs will lose time, rather than prolonging the voyage...it's an economic thing.

I am enjoying the scenery (when we have it) and trying to learn about the other projects as well. The other day we were in the wet lab looking at what they caught in the nets, I took a photo, and have written down the scientific names. The other night when we had finished work, a trawl had just been completed, catching heaps of krill, so we helped the krill team to get their samples ready (that meant putting one krill with some water in a jar, and they needed 360 or so, for their growth experiments and other things).

Some of the other people have been playing hacky sack and totem tennis on the helideck, when the weather is nice. I hope I can join them, if my break matches when they play. It looks like fun, and when the sea is calm and the sky clear, it is so nice being outside.

Summary of  
research being  
conducted on the  
ship from Jan. 14,  
for approx. 3.5  
weeks

The research is being conducted in a 60x50 nautical mile 'box' approximately 30nm off the coast of Mawson. The position of this box is determined by the positions of penguins feeding. Adelie penguins from the Bechervaise rookery off Mawson have been studied for many years, including researching their diets and related weight changes (using an electronic automated weigh-bridge they walk over when leaving & returning to the rookery). Some of these penguins have been fitted with satellite tags to track their movements while feeding out at sea to get an idea of where possible krill concentrations may occur. We steam up & down in a series of parallel transect lines 5nm apart recording krill abundance below us using specialised acoustic equipment, sample where krill is abundant and record predator (bird & whale) abundance. Additionally, several projects are investigating plankton and nutrient 'turn-over' in the water, including one where we deploy sediment traps to 'catch' sinking plankton and krill faeces. The oceanographic data will mainly be collected along the outer edges of the box, but we will be deploying several drogue buoys to calculate current speed and direction.

January 24<sup>th</sup>

On January 24th we saw a sperm whale.

January 25<sup>th</sup>

January 25th was a glorious day. The seas smooth, the sky clear. We saw 4 blows before breakfast...all far away and unidentified, but perhaps a sign of a good day ahead. We were in full watch for the most part, but we were stopping regularly for CTDs, which means we go to incidental (one person) despite the weather, while we are stopped. There were no more whales today.

Turns out we don't have enough fuel to complete all our tasks and in a twist of fate the Polar Bird will come to our rescue in a week (or so) when we rendezvous at the ice edge for a ship to ship transfer of fuel. Apparently she has more than enough for her tasks and our remaining tasks. Jolly good.

January 26<sup>th</sup>

It was an excuse for a BBQ in the heli-hanger, and a night off for the galley staff. With the theme being colonial, people were asked to dress up. Most came as convicts, painting arrows on their issued overalls. One came as Ned Kelly, and two as excellent swag men (one was a girl). There was some bush dancing, which was fun, but it petered out pretty quick. The weather was perfect, with lots of icebergs for scenery. I finished the day with two more hours of watch, after the bush dancing. We saw some whales throughout the day, but not many, really.

Australia Day



January 27<sup>th</sup>

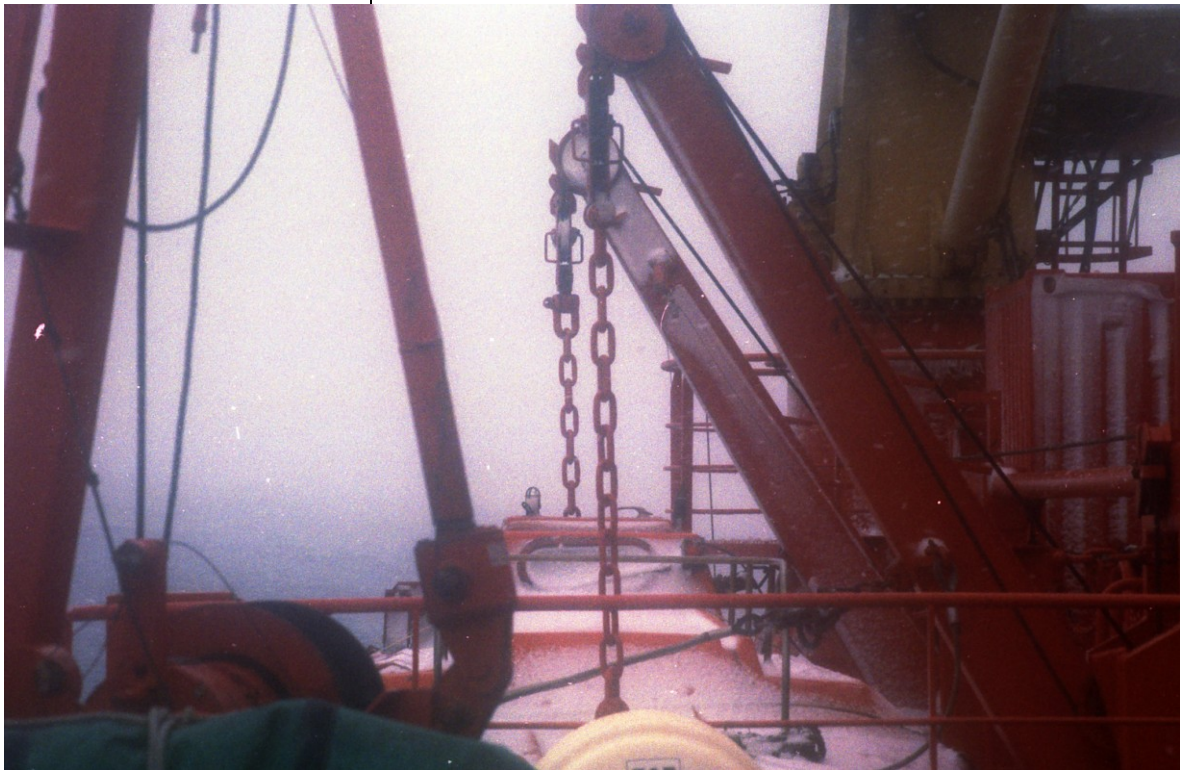
started off

innocently

enough

January 27th started off innocently enough. Calm and bright. But the prediction was not good: up to 70 knot winds...that is rough weather! By 3pm the winds were beyond 16 knots, by 5pm, 25. At 7pm they were 36 knots and the forecast was for 50 knots. The low pressure system was reading 900 (barometric pressure) by 5pm. We were in for a low low. Batten down the hatches, its going to be a rough night! Good thing I found some sea legs (I wonder if I have to give them back when I get off the ship?), I hardly notice the movement now. A snow fog had enveloped the ship by 7pm; the sea was grey and heaving. An incredible change in just one day! We saw 8 whales on this day, before dinner.

On the evening of the 27th some of us got together to learn some bush/folk dancing. It was lots of fun. We laughed a lot, and it was good exercise. The ships movement also added to the occasion! We will do it again soon, I expect. There were 6 of us to start with, and 8 by the end.



*Foggy day*



*Bergs emerge from the fog*

January 28<sup>th</sup>

On January 28<sup>th</sup> we were waiting out the storm, so we were on one person watch, and saw just one whale. During one of the lengthy breaks I started making a plaster cast of my face (top half) for a masquerade mask. We will decorate them tomorrow. Lots of people made them; it was fun, a bit of a laugh and very messy. The 'masquerade ball' is scheduled for the night before the night before we get to Mawson.

January 30<sup>th</sup>

On the morning of January 30<sup>th</sup>, it was overcast; giving a dark and gloomy effect, the sea was oily smooth. Whilst on break, I looked out my porthole to see a large tubular berg, with a hint of blue streaked through it, only half a mile away. A light snow was falling. In front of the berg, a dozen Adelie penguins, porpoising along with the ship. What a sight to see from your bedroom window! Then we went through a small area of pack ice (small bits of ice close together). I could hear the ice crunching away from the ship as we passed through. A lone adelic penguin stood on a little bit of ice. Then it was time to go back on watch, and stand in the lightly falling snow. It was most pleasant. There were a few whales that morning, but mostly adelic penguins. They are everywhere! Porpoising through the water. They are lovely little creatures! The echo sounder shows there is a little bit of krill around, which is what the adelies eat. There are lots of bergs about. It is magnificent!

If only I could make time stand still.

January 31<sup>st</sup>

On January 31st we saw a killer whale porpoising close to the ship. And a really big berg. It was a couple of nautical miles long. We did CTDs on each side of it. We finished with the krill box on the evening of the 30th, so on the 31st we headed east of the box hunting krill. Not much luck though.

February 1<sup>st</sup>

On the morning of February 1st there was a stir of excitement at about 7am. We were on our second watch for the day and Vic announced he had a sighting of a large group of whales about 2nm away. It looked like it might have been a feeding group, so the ship headed over for a stickybeak. There were 7 or 8 fin whales breathing very often. The krill people decided to do a trawl, even though the echo sounders did not suggest there was krill about. And there wasn't. They did not get much of anything really. Nevertheless it was an interesting hour for us. Quite a few people came up to watch, we were fairly close, but they were still probably 1/2 a mile away, too far for speccie pics.

The night of the  
1st was the  
masquerade ball

No long after that, we came across a large blob of krill, which we trawled. There were copious amounts of krill; some were alive, which will be used in experiments. The dead ones will be saved for genetics. Then once the hunt was officially called off we found the biggest swarm of krill we have seen for the whole trip! But we were headed for Mawson, and so they marked where it was, and we will go back after Mawson to find it. Hopefully.

The night of the 1<sup>st</sup> was the masquerade ball. Everyone had made a mask to wear. It was a good idea, and a great way of breaking the monotony on board. The theme was Priscilla Queen of the Desert, so many of the men were in drag. It was a lot of fun, but some of those men made VERY scary women! They played a few games to break the ice, then everyone got into the 70s music. After 11 the music was changed to more night club stuff, which is so hard to dance too. It was fun, I chatted and danced, I left at 12, when the doof doof music was getting to be too much.

## February 2nd



*The mountains behind Mawson Station*

February 2nd dawned clear and bright. A few wispy clouds decorated the sky, the calm sea was a sapphire blue specked with white, and we were headed for Mawson.

From our watch on the flying bridge, we could see the continent getting closer and closer. What an incredible sight! A smooth white horizon, with four mountains, jagged and black, jutting from the crisp, stark, landscape. The sun low in the east, each mount cast its own vast shadow perfectly on the pristine white. As each minute went by, it loomed larger and larger, becoming more and more real. An awesome sight. Apparently we were passing through ice berg alley, but it was quite wide. Soon after lunch, Mawson appeared - a distance red speck on the continent. We did a full watch (seeing no whales) until we reached some pack ice (very loose, but very speccie) off the coast and went off effort. I took 27 photos today (up 'til now I have used only 3 rolls) and I expect to use many more photos in the next day or two... How incredible - how immense! Before us was the desert continent.

We passed a tubular iceberg, tall and proud, with a rim of watercolour green at its base, rather than the picturesque blue we had seen on the older, decaying bergs. This is an extreme place. The scenery is amazing! There are no words to describe it - it has to be seen.



*Tabular Berg, tall and proud*



Nothing can  
explain the true  
wonder of  
Antarctica.

Immense, stark, white. Brown rock. Nothing can explain the true wonder of Antarctica. Mountains that jut out of the white, rugged and brown, giving the illusion of a cloud shrouded 'islandic' mountain peak. The peak of the mountain is naked and exposed; the lower half is blanketed in a stunning white smoothness. The word lush can not be applied. It is unique. So mind-boggling! This continent is a desert, a barren world, save for a few spots. No rivers run here, only glaciers. And the wind, the katabatic wind, rushes across the continent from the centre to the edges. And it bites. Oh how it bites. It cut through the gloves I was wearing, until my fingers were thought to be non-existent by my hands. This is a world that needs to be seen to be believed. I can not do it justice; the photos will not do it justice. Video would not do it justice. It is so immense.

I feel so privileged to be here.

In Antarctica!

## 3rd of February

The 3rd of February found us with over 200 000 litres of extra fuel, which should allow us to complete our tasks and get back to Hobart safely. We are now waiting for the wind to die down, so that we can be unmoored from the Polar Bird, leave the harbour, let them leave, then re-enter the harbour, moor, and hopefully have the station leader come aboard and say "come have a jolly at Mawson". That means that either Tuesday or Wednesday we will get to visit the station and have a look about. Obviously we are not on watch during this time.



*Approaching Mawson Station*



*Mawson Station*

Cabin Fever  
(and we're not  
even half way!)

On the bleak, grey, foggy days, it is hard to avoid cabin fever. And even homesickness. So I imagine myself away to a place green, with undulating land, instead of sea. I take myself back to the Pacific Northwest, where Andrew and I spent two weeks in the Vancouver area.

A place where there are so many greens, so vivid and bright, that they each deserve a different name. It is winter, but the soft white snow and cold air is different to here. There is a distinct lack of noise, a stunning silence of the many-greened forest, only interrupted by waterfalls and rapids of the mountain streams. And we were the only people for miles, or so it seemed, rather than the ONLY people for miles and miles! Or I will imagine myself to the Australian Bush, to the national parks and reserves around Canberra. We are bush walking, with our day-packs full of water, snacks and a picnic lunch. It is summer and the cicadas create a loud chorus that drowns into the background and drums into the subconscious, almost disappearing in its intensity. We will hear birds and glimpse the lizards as they scuttle away from the path. We will stop to eat lunch on a lichen covered rock, over looking a deep valley. Peering through the cool shade of the trees, we will see a sparkling river winding through the valley. Here the green is different. It is dull and smells of eucalyptus. The leaves rustle in the breeze. There is a beauty here that is unmistakably Australia.

But then the horizon becomes distant, as the enveloping fog lifts.

The sun sparkles on the now blue sea, and makes the ice bergs dazzle with the magnificent pure whites and THAT amazing blue. The sea is calm; people venture outside to play hacky sack, and totem tennis, and to take photos. The bridge becomes vibrant as people come to see the Antarctic Magic. Soon cabin fever is past, and the wonder of being in the "Last Frontier" fills me with awe. And still - I am told - "we ain't seen nothin' yet"!

On News

Back Home

I think about what it is like back in OZ right now. We hear news of floods in Queensland and fires, particularly in New South Wales and Victoria. Descriptions of a stark and tortured landscape around Canberra, the devastation of 400 homes and 4 lives. Half the bush in the area has been the victim of the rage of the bush fires. And while the country seers in the summer heat, I don my freezer suit, fleece lined boots, gloves and ugg-boot hat, to stand out in the 0 degree Celsius temperatures looking for whales. It is so hard to imagine what it must be like in Australia right now. What a powerful force is nature. It can be our most vengeful enemy, or our greatest friend.

3rd of February



The fuel transfer from the Polar Bird was completed at 00:15 on the 3rd of February. We now have over 200 000 litres of fuel, which should make up for the deficit for which no responsibility has been claimed or fault accepted. The wind on the 4th was strong, and did not drop sufficiently until the afternoon, when we left the harbour to allow the Polar Bird to leave, and then we came back in. So no visit to Mawson that day. Just milling about, watching videos and playing hacky sack, reading. I used this time off, and unable to do much else, to socialise and relax. I have made many new friends; everyone on board is very friendly. It really is wonderful.

On the morning of the 5th it was abuzz with excitement. Everyone was waiting with baited breath for the station leader to come aboard and welcome us to visit the station. It was 2pm before we were able to start being ferried across. The wind was about

7kts and less, which was marvellous - it was almost balmy! I called Mum and Dad to announce that I was on the continent, tried Andrew, but the phone was engaged. I headed off to check out the station, having a look at the communications building. The buildings are painted in bright greens, yellow, blues and reds (but only one building has all four colours).

Those colours are the saving grace for the otherwise construction-site like station. The scenery surrounding the station is spectacular, but the station itself is blur! Then it was back to the main building (which is a two story red building, with big windows looking out from the bar and restaurant -mess- towards the harbour). I waiting patiently for the phone and rang Andrew.



*Aurora Australis in Mawson  
Harbour*

Phone call to  
Andrew:

In early January Andrew applied for a job in Seattle, and thought he'd give it a shot, we expected it would take a while to process.

On the 5th of February he got the job. "We are moving to Seattle!" a very excited Andrew announced to me over the phone. He also suggested we get married before we go, if we can...we have been engaged for 6 years after all!

The job starts ASAP, so pretty much as soon as I get back to Oz, I will be off again. After a year of saying it was what we wanted, it has happened, and VERY quickly. So as you can imagine February 5th was a very exciting day for me!

After speaking to Andrew I headed back outdoors to see what was happening and find someone to wander about with (we were told to go around in twos or more, for safety reasons). In a few minutes I saw a familiar face, who told me that the Hag was about to leave to take a bunch up to the Plateau. That was good timing, so off I went to climb aboard the Hag. I think it is short for Haggler or Hagland, but that still is an odd name. It is a square vehicle with tracks instead of wheels to get over the slippery ice, snow and rock. It was two joined together, the front carriage being the engine, the back one a passenger trailer, of sorts. Once everyone was piled in we made the short trip up to the plateau, out of site of the station, the Hag being the only man-made (other than people of course) thing in site.



*The Hag on the Plateau*



*View from the Plateau behind  
Manson Station*

| can't believe | am  
actually here!



*In the Plateau,  
Mount Henderson  
in the background*

We could see Mount  
Henderson clearly, 18 km  
from where we were. And  
White. Ice, slippery and rough.  
With streaks of blue.

Unfortunately the over cast  
sky dulled the colours, it was  
still spectacular, but I am told  
that when the sun shines on  
the ice, the blues really stand  
out. I took some pics, and had  
one taken of me with  
Henderson in the back  
ground. The ice is 400 m thick,  
the mountain 1000 m high, so  
the ice is nearly halfway up the  
mountain! It was so amazing.  
We stopped the Hag half way  
back to the station, whilst still  
on the plateau, to take photos  
of the harbour and the station.  
There was some fog, or low  
lying cloud in the distance, but  
we could see the station and  
harbour clearly, with the ship  
in the harbour.



*On the Plateau*

From the Hag, I headed down to where the Weddell Seals sleep. They were, making vocalisations, just little ones, but it was wondrous. They were bigger than I expected. As were the adelic penguins, which were mingling among the seals. The eyes of the adelic are most impressive. They are black with a white rim, like an Egyptian goddess! There were emperor penguins about too.

*Adelie Penguins and Weddell Seals  
at Mawson Station*



*Weddell seal at Mawson Station*



*Mawson bust at the Station*



We also checked out the statue of Mawson, which made a lovely photo with the ship in the background. Then we had a tour of the old Mawson buildings, including the heritage listed Carpenters hut. This hut had originally been on Heard Island, and was moved to Mawson in the 50's. The roof of this hut is evidence of the men-only days of Antarctic exploration and science...it is covered with playboy centrefolds from the 70's and 80's. And being heritage listed, the pictures stay. The back part of the hut had been used to service the dog sleds in the days when dogs were used in the Antarctic (they have not been used since the early 90's). They also used this hut to make their home brew...and it still smells of home brew! The buildings haven't really been used since the early 90's, when the new buildings were constructed.

Then it was off to  
the red shed and to  
the bar to meet  
some of the 'locals'.

I tried their home brew, which was ok. Only four women out of 40 people are staying on the Station, whereas on the ship, there are a lot of women. The difference is mostly because most of the people are tradies (tradesmen) on the station, while on the ship, other than crew, it is all scientists. Most of the people will be coming back with us later on in the voyage. It should be a very interesting 10 or so days to get back.

But that is a month away; we still have our oceanographic program to go, out at the Kerguelen plateau (which is near Heard island and in some of the roughest seas in the world. Oh boy, I can't wait!).

We left Mawson on the afternoon of the 6th. Our little holiday was finished after dinner, when we went back on watch.

If you recall, when we headed for Mawson we had seen the biggest swarm of krill for the whole trip. The buoy that we left to mark where it was, was supposed to be sending a signal of its whereabouts: but it did not work! So the best we could do was guess where it might be, and see how we went. Between the whalos, birdos and the Captain and the Mates we scanned the seas until, "ahoy, thar she is" was called out. And sure enough, we'd found the buoy.

## February 7 & 8

grey skies are  
clearing  
put on a happy  
face

The morning of the 7th, our first full day of watch since reaching Mawson, started with an ominous feel. A snow fog rolled in, and it was not worthy of a two person watch. But, grey skies are clearing, put on a happy face, by mid-morning it was good viewing. After a few unidentified whales, we had 4 sightings of fin whales. One pod passed right in front of the ship, it contained four large fin whales. The largest pod we saw had at least 9 animals, all fin, at its closest it was 1/2 a mile away. Then some individual minkes.

There were several flocks of Antarctic Petrels, some on icebergs, others on the water, and others in the air. It was fantastic seeing them all around the ship, flying quite close. And we saw some speccie bergs. Some jade bergs and blue bergs. Some light mantled sooty Albert Ross' were about too, three at once at one point. Lots of wild life. Terrific day! It was overcast, but not in a grey and gloomy way.

The 8th was relatively quiet. There was a bit of snow about in the morning, which was lovely, but it melted away before breakfast. I saw a humpback whale, swimming quite close to the ship in some brash (small area of mushy and broken up ice). At about that time the ship was slowing and turning to deploy some acoustic equipment, and would you believe it, we nearly ran over the whale - It was so close!

We got some good ID photos. The humpback whales we are seeing in this area are 'Area 4' humpbacks, which migrate up the west coast of Australia. Area 4 is an International Whaling Commission (IWC) term.

From the whaling days, Antarctica was divided into several areas, which seem to coincide with humpback whale populations. The east coast Australia population is from Area 5. The photo ID shot can be compared to photos taken in other areas, and other latitudes, to see where the whales go. Later in the day I saw a pod of 6 fin whales puffing away in the distance. The team also saw some humpbacks. One group was rolling about at the surface, but I did not see. Then we saw some more fins and humpbacks, so the day ended quite well. Lots of sightings.



*Tabular Berg*

## February 9 - 12

**February 9:** We rolled. Big seas! So I played Settlers of Kartan in my break. No whales.

**February 11:** Last two days same as the 9th, but with one minke whale. This evening we had a spot of folk dancing. It was such fun! And I played a game of darts too...I even hit the bullseye! I am making lots of friends. The girls have decided to throw me a Hens night in a couple of weeks. That should be fun. It is an excuse for some fun.

**February 12:** The sea has settled down, and while the sea state is still 4, the swell is negligible. A tubular berg sits on the horizon. The sun shining upon it, through the overcast sky. We had three unidentified whales. A thin layer of snow and ice covered the ship until late morning. The ice was a bit precarious! The snow makes the ship look very lovely...much nicer than the faded red and green.

February 13<sup>th</sup>



A nice day, the last for krill. The last two days have seen the most krill for the whole voyage (and we are not in the 'krill box!'). This morning we saw a minke, really close, and a killer whale, fairly close (but not able to photograph it). We have done several trawls and even videoed the swarm with an underwater camera. After lunch we headed north-east for the Kerguelen Plateau. Not long after lunch, about 2:30 PM, an awful whiff came into my nostrils. I did not know what it could be, it was very fishy!

Vic recognised it, and when he saw a long oily slick on the water he was certain: We were whiffing the remains of a killer whales kill. A few birds were hanging around the slick, perhaps feeding on the dregs, but there was no obviously dead stuff floating at the surface. We spotted a few whales after lunch, but then came 3pm:

We were changing over shifts when it was one blow after another, a pod of 10 fin whales in the distances. We rushed into position, and straight away spotted a second pod of two fin whales. Then a third pod of possible humpbacks, then a minke really close to the ship. At that point, just 15 minutes into the shift, it was decided to go off effort, and launch the FRC (Fast Rescue Craft) with our biopsy crossbow and photo id camera manned by Vic and Paul. Shannon and I were on Monkey Island (the flying bridge) directing traffic. There were at least four pods each of humpbacks and fin whales scattered around the ship. We got 2 biopsy samples from humpbacks and 4 from fin whales (2 each from 2 groups). INCREDIBLE! There were some amazing bergs about too.

And did I mention that it was an almost 100% clear blue sky, with a sparkling blue sea? We could not have asked for better conditions. Most of the people on the ship came up to take photos and have a look. Most pods were a fair way off, but some were close. In particular a pod of humpbacks, with 2 or 4 individuals, pec slapping (slapping the flippers) for 15 minutes or so. Too far for speccie photos, but I took them anyway!

## February 14

**February 14th:** We are steaming north east toward the Kerguelen Plateau, on oceanography time. We will be deploying several moorings that will stay in the water for two years measuring current rate and direction and some other stuff. We will also be doing several CTDs. In the evening, starting with a BBQ dinner in the heli-deck, there was a party. The purpose of the party was to celebrate the end of the krill survey, the start of the oceanography work and the excellent day we had yesterday. We also used it to shave several heads for charity. Every year the Aurora Australis raises money for Camp Quality, the traditional money maker being the head shaving. We will have another one on the way home, when we have picked up the people from Mawson and Davis...who usually pledge big. Everyone decorated their head, by wearing a funny hat, dying it or plaits, sticking things in it...it was lots of fun!

Summary of  
research being  
conducted on the  
ship Feb 15 - 25

We are in the furious fifties, where cold air from the south meets the warm air to the north, and they dance a sometimes violent and passionate dance. Each battling to outdo the other, they twist and turn, lifting the sea and sweeping across it, leaving it white and raging.

The Oceanography section of the trip is also the bad-weather-guaranteed part of the tour! It involved deploying 8 moorings, which we were able to do before really bad weather. They have several pieces of equipment which will gather information for the next 2 years. Each mooring has 3 or 4 current meters, at 1000, 2000 and 3000-4000m depth. The moorings get progressively deeper down a slope; the shallowest is 2334, the deepest nearly 4856m. They are spread in a line over a 250 km distance. The current meters measure current (how about that!) and the other pieces of equipment measure temperature, salinity, and other water variables that are useful for greenhouse studies and changes over time. It is very important information, for 'state of the environment' type studies, and allows industry standards and limits to be projected. The ocean absorbs carbon dioxide from the atmosphere. It is a scary thought to know that since industrialisation we have doubled the amount of maximum CO<sub>2</sub> in parts per million (ppm) in the ocean.

The level of CO<sub>2</sub> does fluctuate over time, over the last 450 years ranging from 175-275ppm (they can tell this from trapped air, of known age). In 2001 the level was 375. If we continue producing CO<sub>2</sub> at the current rate, by 2010 there will be nearly 675 ppm. It makes a very dramatic graph! In terms of global warming, a similar scenario occurs. Around the time of industrialisation, average global temperatures began to increase beyond levels of previously recorded maximums. Studies like this oceanography study can explore the potential problems associated with such increases. Obviously if one aspect of an ecosystem is altered, the equilibrium is lost, this may or may not be detrimental, but it certainly leads to change.

When talking of the global ecosystem it is very complicated. It involves everything (and everyone).

February 15<sup>th</sup>

We were in very ordinary conditions until lunch time, when we were able to go onto full effort. There had been a few unidentified and fin whales after lunch, and a pod of 8-10 fins (on my shift) just before dinner.

I got an email from Andrew today of particular note:

We are getting married on March 22 at 5pm. How about that! We will move to Seattle a few days after.

February 16<sup>th</sup>

The weather was not good enough for full watch, but we did see some fin whales and unidentified ones too. Lots of stopping and short stints of steaming as we deployed moorings and did CTD's.

February 17<sup>th</sup>

At 5am we were all rudely awoken by a 45 degree roll. Anything that wasn't battened down was thrown about...including the captain who was thrown from his bed! The captain hurt his ankle. There were many smashed things, in some of the labs as well as the cabins. I'd become quite complacent after the calm seas of Mawson, and a few of my belongings were thrown into the corridor. Getting up to retrieve these items I found myself surfing across the cabin (I am amazed I did not get carpet burn on my feet!)...no harm done. I have now become ship shape again! The seas were very big, and the winds over 30kts, so we abandoned our posts for the first time in the survey area (Mawson was not in the survey area) keeping a monitor on the weather every hour. The ship was waiting out the weather. By the afternoon the weather had improved enough for an incidental watch. We saw what could have been a fin whale.

February 18<sup>th</sup>

The weather was greatly improved, and we commenced full watches from the flying bridge again. And much to our delight we had 7 sightings by mid-morning...can you guess what they were?

That's right! Fins and unidentified whales. We were steaming most of the morning, and dropped moorings and did CTD's throughout the day.

February 19<sup>th</sup>

Nothing, not a- one. The sea state picked up and we were CTDing.

February 20<sup>th</sup>

We awoke to a sea state 9. Although the swell was not huge, we were hove-to, waiting out the weather, as up to 50 kt winds blew. The decks were declared out of bounds. At one point the sea state got up to a 10. The sea state scale only goes to 12. We were not on effort this day; we just did hourly weather checks. As you can probably guess - no whales were seen today.

February 21<sup>st</sup>

The sea state had dropped to a 6, and we were able to start the oceanography work again. The weather continued to improve through out the day...Today I decorated two polystyrene (CFC free) cups. Everyone is allowed to do two cups to send down with a CTD. Below 1000m the ocean pressure forces the air out of the cups, compressing them into thimble sized cups. The pictures shrink, but retain the shape. Kind of like putting a chip packet in the oven to shrink.

## A Surprise Hens Night

Then at 7pm the girls on board threw me a surprise hen's night. It was a bit of a laugh, and I played along without losing my dignity.

I had to do a scavenger hunt, whilst dressed in a 'wedding dress' being assisted by my bridesmaids. They were wearing matching outfits made from garbage bags! I was wearing issued yellow overalls with bows and a garter pinned to it. They put daggy make up on me. I had a cheesecloth (rag) veil and a headband of feathers, and some very well made paper flowers. Once we had collected the things on the list, we had a girls-only party. Except that my 'mother in law' was a man dressed as a woman! Then a bit later my 'mother' turned up...another man. We played pin the dude on the (almost) nude...mmmm....then two more men turned up to be the strippers, delivering telegrams. One of the telegrams was from 'Bryan Adams' (I mentioned that I had a few Bryan Adams albums the other day. Should have known such things would come to haunt me!).

Then another man (dressed as a man!) came to remove the garter...with his teeth! I was terribly embarrassed, and made sure the garter was low to start with. It was all in good fun though. After that we let the boys join in the fun, and people got to dancing. If the party hadn't been in my honour I would have left earlier, but as it was I was there until 1. I started work at 6 the next morning. Good thing I am not a drinker. I did enjoy myself, and it was nice being centre of attention.

Shannon (my cabin-mate and fellow whalo) made a beautiful card for me, and everyone on the ship signed it (and I was oblivious to all these preparations, over the last few days). Everyone wrote really nice messages.

February 22<sup>nd</sup>

More CTD's and much improved weather...at least until 10am. When we saw the sea state start to increase, eventually to an 8, with winds over 30kts. The joys of the furious fifties!

My cups went down on the CDT today, but there was a hole in the bag, and they escaped. This is tragic for two reasons: one I lost my cups and two it adds to the pollution into the ocean, even if it is in a minor way. So I made one more cup to go down. I am going to give it to my nephew, Zephyr.

February 23<sup>rd</sup>

This day was all steaming until dinner time and was good enough weather for a full watch, so it was great for the whalos. At first there was too much swell to be allowed on to the flying bridge, but after breakfast it was fine. Still a little rolly, but not too bad. We had 8 sightings by dinner time, when we reached our destination: mooring site #8, where we were to do CTDS. Most of our sightings were unidentified or unconfirmed identifications as the swell made them difficult to keep an eye on, and they were not staying at the surface. Otherwise we saw fins (surprise surprise). My cup went down on a CTD and came back a little misshapen, but small and novel.

February 24<sup>th</sup>

Not much swell, but a sea state 5...which means incidental watch. A CTD was completed soon after watch began, and we began a 30nm steam to the next site...so we hoped for improved sea conditions. Despite the bad sea conditions we were visited by a humpback whale during a CTD in the morning. It was quite close...very exciting, particularly given the lack of whales over the last week. We started seeing icebergs again, as we are now heading south again. Joy! Something to look at.

February 25<sup>th</sup>

Lots of bergs, well, several bergs dotted around. We are back in the sixties, and with the furious fifties behind us the sea is somewhat calmer. A beautiful sunrise and three whales in the first hour. Then the sky went black, for a bit, making the world look ominous. The sea state was unfortunately a 5, so we were on one person watches throughout the morning. The afternoon gave us good conditions and we went to full watch. Almost 8 hours to the minute after seeing our last whales, we were treated to a pod of 12 hourglass dolphins.

Then, minutes later, a humpback whale cruised past, a made quite a splash! THEN - More hourglass dolphins (8) 10 minutes after that! These three sightings were all really close to the ship too. After four more hours (during which we had dinner and did a CTD) it was getting towards the end of the day, the light was fading, when Vic cried "There's something out there!" It was several something's in fact, 4 humpbacks feeding. Through the binoculars I saw the head of one come out of the water with its mouth open...showing the baleen plates. Awesome! They were very surface active. What a way to end the day.

We continue to move south, as we make our way to Davis, making CTD stops every 40nm (2.5 hrs). We are due to pick up the fine folks from Davis on Sunday morning (2 March). We will be picking up 28 people in Davis, and 40 odd from Mawson. That more than doubles the number of people on board. Shannon and I will be moving from our four berth cabin into a three berth cabin with another girl, before we get to Davis.

Our return date is no longer the 15th. It is the 18th, possibly the 19th. It is weather dependant, time dependant, fuel dependent, and even food dependant. While we have enough chocolate biscuits to feed a starving nation, we are almost out of bread, milk and flour...you know, just the basics! We will be getting some supplies from Davis and even Mawson. Usually it is the job of the Aurora Australis to give food, not take it. Several someone's did not add up the figures for this trip...first the fuel, now the food!

February 26<sup>th</sup>

It started with calm seas and a full but fruitless watch. We were travelling through the abysmal plains. Throughout the morning the sea state picked up. We did several CTDs. After lunch we had a game of hacky sack, and watched as the wind rapidly picked up to 40kts and the sea state to 9. We went onto hourly checks then. In the evening we had folk dancing, probably the last for the trip. We do the dancing in the bar, and once we pick up the extra people, it will be impossible to take over the bar. It was a good laugh and a lot of fun. We did lots of fast dancing, and when combined with the ships roll, it was very funny!

February 27<sup>th</sup>

Hove-to, waiting for calm weather. Just as we thought we were away from bad weather, having left the furious fifties behind us.



February 28<sup>th</sup>

And so it was that  
on February 28<sup>th</sup>  
2003 | saw an  
aurora australis  
from the RSV  
*Aurora Australis*

The weather improved considerably throughout the day. The sky was fairly clear. There was a nice spattering of icebergs. In fact by the late afternoon it was perfect whale spotting conditions. But do you think we saw any? no! It was dusk when we finished for the day (about 9:30). We had a cuppa, people were being pretty quiet. I went to the bridge to see if the sky was clear, and I saw that some stars were coming out. Stars! I had not seen stars since Hobart. So I put some warm gear on and ventured outside. It was so peaceful. Just me, in the growing dark. The ship pushed its way through some thick brash, just a narrow band, a promise of things to come. I watched as familiar constellations appeared, the Southern Cross, bright and proud; Orion (the Saucepan), faint but distinct. And I saw a faint and wispy cloud stretched across the sky, covering Orion. It was greenish, or so I imagined. I mused that it was an aurora, but it wasn't until I was joined on deck by another spectator that it became apparent. Before long there were several people on deck, all scattered, enjoying the phenomenon in silence (for the most part). Soon after people started moving out, and as it got darker, the aurora australis began to shimmer and twist, it widened and shrank, became greener, then whiter. Then it did a most wondrous and phenomenal, spectacular and awesome dance in the sky. Waves of magenta raced across the wisps of white and green, the bottom faintly orange. It claimed almost the whole sky, seeming powerful and delicate all at once. One spectator described it as a night time rainbow, the colours were so impressive.

I don't know the science behind the phenomenon (yet) but as some of you may know it has something to do with the magnetic poles. Apparently the closer to the magnetic poles the more impressive the auroras are. In the Northern Hemisphere the auroras are called borealis, in the Southern, australis. Perhaps this year I will see the borealis too.

March 1<sup>st</sup>

We awoke early, the keen whalos that we are, with the excitement that we would be crashing through ice this morning, as it was foretold. But, alas, the ship stopped for a CTD, in open water, and it was foggy. The sea was calm, the wind was gentle. If the fog lifts, it will be a perfect day. A large weddell seal investigated the ship during the CTD.

Mid-morning I went on an engine rooms tour. It was very interesting to see the workings of the ship. There are two engines (a V16 and a V12), but we usually only use one (V16). There are lots of pipes and pumps and bright buttons. The chief engineer showed us around. His name is Roger. The engine and various pumps and tanks that keep us running take up three levels. The shaft that turns the propeller is really thick, more than 1/2 a metre. It is very long too. The gear box is at one end, and the propeller at the other. The gear box is about 1.5 square metres. We saw the bit that controls the thrusters; it has a hydraulic lift on it and is called a schotell. The thrusters keep the ship in position when we are doing tricky things like CTDs or parking next to another ship to transfer fuel. The ship makes fresh water from sea water using reverse osmosis.

As I went onto watch after lunch, we came into an area of lots of bergy bits and small floes. Very loose, but promising. I saw adelic penguins and another seal. The penguins were porpoising through the water; the seal was asleep on a small floe. The seal did not even flinch as we passed, even though we were within 20 metres of it. The fog was still thick, so the view was limited to less than 500m.



March 2<sup>nd</sup>

March 3<sup>rd</sup>

Also on **March 1** Shannon and I moved from our portside cabin into a starboard side cabin, with Clodagh. The ship will have but three spare beds...err bunks...once we have all the Davis and Mawson people on board. The sea was perfectly calm today...and we were in a perfect fog. From within our small field of vision, during a CTD, we were visited by a large and curious weddell seal. He investigated the ship for over 1/2 and hour. After the CTD we passed through some loose sea ice, brash and growlers. We were still in fog, but we did see fur seals and adelic penguins on the ice floes. After a game of hacky sack, the fog miraculously, and suddenly, disappeared. It was a case of now you don't see it, now you do! It was not long before we started seeing whales. We saw several pods of humpbacks and minke whales. Then we attended an 'end of the science' evening. This started out as a very sedate evening of chatter and background music. But the music slowly got turned up, and switched to dance music. It was a good night...the last before stage one of our inundation.

We arrived at **Davis** in the morning. There was no opportunity for a jolly, but we were not expecting one anyway. Davis is not nearly as spectacular as Mawson. It is all brown rock. No ice, no snow, no mountains. It looks very bare and drab. What it does have is an elephant seal colony. Apparently Davis base is good for long walks, as the lack of snow and ice make more area accessible. We helicoptered the 28 returning Davisites on board, along with a few supplies. We also got to keep the helicopters, which had been at Davis. We had a game of hacky sack on the helideck as we departed Davis anchorage, the winterers set off flares of farewell for their departing friends, who were all on the helideck having a cider and waving goodbye. So ended stage one of the inundation. At Mawson we collect 40 odd people.

We are well on our way to Mawson, due to arrive on the afternoon of the 4th. The sea state is high, but the first watch saw 5 pods of humpback whales. And then that was it.

March 4<sup>th</sup>

We saw a  
Solar Pillar

At 4:30 am (Mawson time) we were at the top of Ice Berg Alley, of course I was sensibly asleep at this time, and it was dark. Sunrise was at 6:30, and I was up on the bridge before then, watching and taking pics. We saw a Solar Pillar. Apparently they are rarer than a solar halo. Of course, I don't know how common a solar halo is. The solar pillar was pinky-orange, and was a broad, not too tall band stretching into the heavens from the sun, which was just below the horizon. Being iceberg alley, there are lots of icebergs, mostly at a distance. On our portside they are silhouetted by the sunrise, on our left they are sparkling with the reflected sunrise. Beautiful. The sea is calm, it is partly cloudy. Beautiful. There will be no jolly at Mawson; we will be in Mawson harbour overnight. Assuming all goes well, we will leave Mawson on March 5th in the afternoon, and head for Hobart, maybe stopping for three CTDs along the way, if weather, time and fuel permit. We saw a few whales as we passed down iceberg alley, including a minke, quite close. We arrived at Mawson mid-morning, and the katabatic winds were low enough for us to enter the harbour. We moored and began operations. Stage two of our inundation would begin the next morning. In the evening we had some folk dancing in the helideck. Without roll the dancing loses some of its appeal, but it is still a lot of fun. Some of the Davis people have joined our little dancing troupe.

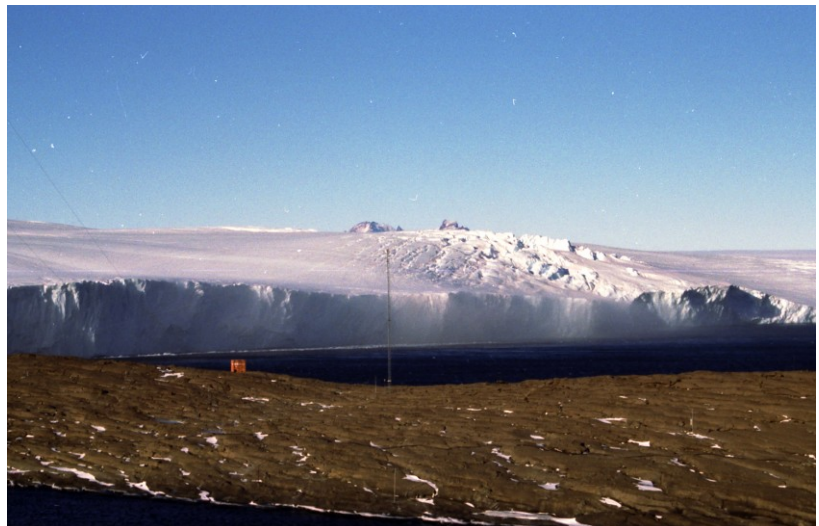


*Solar Pillar sunrise*

March 5<sup>th</sup>



I awoke earlier (for some one who was able to sleep in, as we were not working) to beat the rush to the cheaper phone access. Andrew was in Melbourne, so with crossed fingers I dialled his mobile number. He answered, Hurray! I wished him a happy birthday for the 6th and told him that as of this afternoon we are on our way home! I am very ready to be home, given the exciting times ahead...marriage, moving to Seattle...but it is such a beautiful day at Mawson it is sad to leave. I am sure that once the continent is out of site and the inundation is obvious, I will be wishing we were home already. I ventured outside into the -10 degree Celsius temperatures and 25 kt winds to see Mawson shining under a clear blue sky. Fog was rolling off the ice and a snow cliff, the wind turbine was turning against the blue sky. It was glorious! Meanwhile stage two of the inundation was well underway.



Goodbye  
Antarctica

We left Mawson at 2pm. We began full shifts, in the -6 degrees of the flying bridge. It was still a beautiful clear day, very little cloud. The Sea state was 4, which is lots of white caps, but good enough for full watch. However, we saw but one unidentified whale. There was iceberg after iceberg, as we were going through iceberg alley. One berg had some penguins on it, close enough to the ship for a good photo (well at least I hope it is a good photo...) The bergs were sparkling in the sunshine, the sea was blue. There were jade bergs and part-jade bergs and bergs with that perfect blue streaked through them.



Goodbye Antarctica, with your pure whites and katabatic winds.  
Goodbye Antarctica, with your brown rocks and mountain peaks.  
Goodbye Antarctica, to your penguins and seals. Perhaps one day I  
will return again to your shores.



March 6<sup>th</sup>

Dawn was dulled by the cloud cover, but the sea was calm and there was a sense of peace. It was -6 on the flying bridge. We saw a few whales today, humpbacks and fin. Just before dinner we were called off watch for the 'King Neptune Induction Ceremony'. All first timers to the Antarctic were inducted, in what I am told was a sedate version of the usual ceremony (given some sensitive newcomers). We were introduced to the people on board (nearly all 136!) and something was said about us. For me it was "Catherine's getting married" and then everyone cheered "Andrew!" It was Andrews birthday today too, so that was very excellent! We were then swiped with vegemite and required to kiss Neptunes foot and an 'Antarctic trout'. Eeewww, I am not sure what was worse, Neptunes vegemite smeared foot, or the vegemite smeared fish!

March 7<sup>th</sup>

The sea state was 5, so it was one person watches all day. So today was very relaxing. We did have a few busy moments when several large pods of fins and humpbacks (what else!) were spotted.

We are now well on our way home, with the ETA sometime on the 18th.

We will stop for hopefully three CTDs on Sunday March 9th; it all depends on the weather.

March 8<sup>th</sup>

Today the sea was calm. Overcast it was, but not so dull and grey, the clouds were high in the sky. By 7am we had seen 4 pods of fin whales. During breakfast, three killer whales, a bit later some humpbacks, then after lunch 4 more pods of fin whales. After 2pm, there were no more sightings, but it remained very pleasant on the flying bridge. We were travelling 14 knots, with an 11 knot wind behind us, which meant a breezy 3 knots head on. Very comfortable, and a barmy 0.5 degrees.

On the evening of the 8th it was time to raise some more money for Camp Quality, which meant that a few more people lost their tresses. One was a girl, who now looks like a 12 year old boy! She doesn't look too bad with short hair, but she had very thick lovely long wavy hair.

March 9<sup>th</sup>

CTD day. And a sea state 5-8 during the day. Luckily for the oceanographers the weather did not get so bad that they could not do the CTDS. The wind was over 30 kts, and there was some swell, but it was not too bad. We would have been on one person watches, even if the ship had have been steaming. No whales.

March 10<sup>th</sup>

The sea state is a 7, but the wind is behind us, pushing us along. We are steaming along at about 14.5 knots. No whales. It was a partly cloudy evening, quite warm outside (a few degrees) and relatively still (the wind behind us, almost matching our speed). There was an aurora, not as spectacular as the night of February 28th, but nice too see. It was really just a green cloud, but for a little while it expanded into a dense white streak across the sky, that was awesome!

March 11<sup>th</sup>

We advanced our clocks one hour over night, we are now 4 hours behind home. We saw the sun today, and it was a balmy 5 degrees. Many people were out on the decks looking for a sunny spot on the deck to read or chat. We played hacky sack on the helideck. The sea state was 5 for most of the day (which is one person watch), but in the afternoon it dropped to 4, so we were able to do a few full watches from the flying bridge. It was very pleasant, but we did not see a single whale, not even a fin whale. Our progress is looking good for an arrival early on the 18th.

March 12<sup>th</sup>

We advanced our clocks another hour over night, we are now 3 hours behind home. No whales. Fog, drizzle, sea state too high. Ho hum. The ship is very hot. Outside is 6 degrees. Apparently it has been raining in Hobart for three days. We crossed the Antarctic Convergence today.

March 13<sup>th</sup>

We advanced our clocks another hour over night, we are now just 2 hours behind home. During the morning we crossed the 50 degrees line. We are now in the roaring 40s, and 8 degrees, 1300 nm from Hobart. We are somewhat under Western Australia, travelling ENEish. We are going about 14 knots. It is nearly 8 degrees outside, that is positively tropical. The ship is very hot. too hot! But it is nice outside, as long as it doesn't rain. On Saturday night (15th) we are having a 'tropical slumber party'...mmm.

March 14<sup>th</sup>

We are but one hour behind now. We passed through the antipodes for Seattle today, the equivalent latitude at least. It is now 10 degrees, but it is still very windy, and we saw no whales. We are about half way the distance across Australia, underneath South Australia and the Great Australian Bight.

March 15<sup>th</sup>

Another whale-less day. We are on Hobart time now, and a mere 400nm from dock. We are within the Australian EEZ (Economic Exclusion Zone), which is up to 200nm from the coast. This evening was the final official party on board. The theme was 'tropical slumber' so there were a mix of Hawaiian shirts and pyjamas. The marine science expeditioners (those that have been on the ship since Jan 3rd) were presented with certificates of merit, for example, I was given the 'maid of honour award', in light of my upcoming nuptials. Each certificate was made to reflect something significant

March 16<sup>th</sup>

Finally some beautiful weather! A partly cloudy day, and whilst still windy, was good enough for a hopeful full watch. Paul saw what he thinks were beaked whales, but that was it, and nothing exciting, but it was something, after a week of no whales. Perhaps tomorrow we will see more, as we will be over the continental shelf. In fact we will be crossing the continental shelf this evening. This is a pity, in that it will be dark, and we may miss many sightings, as the continental shelf is a popular hang out for sperm whales.

The moon rose 15 minutes before the sunset tonight and even though it was partly cloudy, the evening was amazing! The wind was head on, and quite strong, but I ventured up to the flying bridge to watch the almost full moon. How beautiful! No one else was on the flying bridge. I could have been the only person in the world! And it was a lovely night for a moon dance, so I danced in the light of the moon, with wind head on I felt like I was flying! I stood with my arms held high; feeling exhilarated by the wind as it rushed passed me. This was my last night before seeing Australia, and green land, again. What a way to end a magnificent voyage.

March 17<sup>th</sup>



We arrived in Storm Bay, just outside the Derwent, during the night and prepared for an afternoon disembarkment. We were treated to a sunrise which revealed the trees of Bruny Island and Mount Wellington could be seen in the distance, with Hobart nestled beneath it. We were a day earlier than expected.

Our final meal aboard was lunch, and it was during this meal that we had our first visitor from Australia. A fly. A simple little fly. For the people who had been on bases for 16 months, this was amazing. Normally a fly during a meal causes waving hands and sounds of disgust, to various degrees, but not at this meal. Awe. Wow. The first insect in such a long time.

Customs came aboard and we docked at Macquarie Wharf 4, the Polar Bird was also there. For the second time in 6 weeks, we shared a mooring with Polar Bird. The Polar Bird will never return to the Antarctic, she is bound for the warmer waters of the Mediterranean, where she will be a training ship. There is no ice for her to get stuck in there!

A lone bagpiper piped as we docked. There were some tears and cheers, children calling out to their parent, waving and kisses being blown.

The full moon  
had risen over  
the city as if in  
welcome home

Once docked, our bags were taken off the ship and we had to put them through the x-ray machine. Then we were allowed to depart. As you can imagine, once I touched the dock, I wanted to go home. So I said my goodbyes, collected my voyage t-shirt, and got a lift to the airport, where I brought my flight forward, and arrived in Canberra at 9pm on Monday night. I flew home via Sydney. Our arrival into Sydney airport was at dusk, and what a sunset! We flew over the Southern highlands, a sea of green, with sparkling splatterings of water. A wonder! The horizon was blazing with the pink-orange sunset, and the lights of Sydney were twinkling beneath us. So much movement and activity. Cars stopping and starting along the intricate web of roadways, all brightly lit and purposeful. There are more people within one square km than I have seen in 1000 square kms for 10 weeks. The full moon had risen over the city as if in welcome home. It could not have been more beautiful!

I went for a moonlit walk with Andrew along the lake after I got home. Cicadas were chirping happily, the air smelt fresh and green. The air was thick. The ground felt soft under my feet. Not hard like the metal of the ship and the ice and rock of Antarctica.

March 18<sup>th</sup>

Day one on the mainland revealed a Canberra newly green after heavy rains. The fire scarred landscape is awash with new green shoots, giving a sense of hope and rejuvenation. This was a day of marvels. Insects, spiders, birds, barking dogs, people, traffic, fresh fruit, fresh vegetables!

March 19<sup>th</sup>

The integration  
back into  
civilisation  
is completed

After awaking to the delightful sounds of birds, it was time to get busy. First stop was the Tuggeranong Homestead to finalise the meal for Saturday night, the Wedding night! Then it was off to Queanbeyan to meet the celebrant, sign some papers and see if our vows were acceptable. Then it was lunch with dad, and transfer of Andrew's car to my Dad, who has purchased it, then pack and repack the luggage for the big move. And so forth and such, welcome back to the hustle and bustle of civilisation. We dined with my cousin and my Nanny this evening. Glorious home cooked meal!

It feels as if we were on the ship for years, and yet the time also seems to have gone very quickly.

## The Colours of the South

The senses become heightened at sea. For one thing, smell. There are so few smells on the ship, that each smell is intensified.

Apparently as we get close to Tasmania, the smell of eucalyptus is very strong. A smell that we did not notice as we left, but on our arrival I noticed the thickness and the stickiness of the air more than anything else. On the continent, the main smell was ice. Cold nothingness, a fresh and pure scent. And sound. On the ship there is the constant droning background noise of the engine. The buzz of computers. Chatter of people. The screech of the CTD, the thrusters roaring. The only natural sounds we have heard have been whilst in Mawson, and it was surreal. The mind questioned the existence of such sounds. The penguins squawk, and occasional non-flightless bird crying, the soft singing of the weddell seals. The continent was otherwise silent. After the ship, it was a welcome silence, an intensified and pure silence. If sound and smell can be described in colour then Antarctica is white. The senses are engulfed with the whiteness of Antarctica. It smells white, it looks white, it sounds white. Even the air tastes white. Perhaps even the touch of it is white. Pure, clean, incorruptible. What an experience. And yet I longed to have my senses flooded with the greens of the world. If white for the senses is pure and incorruptible, green is the rebel of colours. Green is so varied, so dynamic, in its intensities and its personalities. Both green and white give a sense of peace and satisfaction, but in very different ways. It is so hard to explain the wonder of nature. The natural world fascinates and stimulates the senses.

--And so ends another chapter in the Book of Catherine. Perhaps the next Chapter will be called "Lets get married and move to Seattle - like this weekend, eh?"



Catherine Bell is a cetacean researcher. She is about to embark on her first trip to the Antarctic, where she will be surveying for whales and seals. The information gathered by the team Catherine works with, will add to years of data and help in understanding the mystery that is Antarctic wildlife.

Andrew is her fiancé. They live in Canberra. While Catherine is away several unexpected things happen. Bush fires threaten Canberra and devastate the surrounding area; Andrew is offered a job in Seattle, an opportunity both he and Catherine have been waiting for, which will require them to move almost as soon as Catherine gets back.

And, he has less than 30 days to plan a wedding...