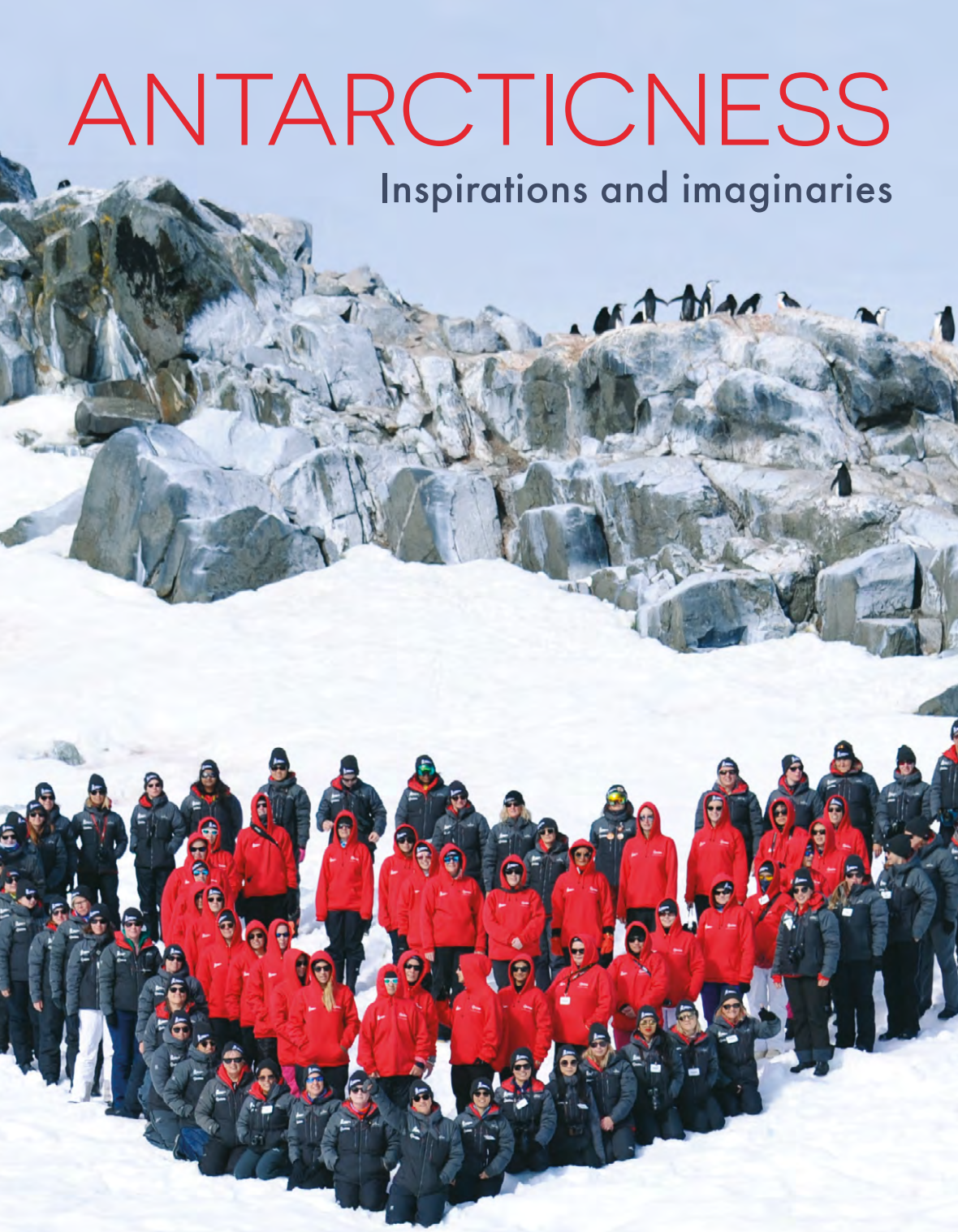
ANTARCTICNESS

Inspirations and imaginaries



Edited By Ilan Kelman

UCLPRESS

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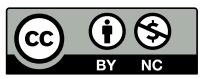

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Mirko Antino holds a PhD in psychology from the Complutense University of Madrid, where he serves as Associate Professor in Methodology for Behavioural Sciences. His main research interests are related to team composition and diversity. Specifically, his work aims to understand how to manage diverse people in order to take advantage of their (diverse) set of competences and skills. His research involves emergency firefighter teams, as well as military and healthcare teams. He is a member of the GLOBE research team (Global Leadership and Organisational Behaviour Effectiveness) and he has also been involved in several teamwork training programmes in private companies and public institutions.

Andrew J. Avery is a doctoral candidate in the Department of History at the University of Kansas, where he researches British imperialism in the twentieth century. He has previously published an article in the *Polar Record* and book reviews through *Reviews in History* and *H-Net*. Avery is also a member of the Scientific Council for Antarctic Research (SCAR), Human and Social Sciences Group.

Kristina Baltutis is a veterinarian with a focus on reproductive medicine and an obsession with the okapi. Her network contains scientists and researchers on the frontlines of conservation, veterinarians inspired to promote responsible population management, and organisations working diligently to protect our world's species. Through the Homeward Bound programme, she is training as the collaborative, inclusive, nurturing leader she aspires to be, and will be connected with hundreds of like-minded women from around the world. Together, she believes we can amend the destructive decisions that have damaged our planet and guide humanity to a conscientious, ethical and sustainable future.

Natalie Barefoot is an international oceans attorney who believes that legal protections should be Earth-oriented, be community-inspired and

respect all living beings. By focusing legal strategies through the lens of keystone species, such as sharks and cetaceans (whales, dolphins and porpoises), Natalie advances protections for wildlife and their ocean habitats. She currently tackles international ocean issues as an attorney with Earthjustice and as a volunteer with Cet Law. Her previous work has taken her to five continents and spanned corporate law, academia, non-profits and international governmental organisations. Natalie loves to spend time with her clients diving, swimming and paddling in or on the water.

Thomas Boothby is an Assistant Professor in the Department of Molecular Biology at the University of Wyoming. His lab studies the molecular, biochemical and biophysical underpinnings of how organisms survive in extreme conditions and how we can harness this understanding of fundamental science to tackle real-world problems such as the development of stress-tolerant crops as well as stabilisation of vaccines without refrigeration.

Elizabeth Bradfield is the author of *Toward Antarctica*, *Once Removed*, *Approaching Ice* and *Interpretive Work* as well as *Theorem*, a collaboration with artist Antonia Contro. Her work has been published in the *New Yorker*, *Atlantic Monthly* and *Kenyon Review*, and her honors include the Audre Lorde Prize and a Stegner Fellowship. Editor-in-chief of Broadsided Press, she works as a naturalist/guide and teaches creative writing at Brandeis University.

James Bradley is a geobiologist and Earth-system modeller, interested in exploring the relationships between living organisms and elemental cycling within extreme environments. He earned his PhD in Geographical Sciences at the University of Bristol, studying soil formation in the High Arctic. He then worked as a Postdoctoral Fellow of the Center for Dark Energy Biosphere Investigations and the Deep Carbon Observatory at the University of Southern California, investigating the survival of microorganisms buried deep within Earth's subsurface. James is currently a Lecturer in Environmental Science at Queen Mary University of London, and a Humboldt Fellow at the GFZ German Research Centre for Geosciences in Potsdam. He works on several ongoing projects investigating the seasonal dynamics of high-latitude soil and glacier microbial communities, and has conducted multiple field seasons in the Arctic and Antarctica during the spring and summer months, and more recently, during the dark polar night.

Sammie Buzzard is a Lecturer in Climate Science at Cardiff University. Her work focuses on Antarctica's ice shelves and the impact of a changing climate on their future stability. Having completed her PhD in the Department of Meteorology at the University of Reading, and subsequent research at UCL and Georgia Tech, she is now carrying out research into ice-shelf surface water and how it may influence ice-shelf collapse and thus potential sea-level rise. As a former president of the UK Polar Network, Sammie has been involved in significant efforts to communicate Antarctic and climate science to the general public, ranging from theatre shows and museum visits to live radio broadcasts.

Daniela Cajiao is a researcher and PhD candidate at the Universidad Autónoma de Madrid, where she is expanding her investigation regarding the social dimensions of Antarctic tourism. Daniela obtained her master's degree in Environmental Management (2010) and a bachelor's degree in Tourism (2005). She has coordinated and provided technical support to multiple projects on conservation and sustainable tourism planning in South American protected areas, particularly the Galápagos National Park, Ecuador. Ever since her first Antarctic visit in 2011, Daniela has been passionate about Antarctica and its sustainable future. Her main interests revolve around tourism, adaptive management and decision-making processes. In 2019, Daniela became the joint first recipient of the inaugural International Association of Antarctica Tour Operators (IAATO) Fellowship for supporting her doctoral research on Antarctic tourism. For Daniela, Antarcticness is about patience and respect that afford the unparalleled opportunity to learn and immerse oneself in this timeless place on Earth.

Anne Charmantier is an evolutionary ecologist educated in France, the UK and Canada, and presently holds a senior permanent CNRS (Centre national de la recherche scientifique) position in Montpellier, France. Her main research interests are focused on understanding the mechanisms involved in the evolution of adaptive traits, especially in a context of rapid anthropogenic changes. Since 2007, she has been managing a long-term blue tit and great tit project, which contributes to her research on local adaptation, plasticity, senescence, ecological genomics and sexual selection. She has pioneered quantitative genetic approaches in wild populations, to study adaptive and non-adaptive responses to climate change and urbanisation.

Wilson (Wai-Yin) Cheung is a Fellow of the Royal Geographical Society, a member of the Explorers Club, and a member of the Scientific

Committee on Antarctic Research Humanities and Social Sciences Expert Group. He is currently a PhD student in glaciology at the ICElab, Queen's University, investigating ice mass loss on Baffin Island. Since 2011, he has worked as a polar expedition and mountain and ski safety consultant for international scientists and visitors in extreme, remote areas (the Antarctic continent and peninsula, Greenland, Kamchatka, Alaska, Norway, Iceland, Canada, the Arctic and the Alps) for more than a thousand field days to ensure a safe wilderness experience for international visitors. The polar regions are part of his life. He has lived in East Greenland with local hunters and learnt their way of living. In each Antarctic season, he spends months in the Antarctic continent and peninsula offering expedition services.

Iqra Choudhry is a researcher committed to working towards the decolonisation of the field of Antarctic humanities. Her PhD research focuses on the previously untouched archives of the Scientific Committee on Antarctic Research and its relationship to the governance of Antarctica through the Antarctic Treaty and its annual Consultative Meetings of the countries who have decision-making power over the continent. She has been lucky enough to attend two Antarctic Treaty Consultative Meetings, giving her insights into the ways in which science is related to Antarctica and to Antarctic politics.

Anna Colucci is a Transformation Manager in corporate sustainability from Italy and has developed her experience thanks to a variety of professional and personal development activities. She holds a BSc in Biology and an MSc in Environmental Management and is passionate about striving to reduce her personal environmental footprint so as to align her working environment to her personal and emotional life. As a biologist, Anna is passionate about science, as an activist she is motivated to bring change, and as a leader she strives to inspire people to actively engage on the topics of climate change and sustainability.

Carole Durussel became hooked on ocean conservation at a young age and then started her career in the field of marine sciences, working on whale conservation projects. Aware of the importance of linking research to policy to achieve better ocean conservation, Carole undertook a PhD in International Environmental Law and has been working for over 10 years with policy-makers to support science-based decision making for the conservation of biodiversity on the high seas. Carole currently coordinates an international project at a research

institute in Germany and contributes expertise to the global negotiations for a high seas treaty under the United Nations.

Walter Eppich is a paediatric emergency physician and Professor of Simulation at the RCSI University of Medicine and Health Sciences in Dublin. He collaborates with team and organisational psychologists to study team processes both in and outside of healthcare. In 2018, he performed ethnographic field observations and in-depth qualitative interviews in Antarctica to understand what enables research teams to adapt in extreme environments. Healthcare is also characterised by extreme environments in instances of intense time pressure and high patient acuity. He seeks to delineate the contribution of workplace talk and team interactions to learning and performance.

Amie Figueiredo is an experienced development practitioner having worked on environmental policy, sustainable development, urban development and housing at the United Nations in Latin America, Europe and Central Asia and Africa. She thrives as a connector, fostering collaboration, cooperation and synergies across disciplines such as environmental and political science, economics, international development and social justice, to show interlinkages and the need for inclusive decision making. She does this through community capacity building, technical policy assistance to governments, and the implementation of cross-disciplinary projects on development issues. She is also passionate about local and global issues affecting the lives of women.

Christiana Figueres is a Costa Rican citizen and was the Executive Secretary of the United Nations Framework Convention on Climate Change 2010–16. During her tenure, she brought together national and sub-national governments, corporations and activists, women's groups, scientists and spiritual communities, and financial institutions and NGOs to jointly deliver the historic 2015 Paris Agreement on Climate Change. Under this agreement, 195 sovereign governments decided on a collaborative path to limit future global warming to well below 2°C, and strive for 1.5°C in order to protect the most vulnerable in every nation. For this achievement, Christiana has been credited with forging a new brand of collaborative diplomacy, for which she has received multiple awards. Since then, Christiana has continued to foster rapid action on climate change. She is the co-author of *The Future We Choose: Surviving the climate crisis* (2019) and co-host of the podcast *Outrage and Optimism*.

She sits on the Board of ACCIONA and Impossible Foods. She is a graduate of Swarthmore College and the London School of Economics, and has been awarded multiple honorary doctorates from academic institutions such as Yale, the University of Massachusetts, Georgetown and the University of Edinburgh. After decades of living and working abroad, she has recently moved back to her beloved Costa Rica.

Ellen C. Frye studied at the University of North Carolina, Chapel Hill for her undergraduate degree in Spanish and completed her PhD in the Literature of Spain at the University of Pennsylvania. She is a tenured professor at William Paterson University of New Jersey, and her field of specialisation is Renaissance and Baroque literature of Spain. Ellen's sub-specialism is seventeenth-century theatre, specifically the actor–spectator relationship as established and enhanced by dramatic devices, including the aside, soliloquy, monologue and metatheatre. For several years, she has also been researching the literature of Antarctica, with special emphasis on religion and spirituality.

Virginie Galindo earned her PhD in Oceanography at the Université Laval, after which she was a postdoctoral researcher at the Centre for Earth Observation Science (CEOS) of the University of Manitoba. Virginie is doing a second postdoctoral contract at the Université du Québec in Rimouski, where she is studying the spatial and seasonal distribution of microbial communities in coastal environments of James Bay.

Stephanie Gardner is an ocean advocate born and raised in Sydney, Australia, with a lifelong passion for the marine environment. She has a PhD in Marine Biology, specifically coral physiology, biochemistry and microbiology, focusing on how corals protect themselves against environmental stress caused by climate change. She currently works as a Postdoctoral Research Associate at the University of New South Wales in the Centre for Marine Science and Innovation. Her research involves experimental design, fieldwork, lab work, data analysis, manuscript preparation and science communication to understand how we may expect reefs to look and function into the future from a microbial perspective. Her ultimate personal and professional dream is to raise awareness of and diagnose the problems facing reef ecosystems today and expected in the future in order to safeguard these vulnerable marine ecosystems.

Madeleine G. Hann is originally from the Shetland Islands, but grew up in northern Norway and northeast England. She is a geologist, geographer and feminist. In January 2019, Madeleine joined the third team of women in STEMM (science, technology, engineering, maths and medicine) to voyage to Antarctica as part of Homeward Bound. Madeleine's research focuses on high mountain-river environments and how they have changed over millions of years. Madeleine graduated from the Royal School of Mines, Imperial College London, in 2017 and finished her PhD in Physical Geography at the University of Manchester in September 2020. She is now a lecturer and researcher at the Royal School of Military Survey.

Adele Jackson is a multidisciplinary environmental artist, an educator, and a researcher interested in the inter-relationships between people, places, culture and nature. Much of her recent work has had an Antarctic focus, inspired by the continent's cultural, geopolitical and natural environments. At the University of Canterbury/Te Whare Wānanga Waitaha, Aotearoa New Zealand, her PhD thesis examined the value of visual artists working in Antarctica.

Rosa Jijón is a visual artist, activist and cultural manager. She won a place on the ARTEA Antarctic artist-in-residence programme from Ecuador in 2013 and stayed at the Pedro Vicente Maldonado scientific station during the summer period. There she developed the *Ice Archive*, a body of work regarding the impossibility of producing a unique image of the white continent and the role of women artists as mediators and translators of Antarctica. She was formerly the Cultural Secretary at the International Italo-Latin-American Organization (IILA). Her artistic projects aim at challenging the production of canonical images from natural, social and political contexts. Objects of her inquiry and visual research are women, migrants, frontiers, borders and landscape representations. Her project *Vilcabamba, Voices of Rivers* with the A4C artistic collective will participate at the 23rd Biennale of Sydney in 2022.

Musimbi Kanyoro is Chair of the United World Colleges and Women's Learning Partnerships and past President and CEO of the Global Fund for Women, one of the world's leading publicly supported foundations for gender equality. She is a social activist and theologian who is globally recognised for her leadership of organisations and initiatives that advance human rights and philanthropy for women and girls. She is a senior advisor to the UN Compact programme Together Gender Equality and a consultant for the UN Women Faith Engagement Strategy. Musimbi

currently sits on the Council of London School of Economics and serves as a trustee of Homeward Bound and a Board member of CARE International. Musimbi received her bachelor's degree from the University of Nairobi, a PhD from the University of Texas, Austin and a Doctor of Ministry from San Francisco Theological Seminary. She was a visiting scholar at Harvard Divinity School studying Hebrew and the Old Testament. Musimbi has received several awards and honorary degrees over many years. In 2015, *Forbes* magazine named her one of ten women 'power brands' working for gender equality. In 2016, she was recognised on the list of 'Forty over 40 – women who are reinventing, disrupting, and making an impact'. More recently, she was named among the 100 people making a difference in gender policy and, alongside Bill Gates, as one of the nine powerful people changing the planet.

Ilan Kelman is Professor of Disasters and Health at UCL and a Professor II at the University of Agder, Norway. His research interest is linking disasters and health, including the integration of climate change into disaster research and health research. That covers three main areas: disaster diplomacy and health diplomacy; island sustainability involving safe and healthy communities in isolated location; and risk education for health and disasters.

Stephanie Langerock is a global citizen with a heart for ocean conservation and equity. Her strong sense of fairness and social justice have led her in both her personal and professional lives. At the age of 18, Stephanie had her first encounter with a couple of magnificent humpback whales in Colombia. This life-changing experience was a stepping stone towards her current role as the Belgian Commissioner for the International Whaling Commission and the Commission for the Conservation of Antarctic Marine Living Resources, where she contributes actively to the conservation of marine biodiversity and ecosystems, including as chair of the International Whaling Commission's Bycatch Mitigation Initiative.

Yu-Fai Leung is a Professor and Director of Graduate Programs at North Carolina State University. His research has been devoted to advancing the science and practice of sustainable visitor (recreation and tourism) management in protected areas, with an emphasis on developing visitor use and impact indicators, monitoring protocols, and methods for evaluating management efficacy. Yu-Fai had the privilege of joining the 2019–20 Ecuadorian expedition to Antarctica, where he conducted field research with Daniela Cajiao on tourist–penguin interactions and tourists'

compliance with wildlife viewing rules. He is also engaged in a study that examines Antarctic tourists' experiential and learning outcomes. He has been a member of the IUCN World Commission on Protected Areas, Tourism and Protected Areas Specialty Group, and has recently become a member of the SCAR Standing Committee on Humanities and Social Sciences. He served as Chief Editor of the 2018 IUCN Best Practice Guidelines on tourism and visitor management in protected areas, currently available in seven languages.

Emma J. Liu is a volcanologist and lecturer at UCL. She specialises in physical volcanology and volcanic gas geochemistry to understand current eruptive processes and past eruptive histories. Emma received her PhD from the University of Bristol in 2016 and completed a Leverhulme Early Career Fellowship at the University of Cambridge before joining UCL in 2019. She was awarded the L'Oréal-UNESCO Women in Science Fellowship in 2018 for her work developing drone-based strategies for measuring volcanic gas emissions. In January 2020, Emma undertook a six-week research expedition to the South Sandwich Islands, a remote chain of sub-Antarctic volcanoes, to explore the interactions between volcanic activity and ecology.

Anna Madlener holds a BSc in Mechanical Engineering from the Technical University of Berlin and an MSc in Systems, Control and Robotics from the KTH Royal Institute of Technology in Stockholm. Originally from Germany, Anna spent a large part of her life growing up close to the Italian coast and now develops underwater robots at EvoLogics in Berlin, an innovative bionic engineering company. A kitesurfer and diver, Anna strives to shape a technological future that is unfolding its potential to support protecting the planet by encouraging engineers to work across all disciplines.

Pedro Marques-Quinteiro holds a PhD in Human Resources Management and Development from the ISCTE – Instituto Universitário de Lisboa. He works as a Research Fellow and Assistant Professor at the ISPA – Instituto Universitário, Portugal. Pedro studies extreme teams such as police tactical teams, urban firefighters, hospital teams and Antarctic teams, using principles from complex systems literature to research team processes and emergent states enabling adaptation during tasks. Recently, Pedro has been involved in collaborations with the Portuguese Polar Programme and the European Space Agency in order to identify success factors for crews on long-duration space missions.

Jean McNeil is the author of 14 books of fiction, non-fiction, poetry and essays, including *Ice Diaries: An Antarctic memoir* (2016), which won the Banff Mountain Film and Book Festival's Grand Prize and was named as one of the best nature writing books by the *Guardian* in 2018. She has been writer-in-residence with the British Antarctic Survey in Antarctica and the Natural Environment Research Council in Greenland, and has undertaken official residencies in the Falkland Islands and the Svalbard archipelago as well as on oceanographic expeditions across the Atlantic. She lives in London and is Professor of Creative Writing at the University of East Anglia.

Dwayne Ryan Menezes is the founder and Managing Director of Polar Research and Policy Initiative, a London-based international thinktank dedicated to Arctic, Nordic, North Atlantic, North Pacific and Antarctic affairs. He is also Director of the Secretariat of the All-Party Parliamentary Group for Greenland in the UK Parliament; Honorary Fellow at the UCL Institute for Risk and Disaster Reduction; Associate Fellow at the Institute of Commonwealth Studies, University of London; Vice-President of *Arctic Today*; and Advisory Board Member of *JONAA, Journal of the North Atlantic & Arctic*. He studied History at LSE and the University of Cambridge, graduating from the latter with a PhD. He then held honorary, associate or visiting fellowships at research centres at Cambridge, Oxford and London. Over the past decade, he has served as Consultant to the Commonwealth Secretary-General, Principal Consultant to a European Parliament Intergroup, Research Associate to a UN Special Rapporteur, Head of the Secretariat of the Yemen All-Party Parliamentary Group, and Founder and Director of Human Security Centre and Think-Film Impact Production. He is a Fellow of the Royal Historical Society, Royal Geographical Society and Royal Society of Arts.

Marc Neveu is a research scientist at NASA's Goddard Space Flight Center and the University of Maryland, College Park. His interests include planetary exploration and astrobiology: the search for the origins, evolution and distribution of life in the universe. He seeks to understand whether oceans on other worlds harbour life by simulating their physics and chemistry, as well as through laboratory and field studies of analogous places on Earth.

Hanne Nielsen is a Lecturer in Antarctic Law and Governance at the University of Tasmania's Institute for Marine and Antarctic Studies. She specialises in representations of Antarctica in cultural production, the

commercial history of the far south, and Antarctica as a workplace. Hanne has spent five seasons working in Antarctica and the Southern Ocean as a guide and now lives in the Antarctic gateway city of Hobart. She is a former president of the Association of Polar Early Career Scientists (2017–18) and a current member of the Executive for the SCAR Standing Committee on Humanities and Social Sciences.

Gabriela Roldan is a social researcher at Gateway Antarctica at the University of Canterbury, New Zealand. Her doctoral thesis discusses the polar associations of the Antarctic gateway cities and how these connections may influence gateway citizens in the construction of an identity with Antarctica. Gabriela's other research interests are in polar geopolitics, Antarctic tourism management and practices, and the popularisation of Antarctic education.

David Rosenthal grew up and went to school in Maine. He graduated from the University of Maine Farmington in 1976; started out studying physics and ended up as an artist; and moved to Cordova, Alaska, in 1977 to work in the fishing industry, starting a pattern of taking jobs to live and work in interesting landscapes that continues to this day. He travelled in Alaska by working on boats and as a participant in the Alaska State Artist in the Schools Program. As part of the United States Coast Guard art programme, he travelled on the icebreaker *Northwind* into the Arctic in 1988, then travelled on the icebreaker *Polarstar* as it supported shipping and resupply for Thule airbase in Greenland in 1989. Also in 1989, he began working for the United States Antarctic Program. He spent two austral winters and five austral summers working for the NSF contractor, and two additional austral winters and an additional austral summer as a participant in the US Antarctic Artist and Writer Program, finishing up in 1999. He still travels to various locations in the higher latitudes while maintaining a home and studio in Cordova.

Hannah Laeverenz Schlogelhofer is an interdisciplinary researcher studying microscopic life forms. She holds a PhD in Biophysics and Microbial Ecology from the University of Cambridge, as well as an MSci and a BA in Natural Sciences and an MRes in Nanoscience. She is currently a postdoctoral researcher at the Living Systems Institute at the University of Exeter, UK where her research interests lie at the intersection between microbiology, ecology, physics and mathematics. Hannah travelled to Antarctica as part of the second cohort of Homeward Bound.

Jan B. Schmutz holds a PhD in Industrial and Organizational Psychology from the University of Fribourg. He works as a senior researcher and lecturer at ETH Zurich. Jan studies how teamwork, and in particular team reflection, helps teams manage crisis situations in extreme environments. In his research, he has investigated military rescue teams, medical emergency teams and Antarctic teams. Further, Jan collaborates with the European Space Agency as well as NASA in order to identify success factors for crews on long- and short-duration space missions. As a healthcare simulation educator, he facilitates regular team training in healthcare institutions around Europe.

Cindy Shellito is Professor of Meteorology and Climate Science at the University of Northern Colorado. Her work is motivated by her experiences outdoors, a passion for global learning, and a desire to share her experiences through her writing. Her research has focused on using climate models to understand global warming in the Earth's deep past and, more recently, on exploring weather patterns in the Andes. She is passionate about engaging students in learning about climate change and inspiring them to seek ways to take action.

Karen Spenley grew up in the north of the UK and her strong sense of purpose led her to study engineering at the University of Cambridge. Since then she has worked globally in the energy industry with a mindset of collaboration for finding solutions. She is currently the Technology Sustainability Project Manager for Schlumberger. Karen joined the fourth cohort of Homeward Bound, and travelled to Antarctica in November 2019. The Homeward Bound theme of stronger together resonates with Karen as she believes that driving cross-disciplinary science is fundamental to finding solutions for our planet and society.

Betty Trummel spent 35 years teaching elementary school and ten years as an adjunct professor, teaching 'Science Methods for Elementary Educators'. A lifelong learner who believes in a global perspective, she has taught in classrooms worldwide, from remote McMurdo Station in Antarctica to the Arctic outpost of Svalbard. A science communication specialist assigned to research projects funded by the National Science Foundation, Betty has been deployed to Antarctica three times. Betty is a recipient of the Presidential Award for Excellence in Elementary Science Teaching, Northern Illinois University's Outstanding Young Alumni Award, and the Distinguished Alumni Award from the College of Education at the University of Illinois.

Priscilla Wehi is a conservation biologist at the Centre for Sustainability, University of Otago, and a parent of three children. She is a 2014–20 Rutherford Discovery Fellow, is Director of Te Pūnaha Matatini, a Centre of Research Excellence in Complex Systems, and leads a research stream centred on Māori epistemologies as part of a five-year monitoring and conservation project in the Ross Sea. She voyaged to the Antarctic Peninsula as part of the second cohort of Homeward Bound. She completed a BSc (Hons) in Zoology at the University of Canterbury, New Zealand and an MSc in Animal Ecology at Lincoln University, New Zealand before completing her PhD in 2006 at the University of Waikato, New Zealand. She has interests in insect ecology, stable isotope ecology, socio-ecological relationships and biocultural diversity.

Tun Jan (T.J.) Young is currently a Postdoctoral Fellow in Glacier Geophysics at the Scott Polar Research Institute, University of Cambridge. His research implements a variety of innovative field-based geophysical techniques, particularly ice-penetrating radar, to investigate the dynamics of ice sheets, and to characterise the englacial and subglacial processes that modulate complex glacier flow. T.J. was a former park ranger in Taiwan, and together with his research experience, has led and participated in more than ten deep field expeditions in Greenland, Antarctica and high-mountain Asia. T.J. has been actively involved in the past and present leadership of various organisations, such as the UK Polar Network, the Association of Polar Early Career Scientists and the American Geophysical Union. Through these channels, he advocates for effective environmental stewardship that actively involves innovative science communication, education and outreach.

Foreword

Christiana Figueres and Musimbi Kanyoro

White.
Ice.
Cold.
Vast.
Desolate.
Harsh.
Inhospitable.

How would you describe Antarctica? A white continent, home to penguins and heroic tales of the South Pole? This book is a little different. It is not a story of a single triumph, failure or journey, but presents evidence of how Antarctica touches our lives in so many ways. We invite you to explore the beating heart of our Blue Planet through different lenses. It involves diverse authors and experiences, and invites you to consider your connection to the Antarctic narrative.

There are no native people in Antarctica; there never have been. As humans, we are visitors only. Antarctica offers us immense hospitality when we treat it with respect. The Antarctic Treaty System, established in 1959, was a landmark of international collaboration to protect a precious place on Earth. A showcase of multilateralism and cooperation for the common good, it declared that Antarctica should be 'used for peaceful purposes only'. Antarctica is peaceful, but so very wild and alive. The land, sea and air are teeming with life, storms and waves spiral around the Southern Ocean and volcanoes lurk below the ice. Antarctica is pure magic!

Antarctic exploration – partly conquest, partly science – has dominated most published material about the continent. But how has Antarctica influenced art, philosophy, spirituality and leadership?

Antarctica has a special power in our hearts and minds, in politics, geography, history, arts and culture.

Antarctica is not as far away as it used to be. We are all a part of nature and Antarctica is a part of all of us. We can all be a voice of protection for Antarctica. As you dip in and out of this book, we hope that you will feel a sense of stubborn optimism building inside you, knowing that all over the world, in all walks of life, people are choosing courage over comfort to respect and celebrate the natural world we are part of. It may now be the braver, bolder choice *not* to travel to the White Continent. Antarctica is beautiful even if we are not there to see it.

We all have something to learn from Antarctica. This eclectic collection of work is an important and powerful exploration of the continent from new angles. As the icebergs carve deep into the ocean and our souls, Antarctica is firmly rooted in our collective past, present and future. Antarctica will not be ignored. Will you be its voice?

1
Proffering Antarcticness

Ilan Kelman

Drifting

The seventh continent, the white continent, the ice continent, the southern continent, the unowned continent, the unknown continent, the highest continent, the coldest continent, the driest continent, the windiest continent, the most isolated continent, the scientific continent, the end of the world, the bottom of the world, the uninhabited continent, the peace continent.

The Ice.

The epithets are vast and varied for this book's place and concept. For humanity, is it more of a place or a concept? Or are the two inseparable? It is not just that so few people visit the place, but also that so few people have the privilege of considering options for travelling near – or of simply considering its meanings and relevance. Yet the location influences so much of humanity.

Politically, the treaty of 1959 followed by the collection of documents comprising the treaty system aim to represent and yield a common good for humanity. No political entity is said to own any part of the Earth south of 60°S in latitude, which is a large chunk of the planet all the way to the South Pole. Seven countries make territorial claims – Argentina, Australia, Chile, France, New Zealand, Norway and the UK – but those claims are neither accepted nor denied. The region is meant to be for sustainable human use, avoiding militarisation, nuclearisation and resource extraction. Does this cut out all the typical fun?

The opposite. The three main uses by people remain science (generating knowledge and having fun), tourism (learning and having

fun) and exploration (seeking adventure and having fun). It is about experiences and experiencing on-site and then bringing it all to the world.

These actions often take place far from the southern regions. Science is done in archives, through using already collected data, with remote observations, and by talking to people who have been there and returned. Armchair tourism through webcams, social media and online events lets people travel in their minds, gaining from people or technology that have done so physically. Exploration also occurs these ways, while we immerse ourselves in other products such as a Kim Stanley Robinson novel, a Carl Wittrock symphony or the never-ending debates regarding the combination of heroism, luck and stupidity among early voyagers into the continent's interior and around its waters.

Myths abound, constructing legends rather than just reporting them. A book claims that Robert Scott was just unlucky with the cold weather, thereby neglecting many aspects of long-term climate trends. Online posts 'prove' the existence of an artificial pyramid from an advanced civilisation long before Roald Amundsen and Scott were venerated and vilified. A movie keeps alive Nazi plots to run the world. Captain Nemo's claim on 21 March 1868 to the lands around the southernmost point has not really been accepted.

With the politics and cultures comes the physicalities. Will the ice melt, raising sea levels dozens of metres and inundating megacities? Could uplift of land, as the weight of the ice diminishes, slow the thaw rate? What micro-organisms might be unleashed from within or below the ice? Have we managed to close for ever the 'hole' in the stratospheric ozone layer? Are the fish and krill doomed to be obliterated by human catches or shall their populations remain thriving alongside whales, seals and sea lions? If Mount Erebus, currently the southernmost known active volcano on the planet, erupts, how will the ice, the oceans and the climate be affected? If fissures of fire burst at even lower latitudes, does the term 'ant-jökulhlaup' apply?

While the collective governance regime provides a counterpoint to the territorialism, selfishness and extractivism across the rest of the Earth's land, the mathematics, physics, chemistry and biology of the continent reflect human influences. Change is not necessarily bad in and of itself, but the rapidity of the changes leaves nature little time to adjust, while humanity is not ready to deal with the direct effects, from species and ecosystem changes affecting food and water availability to intensified storms and higher seas. The causes of the changes, namely

pollution (including greenhouse gases) and resource over-exploitation, are so unnecessary, yet political inertia has thus far precluded substantive, successful efforts to achieve more balance.

Thus, physical sciences, social sciences, arts, humanities and professions connect. People and nature cannot be separated, even considering how few people can travel far south. Representations and realities collide, with long-term remoteness impinging our day-to-day lives and inaccessibility helping to connect us. However we label and meld the place and the concept, they touch us.

And throughout all this, I have not even mentioned 'Antarctica'.

Delving

What is Antarctica? What embodies the Antarctic? These are the questions for and from this book.

To seek understandings, and to enjoy the journeys therein, the chapters here join disciplines, communication approaches, ideas and experiences to explore and analyse explanations and depictions of the continent. Words and images present and represent the Antarctic, as presumed and as dreamed alongside the actualities of being there, of watching from afar and of residing in between. It cannot be merely whimsical. The insights in this volume detail how the continent is viewed and managed while identifying successes, failures and recommendations for Antarctic policy and practice.

In doing so, the authors never lose sight of the multiple parties supporting the continent's governance as it undergoes rapid political and environmental transformation. Given the diversity and disparity of the interests and ongoing changes, the chapters and their forms link to provide a more coherent and encompassing perspective of how society views and does not view Antarctica – scientifically, artistically, humanistically, and the interplay between these modes – along with what the continent provides and could provide politically, culturally and environmentally. Rigorously researched academic chapters meet poetry, while personal reflections mingle with paintings and photographs. Only so much can appear on a digital or printed page, leaving the musicality, three-dimensionality, smells and tastes of Antarcticness to be posited by each reader.

Do we get more pain or ecstasy? Chills or snow blindness complementing our sunburn? Terror or desire regarding travel there?

The question remains: what is not provided by Antarcticness?

Formalising

The scope of this book is investigating and describing the meanings and potential meanings of Antarctica through science, art and their combination. The aims are:

1. To present original research, art and interpretations of different experiences and explorations of Antarctica.
2. To involve and connect as diverse a range of authors, backgrounds, disciplines and formats as feasible in a book format.
3. To present the work within explanations and narratives of what Antarctica does and does not mean politically, culturally and environmentally.

How pertinent is it? The primary audience for this book is a general scholarly and artistic readership interested in Antarctic research and topics, but not necessarily having previously engaged in detail with these aspects of the region. Examples are a geographer focusing on Antarctica with an interest in learning about other disciplines, a pedagogical specialist seeking to understand the reasons and mechanisms for educating about Antarctica, university students wishing to explore Antarctica for the first time, visual analysts examining how Antarctica is and is not represented, and policy-makers seeking to know the relevance of Antarctica for their location and/or sector. The secondary audience for this book is the non-specialist but scientifically inclined public who wish to learn more about Antarctic science, scientists, art and artists – as well as their combination. This group includes science communicators and journalists covering Antarctica.

These groups include us all. We all affect Antarctica through our daily choices (for those with such choices) and we are all affected by Antarctica through its decadal changes. We create and destroy Antarcticness.

Informalising

In determining and disputing Antarcticness, we each have our own pathways to generate. The chapters provide directions, guiding and supporting ways of thinking. These are the inspirations.

Each reader must nonetheless look beyond the images and words. We each enjoy different experiences and knowledges, revelling in the

strengths built from diversities. The same image, the same poem and the same prose cannot mean the same for everyone under all conditions. We create Antarcticness for ourselves, steeped in our own preconceptions and prior encounters with the continent, in person or otherwise. The mind's Antarcticas form a myriad of Antarcticnesses. These are the imaginations.

The inspirations and imaginations interfuse. Our imagination inspires just as inspiration feeds our imagination. The voyage of Antarcticness launches.

2.

Voyage into Antarcticness: a photo essay

James A. Bradley

This photo essay serves to convey the essence of 'Antarcticness' via a series of photographs curated and displayed to produce the narrative of a journey onto the Antarctic continent, and the essence of feelings, experiences, emotions and perspectives picked up along the way (Chapters 6, 9, 10, 13, 14 and 16). Photographs were taken from an NSF-supported (1245703, 1245752) expedition to Ross Island and McMurdo Station, East Antarctica, during the 2017–18 season. The photographs, curation, and narrative are by James A. Bradley with additional photographs contributed by Thomas C. Boothby, Marc Neveu and Virginie Galindo.

2.1 CHC (Christchurch airport, New Zealand) to NZFX (Phoenix Airfield, Antarctica) is far from your everyday journey. Stepping onto the stripped-out C-17 aircraft in custom-issued extreme cold weather (ECW) clothing despite the warmth of the midsummer day, I enter a cavernous, windowless, bare, spacecraft-like hollow cylinder. Rows of seats accommodate scientists, military personnel and station workers, alongside all sorts of cargo, including jet engines and even helicopter blades. There are only a couple of window seats, occupied by the pilots and some lucky invited passengers. Photograph by James A. Bradley, 2018.

2.2 The flight time from Christchurch to the ice runway of Phoenix Airfield, near Scott Base and McMurdo Station, in East Antarctica, depends on the aircraft and the weather. This US Air Force Hercules LC-130 makes the journey in seven hours, but does not carry enough fuel for a return trip. Therefore, pilots must decide, at the halfway point, also known as the point of no return, whether to 'brave it' and continue to Antarctica no matter any change in weather, or to 'boomerang' and turn the aircraft back around for New Zealand. This resignation of control holds true for much of one's experience of the southern continent, and the sooner this attitude is adopted, the sooner one begins to understand the essence of living and working in Antarctica. Photograph by James A. Bradley, 2018.

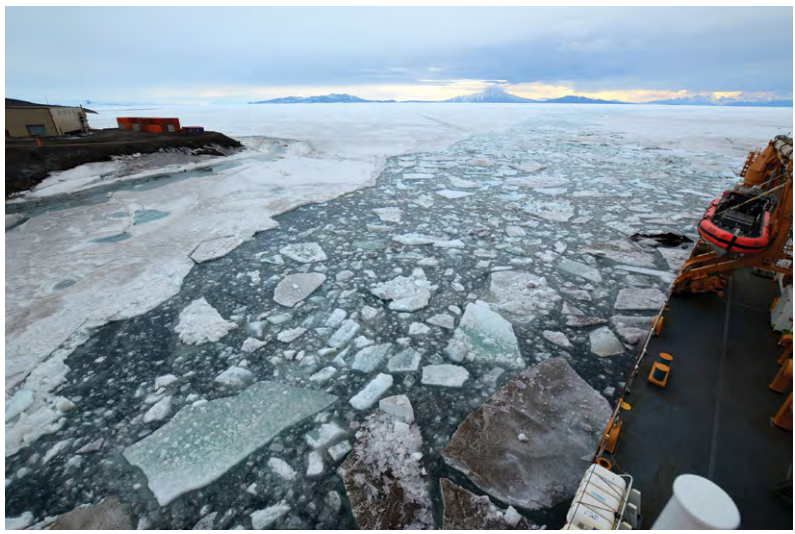
2.3 On the approach to the southernmost continent, the first visual sentiment of Antarcticness is of vast emptiness. The sense of scale is lost amongst disorienting floes of sea ice, floating ice shelves, ice cliffs, fractured glaciers and the crumpled and jagged folds of mountains. The colour palette is dazzlingly bright, made up of blues, whites and pinks. Photograph by James A. Bradley, 2018.

2.4 Touching down in Antarctica, and leaving behind the blue ice runway, I become acutely aware of the immenseness of the surrounding landscape, and of the human determination to overcome this truly extreme environment (see Chapter 4). The metal shells of these Hercules LC-130 aircraft perch on the Ross Ice Shelf, silhouetted against the midnight bright blue sky. Photograph by James A. Bradley, 2018.

2.5 A fresh blanket of snow covers 'Mac-Town': McMurdo Station, the US hub of the southernmost continent. Truly at the edge of the map, amid a dazzling expanse of flat sea ice, rolling glaciers and jagged mountains, this is a mining-town-meets-college-campus wonderland (think fuel tanks, shipping containers, dormitories, cafeterias – all surrounded by untouched wilderness). Just offshore, the *Nathaniel B. Palmer* science vessel navigates a recently cut channel through the sea ice to reach land for the first time in several long weeks. Photograph by James A. Bradley, 2018.

2.6 McMurdo Station is home to around 1,200 summer staff and scientists, and 250 over-winterers. The corrugated iron domed Coffee Shop, one of three taverns in town, darkened from the midnight summer sun, provides a cosy setting for a glass of wine, a science talk or a movie night. The closeness of the Antarctic community contrasts strikingly with the wider feeling of isolation from the outside world. Photograph by Marc Neveu, 2018.

2.7 Ross Island, and in particular Hut Point, holds particular historical significance. The legacy of the Heroic Era of Antarctic exploration is exquisitely preserved here – sleeping bags, biscuits and seal carcasses that remained untouched for 100 years. Discovery Hut, built by Scott during the Discovery Expedition of 1901–4, served as a storehouse, living space, staging point and refuge during four British expeditions in the early 1900s. A cross marks the memory of Seaman George Vince, the first person to die in McMurdo Sound in a tragic incident in 1902. Numerous other symbols of remembrance scatter the landscape and serve to uphold the achievements and tragedies of the Heroic Era. Photograph by James A. Bradley, 2018.



2.8 Onboard the USCGC (United States Coast Guard Cutter) *Polar Star* icebreaker. This old ship, commissioned in 1976, is our lifeline, slowly cutting a channel through the thick sea ice to provide the only coastal access to McMurdo Station. It is through this icy channel that a resupply ship will arrive, a week or two later, restocking the station once per year. The station stores enough food to support its personnel for around three years – with built-in buffer time in case impenetrable sea ice or giant icebergs block access to the land. We are truly at the mercy of nature, but this year, the ship did a good job. Photograph by James A. Bradley, 2018.

2.9 Drilling ice cores to hunt for psychrophiles – microorganisms surviving close to the cold limit of life. Analyses of Antarctica's ice reveals hundreds of thousands of microscopic organisms surviving, or perhaps even thriving, while trapped in the ice. Analyses of the samples collected will generate new knowledge and understanding about the limits to life on our planet, and its resilience to climate change, the effects of which are enhanced in Earth's polar regions. Photograph by Thomas Boothby, 2018.

2.10 Scientists working at the sea ice edge are interrupted by an inquisitive orca, surfacing from where instruments were deployed just moments ago. Working in the southern continent, I feel truly connected with nature, and have been stopped dead in my tracks in amazement on a number of occasions – as this photograph captures. Photograph by Virginie Galindo, 2018.

2.11 Inquisitive Adélie penguins pose for a photograph in front of the southernmost active volcano on Earth, Mount Erebus. Smoke can often be seen billowing from its summit. Adélies can be extremely curious creatures, often making a beeline to check out a group of scientists working in the distance. It is our delight to see a waddle of penguins slide over to us, stop for a moment to observe us, and then carry on their journey. Photograph by James A. Bradley, 2018.

2.12 This curious Adélie penguin shrugs off the bitter cold and vicious wind, unlike the enthralled polar scientists it has stumbled on. Photograph by Thomas C. Boothby, 2018.

2.13 Scientists are truly at the mercy of nature, as a seal makes our sea-ice drillhole into its new home. This forces us to abandon sampling, to be replaced by a wildlife safari. We are guests in this icy land. Photograph by Marc Neveu, 2018.

2.14 Antarctica is a back-country paradise. Fat tyre bikes or skis are used to cross the ice shelf to reach the mountain slopes. Outdoors in the wilderness, I am acutely aware of the physicality, and dare I say spirituality (see Chapter 8), of being in Antarctica. Antarctica is a sensory overload of soft and squeaky snow underfoot, cold air on bare cheeks, whistling wind in ears, and sights of splendid scenery and wildlife. Photograph by Marc Neveu, 2018.

2.15 Castle Rock. Twenty-four hours of daylight during the Antarctic summer screams out as an opportunity to ski in the midnight sun. Flags mark a crevasse-free route across the glacier. On this glacier, looking across the sound and mountain ranges, feeling the cold and squinting in the brightness, it is impossible to shake the sense that this place is truly otherworldly. Photograph by James A. Bradley, 2018.

2.16 A fixed rope assists climbers to reach the summit of Castle Rock. On a clear day, climbers are rewarded with breathtaking uninterrupted views of the smoking summit of Mount Erebus. With the opportunity for adventure comes an unshakable sense of responsibility. We are trusted out here to make smart decisions. Our safety is largely in our own hands. We know that help might not be available if we call for it. This instils a sensibility of respect for the environment we call our workplace and playground. Photograph by James A. Bradley, 2018.

2.17 One learns to keep a close eye on the weather in Antarctica. On the southernmost tip of Ross Island, look across the sound and see mountains in the south. As a general rule, if the distant peaks disappear from view, a storm is coming in and it will usually be on you in a matter of hours. If the islands in the foreground then disappear, seek immediate shelter. Photograph by James A. Bradley, 2018.

2.18 'Apples' are strategically placed for those seeking respite from the cold, the high winds and the general unpredictability of weather on the Ross Ice Shelf. The US Antarctic Program uses a three-tier classification system for Antarctica's weather, ranging from category 3 (least severe) to category 1 (most severe). The extraordinarily low temperatures, high winds and low visibility that give rise to category 1 weather are not to be taken lightly. These conditions will often shut down the operation of entire stations for days at a time. Photograph by James A. Bradley, 2018.

2.19 No country owns any piece of the Antarctic continent. Therefore, Antarctica has no official flag. Antarctica's flaglessness captivates the imagination of schoolchildren across the world, who are annually tasked to design their own flag (see Chapter 11). Polar researchers bring these creations to Antarctica and capture a photograph of the students' flags amid the snow and ice, to instil the essence of Antarcticness from the ice into classrooms all around the world. Photograph by James A. Bradley, 2018.

2.20 The constant movement of ice shelves, the formation of annual sea ice, and the sheer sparseness of human habitation means that every footstep is on untouched ground. Every ski sets out fresh tracks. All sense of scale is lost against a backdrop of towering masses of ice. Photograph by Marc Neveu, 2018.

2.21 Inquisitive orcas spy hop and breach at the ice edge. Behind, a dazzling mirage creates the illusion of ice cliffs hovering freely above the open sound. This alien landscape becomes even more otherworldly as nature puts on a show. Photograph by Marc Neveu, 2018.

2.22 A seal rests on its icy bed. A strong sense environmental stewardship and responsibility is instilled in all aspects of Antarctic life. The need to minimise one's impact is implicitly understood. Wildlife must not be disturbed. No trace should be left behind. The natural stillness is preserved. Photograph by Marc Neveu, 2018.

2.23 Often I have the impression of standing in between two circular discs. An endless blue disc circles above me. Underfoot, a crunchy white disc stretches out to the horizon. Most directions I turn, I'm looking more or less north. No matter where I walk along the horizontal plane, the discs above and below me stretch on outwards into an endless expanse. It's truly disorienting and magical at the same time. Photograph by James Bradley, 2018.

2.24 Despite the continuous daylight and endless fields of ice, at some point an end is called to the day. Sample boxes are full and equipment is packed, and I am grateful for a direct helicopter ride to the warmth of the station's laboratories, stopping first at the 24-hour pizza bar for some nourishment. The constant daylight can upset sleep and cause overwhelming tiredness, but it can also be truly energising. Nothing beats a ski to Castle Rock underneath the dazzling midnight sun. The extreme cold can have you longing for warm summer days, but the bitterness has you feeling more alive than ever. The dryness of Antarctica's climate chaps lips, and static shocks await on every door handle in town. It also produces dazzling clear skies, shimmering mirages and an extraordinary freshness in breathing the air. In Antarctica we are completely isolated, yet our community is closer than nearly anywhere else. We live in a mining-like town amid pristine natural beauty. Photograph by Marc Neveu, 2018.

3

Antarcticness at the ends of the world

Gabriela Roldan and Hanne Nielsen

At the southern tip of Argentina stands a sign, proudly proclaiming the city of Ushuaia as being at 'the end of the world' (Figure 3.1). In the background, cruise ships come and go, carrying parka-clad visitors who look to the south with adventure on their minds. For them, this town is not an ending but a beginning, the starting point of their Antarctic encounters. The port of Ushuaia is a hub of Antarctic activity during the summer season. Between November and March, the docks heave with a mix of Antarctic research and resupply vessels, fishing boats bound for the far south, and tourist ships that transport more than 70,000 visitors a year to Antarctica (International Association of Antarctica Tour Operators 2020). While those tourists return from the white continent with memory cards full of penguins and ice images, and brimming with stories to share back home, a sense of Antarcticness is not limited to direct encounters with the continent. The cities from which people depart have their own stories to tell about Continent Number Seven, and those who live in the Antarctic gateways participate in the performance of southern connections in a wide range of ways.

This chapter examines the representations of Antarcticness found in the Antarctic gateway cities of Ushuaia (Argentina), Punta Arenas (Chile), Christchurch (New Zealand), Hobart (Australia) and Cape Town (South Africa). These cities claim strong connections with Antarctica because of their roles in concentrating transit to and from the icy continent. We focus on art, maps, signs, festivals and other activities organised to promote public awareness of Antarctic connections within these communities. The analysis reveals that the dominant representations and narratives of

3.1 Sign 'Ushuaia, end of the world'. Photograph by Gabriela Roldan, 2018.

Antarcticness at the gateways not only satisfy the political agendas of their host countries with regards to Antarctic leadership and sovereignty ambitions, but also assist these towns in gaining visibility on the world stage as south polar specialists and ambassadors for their countries. Antarctica matters to these communities; their Antarcticness is a multi-layered connection constructed and reconstructed over time in the fabric of their social identity. Far from being the 'ends' of the world, these Antarctic cities can instead be construed as places where a connection with Antarctica and Antarcticness can both begin and deepen.

Human connections with Antarctica

Antarctica has a young human history compared to other continents. Oral histories suggest that the Rarotongan navigator Hui Te Rangiora reached Antarctic waters as early as 650 CE on board his vessel *Te Ivi o Atea* (Wehi et al 2021; Fox 2005), while the Polynesian explorer Tamarereti came across a 'white land' on his southward voyage to investigate the aurora australis (McFarlane 2008). When the British navigator James Cook crossed into the Antarctic Circle in January 1773 in search of 'Terra

Australis Incognita' and encountered a barrier of ice (Hamilton 2020, 138), he concluded that due to the hostile conditions 'the lands which may lie to the South will never be explored' (quoted in Hamilton 2020, 170). The continent itself was not sighted by Western expeditioners until January 1820, when the concurrent 'discovery' of mainland Antarctica by the Russian Fabian Gottlieb von Bellingshausen and the British Edward Bransfield (Day 2012, 21) ushered in an era of commercial exploitation with the harvest of seals and whales. Land-based exploration followed, with the period 1897–1922 known as the 'Heroic Era'.

The 1930s saw the 'Mechanical Era' of exploration, with technology such as aeroplanes and tractors making it far easier to survey and traverse large tracts of ice. This technological support also enabled scientific expeditions to reach remote locations, and more than 50 bases were established around Antarctica for the International Geophysical Year of 1957–8 (Berguño and Elzinga 2010). Today, Antarctica is governed by the Antarctic Treaty System and most of the 54 member states are involved in research activities in the far south, coordinated by national Antarctic programmes (NAPs). The main routes to access the continent are via these NAPs, or as a tourist on board a vessel such as those that dock in Ushuaia. Activities in and around Antarctica expand knowledge about the place, but these are far from the only way that people interact with the continent.

Imagination predates exploration, as Antarctica existed as an idea long before humans had any physical interaction with the place. The word 'Antarctic' dates back to the ancient Greeks, who conceived of a land mass that was opposite to and balanced out that in the north beneath the Arktos constellation, hence 'Ant-arktikos' (Leane 2016a). The 'Terra Incognita' that sailors such as Cook set out in search of was a later version of this place that had been conceptualised but not encountered. In recent times, human connections with Antarctica have been understood in other ways that highlight how interconnected this far-off continent really is with the rest of the world. For instance, the presence of microplastics in the Southern Ocean and the annual ozone hole over Antarctica (Stephens 2019) are both caused by human activity elsewhere on the planet, meaning that activities of those in distant locations impact on the place. This connectedness flows the other way too, with low-lying areas far to the north at risk from rising sea levels should Antarctic ice sheets collapse (Garbe et al. 2020). Having an appreciation of these global connections means it is possible to incorporate distant places into one's own 'ecocultural identity' back home (Nielsen 2020, 236), contributing to understandings of Antarcticness.

Antarctica is a highly mediated continent. Most people never visit Antarctica directly, meaning that the imagined versions they hold in their minds remain far more tangible than 'the Ice' itself ('the Ice' is 'a general and informal term for Antarctica, and her ice-bound regions' [Hince 2000, 173]). This makes it all the more important to have a clear understanding of the range of cultural production that informs ideas of the place: the films, books, images and narratives about Antarctica that circulate back home (Nielsen 2020). As Roberts et al. (2016, 14) have argued, the field of Antarctic studies articulates an 'understanding that the Antarctic is a series of representations that are always selected, distilled, and packaged by humans'. The ways we narrate our imagination of, knowledge about, and experiences of Antarctica and Antarcticness matter hugely.

Antarctic gateways also have versions of themselves as 'Antarctic places', and they lay claim to these physical, logistical, geopolitical, historical, cultural and academic connections in different ways. The most obvious physical connection between each of the Antarctic cities is their proximity to the Southern Ocean. That ocean has been conceived of variously as a barrier to or a connection with the far south (Lavery 2019; Nielsen et al. 2019). Whalers have reaped bounty from beneath the Southern Ocean's waves, early explorers braved a rough transit across it, and oceanographers have just begun to map its depths (Mayer et al. 2018). In modern times, Antarctic gateway cities continue to support regular air and sea traffic to Antarctica, conducted by NAPs, tour operators and the fishing industry. For those living on the edges of the Southern Ocean, weather forecasts predicting an 'Antarctic blast' are common, with the chill of a southerly wind providing a corporeal reminder of one's relative proximity to ice. The southern lights, or aurora australis, form another visible connection with the far south. Geological similarities between Antarctica and continents to the north form a further historical connection. Similarities between fossilised southern beech tree leaves found in Antarctica and the species found in southern South America, Australia and New Zealand led to better understanding of the Earth's tectonic plates' movement and the continents' shared history as part of Gondwana some 180 million years ago (Storey and Cook 2015).

Geological similarities between Antarctica and Antarctic-adjacent places have formed the basis for geopolitical claims in modern times, with both Chile and Argentina partially basing their claims to Antarctic territory upon the geological connections between the Andes and the mountains emerging and submerged in the Scotia Arc (Elzinga 2013). Other Antarctic claims are based on acts of European imperial expansion,

such as historical precedence and mapping, or the attainment of geographical firsts (for example those of Australia, the UK, New Zealand, Norway and France – see Mancilla 2018). Of the seven countries that made claims to Antarctic territory prior to the 1959 Antarctic Treaty, four host Antarctic cities: Argentina, Australia, Chile and New Zealand. Fostering a sense of Antarcticness in local residents can therefore have political implications, as it is in the interests of the claimant countries to ensure that the continent remains relevant to the domestic population. The foregrounding of particular historical narratives over others – for instance, the visibility of Heroic Era connections – and placing an emphasis on the Antarctic expertise located in a city (whether through hosting researchers or institutions) provide further ways to reinforce connections.

What is an Antarctic gateway?

The common interpretation of a gateway city is based on the transportation infrastructure and services available at the urban centre to access another area of interest. In the Antarctic context, the gateways of Ushuaia, Punta Arenas, Christchurch, Hobart and Cape Town are seen as springboards for organising trips to Antarctica. Although towns such as Bluff (New Zealand), Stanley (Falkland Islands/Islas Malvinas) and Puerto Williams (Chile) are at times called Antarctic gateways (Bertram et al. 2007; Dodds 2012; Prior 1997), their current association with Antarctica is relatively minor and mostly restricted to small amounts of tourism or political positioning. Scholarship concerned with the study of polar tourism (which is largely a maritime activity) defines an 'Antarctic gateway port' as 'a coastal or island port, able due to its proximity to the Antarctic to benefit from, and control access to, Antarctic and Southern Ocean resources, including fishing, tourism and scientific support' (Bertram et al. 2007, 124). Here, we argue that the concept of an Antarctic gateway is far greater than the sum of a city's transport facilities and associated benefits, and we pay attention to how they portray their associations with Antarctica and contribute to Antarcticness.

The Antarctic gateway cities have forged multiple connections with the southern continent throughout their histories. These connections can take place at the local, national and international levels. Local governments have developed long-term plans and infrastructure to facilitate access to Antarctica, enabling connectivity, traffic and trade to and from the Antarctic. The cities promote themselves as Antarctic

specialists, building on a distinct reputation. In return, the Antarctic connection generates valuable income for the gateways and enhances their international reputation. Antarctic business is considered a regenerator of the regional economy and attracts innovative solutions, technologies and businesses to supply the growing demand for polar supplies. As Hall (2000, 158) argues, the 'Antarctic brand' is a powerful and appealing commercialisation tool for the gateways; the Antarctic association symbolises wilderness, purity and nature (see also Chapters 9 and 14), qualities that the gateways can co-opt as their own. Antarctica puts the gateway cities on the map and provides a diplomatic opportunity for countries to use the cities to build international Antarctic partnerships.

From a geopolitical standpoint, the gateways also sustain awareness of claimant countries' Antarctic territorial claims (South Africa is the only non-claimant country to host an Antarctic city). From a cultural perspective, the gateways are more than passive transport platforms to Antarctica. Leane (2016b) suggests that Antarctic gateways are framed as being on the edge of the familiar world, and as the portals to another, the southern polar region. The five cities introduced below are a melting pot for polar knowledge, science, education, exchange of ideas and transmission of cultural practices between the local communities and their polar visitors. This in turn leads to a sense of Antarcticness or connection with the place across multiple sections of society.

Ushuaia (Argentina)

Promoted as the 'southernmost city in the world', Ushuaia appeals to Antarctic travellers' narratives of adventure and discovery that associate this region with imaginaries of wilderness, mountain-sea scenic beauty and isolation (Mosti and Sallies 2016). A sign near the port reminds visitors that this gateway is the closest city to Antarctica, at approximately 1000 km from the tip of the Antarctic Peninsula (Figure 3.2), reinforcing the perception of tourists that they will soon step into 'another world' (Leane 2016a; Chapter 10). Distances matter when reflecting upon Ushuaia's Antarcticness. Gift shops and murals featuring penguins and artisan crafts feed into this narrative, with abundant polar and penguin-like products widely available. The 'Antarctic Experience' on the waterfront opened in 2019, offering a virtual reality experience of the far south and reinforcing the historical connections between Ushuaia and well-known Antarctic explorers such as Ernest Shackleton, Roald Amundsen and the local hero José Sobral. Even if some of them never

3.2 Sign with distances to Antarctica in Ushuaia's port. Photograph by Gabriela Roldan, 2018.

visited Ushuaia on their voyages south, the Antarctic narratives connect them to the city.

Tourists are not the only ones to experience the Antarcticness of Ushuaia. For locals, Antarctica is part of their bicontinental country, but its distance means it is seen as only accessible to wealthy tourists. However, they learn about the region at school, experience blasts of polar weather, see ships depart, and benefit from the economic activity associated with polar traffic. Military influence and geopolitical factors also shape the perceptions of locals and their connection with Antarctica. A large map of the Argentine Antarctic Territory is displayed outside the port – the geographic limits of the Argentine Antarctic territory's claimed area are south of 60°S, between 25°W and 74°W (Gilbert 2015) – while further maps and signs marking claims to sovereignty, and busts of military polar figures such as Commandant Irizar, General Pujato and Mayor Giró Tapper, feature in the 'Antarctic Pioneers' pathway along the waterfront (Figure 3.3).

Ushuaia is located on the island of Tierra del Fuego in the far south of Argentina. This city is nestled between the mountains and the sea, and

3.3 General Pujato's bust in Ushuaia's Antarctic Pioneers lane. Photograph by Gabriela Roldan, 2019.

flanked by its closest neighbour, Chile. Its geographical location and its role as the seat of the government for the province of Tierra del Fuego, Antarctica and the Islands of the South Atlantic, a territory that has been in perennial conflict with Chile and the UK, speaks of the geopolitical significance of Ushuaia for Argentina's polar ambitions. Compared to the other gateway cities, Ushuaia is small, with an estimated 77,000 people calling the place home. Yet this is one of Argentina's fastest-growing regions due to economic stimulus packages and special fiscal agreements created by the government in the 1970s to promote internal migration to the southern provinces for the purpose of asserting sovereignty.

Ushuaia's connections with Antarctica started before the town was built. In 1826, the sighting and surveying of the Beagle Channel by British Admiralty ships, and subsequent expeditions with a scientific interest, such as the Argentine Austral Expedition led by Giacomo Bove (1881–3) and the French International Polar Expedition led by Louis Martial (1882–3) (Barr and Lüdecke 2010), provided abundant information on resources and waterways available for mariners venturing south. By the end of the nineteenth century, Ushuaia had an Anglican mission and a

modest Argentine navy post which welcomed Antarctic explorers and supplied their vessels before they ventured to the polar unknown. Loading coal, fresh food and mail in Ushuaia were fundamental for the success of expeditions. Adrien de Gerlache's Belgian *Belgica* (1897–9) and Otto Nordenskjöld's Swedish *Antarctic* expeditions (1901–4) benefited from the locals' generosity and from sharing with local authorities detailed plans of their polar intentions; when Nordenskjöld's men were marooned in Antarctica, the Argentine navy launched a rescue expedition, which become the first foray of the South American country into the polar region (Capdevila and Comerci 2013). Connections to the Heroic Era are performed on the waterfront via the 'Antarctic Pioneers' lane that features explorers' busts. What started as a grassroots initiative to celebrate an Antarctic centenary has grown into a council-sponsored showcase of the city's breadth of involvement with the far south.

By the late 1950s, voyages which combined tourism and station logistics placed this gateway at the forefront of Argentina's plans to create awareness and gather support for the country's polar activities. Since then, Ushuaia has held a long-standing connection with Antarctica through geopolitics and tourism. In the 1990s, national investment improved transport infrastructure and policies attracted international tour operators, transforming Ushuaia into the most popular Antarctic gateway for cruise ships. Prior to the coronavirus pandemic the city hosted over 90 per cent of the industry's shipborne operations (Jensen and Vereda 2016). As a result, the Antarctic tourism industry contributes to the local economy, generating employment for the hospitality, gastronomy and maritime logistics industries. Locals perform the role of gatekeeper to the south, staffing the port, the souvenir shops and the guest-oriented hospitality industry. Antarctica can be 'experienced' in Ushuaia at any time of the year, in that the polar winds can turn a perfect summer day into an icy wonderland in hours. However, the sense of Antarcticness in this town relies heavily on the geopolitical portrayals of the southern polar neighbour and its wealthy tourists. Antarctica is simultaneously close and a faraway land that most people in Ushuaia can only imagine as they brave a weather system, or understand through someone else's lenses.

Punta Arenas (Chile)

On the northwestern shore of the Strait of Magellan is the city of Punta Arenas, home to approximately 130,000 inhabitants, concentrating the

3.4 Sign welcoming travellers to Punta Arenas indicating the city's Antarctic connection. Photograph by Gabriela Roldan, 2019.

permanent population of Chile's southernmost territories (Biblioteca del Congreso Nacional de Chile 2017). Visitors arriving to Punta Arenas by boat are welcomed to 'the Antarctic Gate', a reminder of the city's role as a portal to Antarctica (Figure 3.4). In addition, souvenirs, murals and memorials dotted along the waterfront perform expressions of Antarcticness. Over 50 sites of Antarctic historical and cultural significance are compiled in the booklet *Traces of Antarctica*, available in print and free download (Solar 2013). This guide also emphasises Punta Arenas' past association with the protagonists of the Heroic Era of Antarctic exploration. The places that Robert Falcon Scott, Ernest Shackleton and Roald Amundsen visited during their Antarctic adventures are portrayed in detail. There are plenty of educational opportunities and outreach activities for locals interested in Antarctic matters, from kindergarten and school programmes to tertiary certifications and the popular Antarctic School Fair, a countrywide annual science competition that introduces high school students to scientific research in Antarctica. These educational initiatives are developed within Chile's Antarctic strategy in an effort to 'Antarcticise' Chile (Vega 2018, 47). To 'Antarcticise' is to bring a sense of Antarcticness to the fore, while supporting the construction of a national identity imagined to extend from the Atacama Desert to the South Pole.

In 1520, the Portuguese explorer Ferdinand Magellan came upon the eponymous strait that connects the South Atlantic and Pacific Oceans, attracting the attention of European powers to this strategic waterway. Explorers, merchants and fortune seekers soon explored the intricate passages of this region and settled, to the detriment of the native population. Magellan's was the first of many significant geographical sightings made by Western explorers in this region, many associated with the search for Terra Australis. Landmarks such as Cape Horn and Drake Passage populated maps of these southern lands, enticing Antarctic explorers such as James Cook, Edward Bransfield, James Weddell and Jules Dumont d'Urville to survey, seek refuge, and provision their ships in this area. Sealers and, later, whalers were attracted by the abundance of marine mammals, which resulted in profitable businesses for the modest settlement at the Magellan Strait. Hence, in 1848, Chile established a penal colony and a port to help exercise control over the southern territory and the trade in the area. Punta Arenas became increasingly important as the preferred route for international shipping connecting Europe and the Americas' Pacific coastline, particularly during the Californian Gold Rush in the mid-1800s. By the end of the nineteenth century, Punta Arenas was a burgeoning polyglot port town, an essential stop for all travellers to southern South America and beyond. The opening of the Panama Canal (1914) greatly diminished Punta Arenas' transport hegemony, but its location and wealth, and the influence of European settlers in these regions, continued to appeal to those exploring the southern continent.

Antarctic expeditions led by Adrien de Gerlache, Robert Falcon Scott, Jean-Baptiste Charcot, Hubert Wilkins and Richard Byrd benefited from the financial backing and support from the European community settled in Punta Arenas. The most popular Antarctic expedition remembered in this town is linked to the rescue of the *Endurance* expedition's men marooned at Elephant Island in 1916. After failed attempts to reach Antarctica in search of his men, Shackleton received support from the British expat community in Punta Arenas, who organised assistance from the Chilean Navy. Second Officer Luis Pardo volunteered for this mission on the steamer *Yelcho*, travelling through uncharted Antarctic waters and returning successfully with all stranded men.

Upon their return to civilisation, Shackleton and his crew enjoyed the hospitality of Punta Arenas. The sites where social gatherings took place to honour these men are marked today with informative plaques dotted through the city. In 2016, the centenary of the *Endurance* expedition sparked celebrations worldwide, and Punta Arenas hosted a

3.5 The entrance to Chile's National Antarctic Programme headquarters in Punta Arenas is marked with a map that highlights the city's advantageous proximity to Antarctica. Photograph by Gabriela Roldan, 2019.

variety of commemorative events with the presence of descendants from the Shackleton and Pardo families. In December 2020, Pardo's bravery was honoured with a memorial on Punta Arenas' popular waterfront as an enduring reminder of the city's connection to Heroic Era exploration and as a counterpoint to the dominant narratives that centre on Western explorers.

Maps and banners in public areas around Punta Arenas celebrate the southern connection, fostering a strong sense of regionalism in 'Magallanes' that draws on narratives of endurance and courage of those who settled in this subpolar environment (Diaz Saldivia 2009). Geopolitically, Punta Arenas holds great importance for Chile's Antarctic territorial claims. Within the country's administration, this city is the capital for the Magallanes and Chilean Antarctic Region, comprising Chile's southernmost continental land, a portion of the archipelago of Tierra del Fuego, and the claimed Antarctic sector which is south of 60°S, between 53°W and 90°W (Gilbert 2015). Figure 3.5 shows this illustrated on the wall of INACH, the national Antarctic programme. Punta Arenas' Antarctic gateway role regained importance when Chile's NAP moved to the city in 2003. Chile's Antarctic capabilities and science programme benefit from the gateway's

modern port and airport infrastructure, and the relatively short distances to Antarctica. A year-round air link connects Punta Arenas with the aerodrome in King George Island, facilitating the transport of scientists and tourists to Antarctica.

In 2016, 20 countries launched their Antarctic expeditions from Punta Arenas (Retamales 2016), making this the most popular access point to the Antarctic Peninsula. The Antarctic tourism industry also benefits from Punta Arenas' Antarctic connections and logistics. Local tour companies offer flights to Antarctica that satisfy different budgets and interests: from a day visit to adventure tourism, or the novel travel combination of fly-cruise that allows for cruising Antarctic waters without the hassle of sailing through rough seas. 'The Antarctic Gate' has different meanings for tourists, locals, policy-makers and diplomats, but Antarctica continues to have an enduring presence in the city of Punta Arenas and influences the identity of the people of Magallanes.

Christchurch (New Zealand)

In February 1913, the New Zealand city of Christchurch mourned the death of Robert Falcon Scott's polar party and commissioned a marble statue of the hero by his widow, the sculptor Kathleen Scott. The ceremonial unveiling of the statue was attended by Mrs Scott, local authorities and hundreds of Cantabrians, who paid their respect to the polar explorer. Since then, Scott's statue has been the meeting point for Antarctic-related social and official gatherings, such as the annual wreath-laying ceremony to those Antarcticans who have died. When the statue was damaged during the Canterbury Earthquakes in 2011, local Antarctic enthusiasts pressured the local government to repair and reinstate it to its plinth. In 2017, Scott's statue returned to its original site on the banks of the Avon River and was celebrated with a well-attended ceremony and an audience including the explorer's direct descendants. The Scott Statue is a particularly visible marker of both Christchurch's strong historical links with Antarctic exploration and the city's own colonial past (Figure 3.6).

Around 370,000 inhabitants make Christchurch the largest city of New Zealand's South Island. It is also the seat of government for the Canterbury region, a large agricultural province and contributor to the country's economy. Before European colonisation, Māori iwi had established themselves on the undulating slopes and alluvial plains of the region, from the coast to the foothills of the Southern Alps. In 1850, the

3.6 Captain Scott's statue reinstated to its plinth in Christchurch. Photograph by Gabriela Roldan, 2017.

arrival of pilgrims from the Anglican English Canterbury Association imposed a distinctive influence that is tangible in Christchurch today.

The rural and conservative aspects for which Christchurch was known have changed in recent years. In 2010 and 2011, the Canterbury region suffered major Earthquake disasters, affecting the life of Christchurch significantly through material and psychological damage. The extensive destruction of the city's infrastructure, and damage to residential and business properties, resulted in the immediate relocation of communities and businesses (Parker and Steenkamp 2012). The rebuilding of the region required many years and a large workforce, many of whom migrated from Southeast Asia and Europe and have settled permanently in Canterbury. As a result, the urban landscape and population of Christchurch have changed. Once known as the 'the most English of colonial cities' (Rice and Sharfe 2008, 15), Christchurch is now promoted as 'the city of opportunities' (ChristchurchNZ 2018). One of these opportunities is the chance to engage with the city's Antarctic connections.

Christchurch celebrates its historic Antarctic connections mainly through the English expeditions that visited the region. James Cook's

eighteenth-century expeditions to the South Pacific and Antarctica are celebrated with a statue of the explorer prominently displayed in the central city, though Cook never set foot in Canterbury and his legacy of colonialism continues to cause harm. Christchurch's port of Lyttelton became associated with Antarctica's Heroic Era of polar exploration. Its relative proximity to Antarctica and the opportunities offered by an affluent English population made Christchurch a convenient stopover for British-led Antarctic expeditions. Explorers such as Scott and Shackleton benefited greatly from the interest and financial support given to their polar expeditions by the people of Canterbury (Mountevans 1953; Riffenburgh 2004). Fresh food, coal, workforce, scientific and logistical support, and a hefty financial backing for these polar endeavours created long-lasting connections with the expeditioners and with Antarctica. Christchurch hosted the Antarctic explorers as heroes and their success and fate had a deep impact on this English colony. As a result, Christchurch honours the places where these polar heroes were hosted, such as the Canterbury Club and Te Koraha, the former home of the Rhodes family. The polar heroes' personal artefacts, stories and memorials are part of the city's Antarctic connections and form the basis of a permanent exhibition at the Canterbury Museum.

Christchurch's modern Antarctic connections are based in its international airport facilities and date from the mid-1950s, when the US military taskforce 'Operation Deep Freeze' launched its expeditions to Antarctica from this city. Since then, Christchurch has been the host and Antarctic partner of the US. This long-standing international collaboration includes a logistics pool of Antarctic air transport for science and support staff of both countries, which has enabled many benefits, such as scientific and technological cooperation. This connection also plays out in Antarctica. As a result of logistical requirements, the US South Pole Station runs on Christchurch time.

Christchurch is the only gateway city with a multi-million-dollar Antarctic-dedicated campus, the International Antarctic Centre (IAC). The IAC was built in the 1990s to house the New Zealand and US NAPs. Decades later, this successful development also hosts the local headquarters for Italy, South Korea, China and Germany, as well as an Antarctic departure lounge, warehouses, workshops and a tourist attraction. The IAC offers visitors a taste of the far south, with displays on contemporary science projects, rides in Hägglunds all-terrain vehicles and a wind tunnel demonstrating the concept of wind chill. This Antarctic campus is visible from the airport, meaning Christchurch's identity as an Antarctic city is apparent to all those arriving by plane. It also provides a convenient family-friendly activity for those awaiting flights.

3.7 Mural in central Christchurch titled 'Crevasse', by Oi YOU! street art. Photograph by Gabriela Roldan, 2021.

There are multiple opportunities for the local community to be acquainted with Christchurch's Antarctic connections, from public art to formal education. Every spring, the local government's Antarctic Office organises festivities to celebrate the beginning of the Antarctic season. A civic reception welcomes local and international visitors that use Christchurch as their Antarctic gateway. The Antarctic festival offers the local community the opportunity to celebrate the city's Antarctic connections. For instance, the 2020 Days of Ice festival saw two murals featuring Antarctica appear in the central city, delighting both locals and visitors to Canterbury (Figure 3.7). In addition, the IAC and local museums offer educational and outreach programmes with an Antarctic focus, allowing children access to artefacts and stories about the far south. The University of Canterbury also houses a specialised Antarctic research centre, Gateway Antarctica, and hosts the Secretariat of the international Council of Managers of National Antarctic Programs (COMNAP). At a grassroots level, the local branch of the New Zealand Antarctic Society is a civil organisation that dates back to 1933 and was instrumental in establishing New Zealand's first Antarctic station

(Quartermain 1971). It is an active contributor to the promotion of Christchurch's Antarctic connections, organising public talks and assisting the local Antarctic community in outreach activities to raise the local profile of the far south.

Hobart (Australia)

Those arriving in the Australian city of Hobart in the month of October are welcomed with city-branded banners that label the place as a 'Gateway to Antarctica' (Figure 3.8). The banners, which coincide with the annual Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) meeting that brings together international diplomats to make decisions about fishing and protected areas in the Southern Ocean, are markers of both geographic and geopolitical alignment with the far south. Hobart's wider community has the opportunity to engage with the city's Antarctic cultural connections through the illustrated and self-guided tour booklet *Polar Pathways*, a 60-page guide that includes information on museum permanent exhibits, statues and murals, and places of interest from the past and present that link the region with Antarctica. Children can touch the frozen map of Antarctica at the Tasmanian Museum and Art Gallery's 'Islands to Ice' exhibition; the botanical gardens feature a sub-Antarctic house complete with wind and piped-in penguin noises; and city commuters drive past historical sites such as the hotel that Roald Amundsen stayed in upon his return from the South Pole (Leane and Nielsen 2019). In addition, the biennial Australian Antarctic Festival unites the local Antarctic community in a week of festivities and events for public outreach. Tours of icebreakers and local scientific institutions such as the Institute for Marine and Antarctic Studies (IMAS) aim to improve local awareness of the significance of the Antarctic connection to this Australian city.

Hobart is the administrative capital of Tasmania, Australia's southernmost and only island state. An estimated population of 240,000 people live within the city and Greater Hobart (Australian Bureau of Statistics 2019). Located on the southeastern coast of Tasmania, Hobart lies between the Derwent River and kunanyi/Mount Wellington. The muwinina people are the traditional owners of the land upon which Hobart is built. The naming of Australia's new icebreaker the RSV *Nuyina* celebrates the Indigenous palawa people's connections with the far south, since 'nuyina' is a palawa kani expression for southern lights (Australian Antarctic Division 2020). This naming choice reinforces the visibility of

3.8 Banners promoting Hobart as the gateway to Antarctica. Photograph by Hanne Nielsen, 2019.

and long-standing connection with the far south (via the aurora) for those who live in and around the Antarctic city of Hobart.

Hobart's Antarctic connections are linked to its maritime past. In the seventeenth century, the Dutch explorer Abel Tasman named the island Van Diemen's Land. In 1804, the British established a penal colony where Hobart sits today (Alexander and Petrow 2005). European explorers, fortune-seekers and traders of the South Pacific called into Tasmania to replenish their ships and to inform the world of their new discoveries. In the early 1800s, sealers and whalers established their operations in Tasmania and the sub-Antarctic islands, trading from the port of Hobart much sought-after oil and other whale products (Evans 2006), which encouraged others to explore and exploit further the Southern Ocean. The legacy of the sealing and whaling industry is remembered in Hobart today with information panels and whalers' try pots located along the city's waterfront and in public spaces.

Hobart appealed to South Pacific explorers beyond its trading capacities and convenient geographical location because, as Leane (2016b, 34) suggests, it was the 'means to another end: Antarctica'. The Antarctic expeditions led by the French explorer Jules Dumont d'Urville

(1837–40), British explorer James Clark Ross (1839–43) and Norwegian whaler Henrik Bull (1893–5), to name a few, were hosted, supported and celebrated in the Tasmanian port (Kriwoken 1993; Riffenburgh 2007). During the Heroic Era, Hobart also witnessed the launch of famous expeditions, such as the *Southern Cross* expedition led by Carsten Borchgrevink, which was the first to winter on the Antarctic continent (1898–1900). This expedition included the participation of a young local physicist named Louis Bernacchi (Kriwoken 2011). His Antarctic expertise is celebrated in Hobart's popular waterfront with a prominent sculpture of the scientist and his dog Joe (by local artist Stephen Walker), surrounded by sub-Antarctic penguins and a memorial plaque, offering an Instagrammable vista to visitors to the port.

Hobart's city centre also remembers the most popular Australian Antarctic explorer, Douglas Mawson, who became the first Australian to lead an Antarctic expedition (1911–14) and was a fervent believer in Australia's rights to the adjacent south polar land (Haward and Griffiths 2011). The exploration and scientific discoveries made during Mawson's three voyages to Antarctica and Macquarie Island, and his mapping of the coastline of East Antarctica, were precursors to the 1933 Australian Antarctic Territory Acceptance Act, which formalised Australia's territorial claim. Hobart celebrates Mawson's accomplishments with the Mawson's Huts Replica Museum, an attraction that showcases what life was like for early Antarctic explorers and offers education programmes and funding opportunities to create awareness of Australia's Antarctic history. This replica museum, run by a private trust, also represents an expression of everyday Australian nationalism for locals and visitors alike. As Leane et al. (2016) suggested, this museum assists with the construction of the gateway's Antarctic identity, while underpinning the geopolitical interests of Australia in Antarctica through maps that perpetuate the narratives of territorial rights in Antarctica.

In 1981, the Australian Antarctic Division moved to Hobart and revitalised this city's Antarctic interests and connections (Allen 2006). The Australian NAP's relocation brought to Tasmania much-needed jobs and a science community that transformed the education and employment opportunities for this state. Today, Hobart is home to the largest concentration of Antarctic research and teaching infrastructure of all Antarctic gateways. The University of Tasmania has undergraduate and postgraduate Antarctic studies courses, and its dedicated IMAS research centre specialises in Antarctica and the Southern Ocean. Hobart also hosts the secretariat for the Agreement on the Conservation of Albatrosses and Petrels (ACAP) and the CCAMLR headquarters, which attracts

3.9 Antarctic and Southern Ocean Coalition-sponsored mural painted in Hobart during the Commission on the Conservation of Antarctic Marine Living Resources meeting. Photograph by Hanne Nielsen, 2019.

multinational polar visitors for its annual meetings (Figure 3.9), contributing to the local economy and tourism industry while giving the gateway an ambassadorial role within Antarctica's scientific and policy-makers' communities.

The cluster of Antarctic science, training, education, services, logistics and business capability in Hobart is abundant and an important contributor to the city and the state's economy. The Antarctic connection stimulates local growth and attracts international science and technology partnerships. Hundreds of students from all over the world congregate in Tasmania for Antarctic education and research purposes. Equally, hosting the country's NAP and, regularly, the Antarctic expeditions of nations such as France and China generates public interest and business opportunities that expand the polar capabilities offered in Tasmania. As result, the Tasmanian Polar Network (TPN) – a consortium of public and private stakeholders composed of research institutes, businesses and government agencies – provides specialised polar knowledge, expertise and a range of cold-climate products and services. TPN also has a visible presence at the city's biannual Antarctic Festival. Hobart's Antarctic connections are therefore manifold and span the historical to present-day policy.

Cape Town (South Africa)

South Africa has operated its national Antarctic programme (SANAP) from Cape Town since the first South African expedition to Antarctica left from this city in 1959 (McNish 1971). SANAP's headquarters are located in the attractive business complex and marina of the Victoria and Albert Waterfront (V&A), where the ship *Agulhas II* docks and departs for Antarctica. The central location of the V&A allows tourists and public alike to witness the operations of this distinctive red polar ship, which is the most visible Antarctic connection in the city. In a celebration of this connection, local authorities invite the community to a farewell party for the Antarctic expeditioners at the start of the season to wave off the ship (Figure 3.10). Other markers of Antarctic links include a distance sign that includes Antarctica alongside well-known cities (Figure 3.11), and an obscure memorial to Scott in an outer suburb that is all but forgotten. This focus on contemporary connections is deliberate and reflects South Africa's internal priorities as much as it does the country's interaction with Antarctica.

Nearly four million people call Cape Town home. Located on the southwest coast of the African continent, Cape Town is the largest and oldest of the gateway cities. It is a multi-ethnic centre where Afrikaans, English and Xhosa are widely spoken. The city has a modern and European style, attracting tourism and foreign investment into the region and particularly the city's affluent central area. In contrast, the poor townships located in the periphery of the city seem to perpetuate the urban displacements of past eras, accentuating the inequalities and dominance of the wealthy population. The colonial history of the Cape dates back to the fifteenth century, when Portuguese – and later Dutch, French and British – seafarers called into the natural harbour of Table Bay to replenish their ships en route to the Indian spice markets (Nattrass 2018). Colonisation, land expropriation, war, the exploitation of natural resources, acculturation and enslavement by Europeans marked the following centuries of South Africa's history. In recent times, the violent apartheid regime that ruled South Africa from the mid- to late twentieth century has left deep scars in its people and institutions, despite the country's efforts towards reconciliation and racial equality since the establishment of democracy in the 1990s.

Cape Town's Antarctic connections date back to the early exploration of Terra Australis. As an established European colony at the 'end of the Earth', the Cape was a busy stopover for those sailing the South Atlantic

3.10 Members of the public bid farewell to South Africa's polar ship in Cape Town. Photograph by Gabriela Roldan, 2019.

3.11 A distance sign in the popular Victoria & Albert waterfront shows Antarctica is closer to Cape Town than locals imagine. Photograph by Gabriela Roldan, 2019.

and Indian Oceans and beyond. French explorer Marion du Fresne sailed south from the Cape in 1772 and mapped the sub-Antarctic islands today known as South Africa's Prince Edward Islands (Cooper and Headland 1991). James Cook called into Cape Town on all his major voyages. In 1772, Cook sailed south from the Cape on his second expedition, becoming the first to cross the Antarctic Circle and to circumnavigate the Antarctic continent.

During the nineteenth and early twentieth centuries, the Cape Colony was an established trade port for the sealing and whaling industries. Cape Town and the village of Simon's Town on the Indian Ocean coast offered labour, provisioning and winter quarters for British and Norwegian whaling companies that operated in the Southern Ocean (van der Watt & Swart 2015). Scott's two Antarctic expeditions (1901–4 and 1910–13) benefited from the goods and generosity of the British settlers at Cape Town. Similarly, in 1929, the British-Australian-New Zealand Antarctic Research Expedition (BANZARE) ship, the RRS *Discovery*, arrived at Cape Town for coaling en route to Antarctica, led by the Australian Douglas Mawson. In his account of the expedition, Mawson remarked how much interest the public had in Antarctica and how the local newspapers at the Cape included concerns for Norway's territorial intentions in the far south (Mawson 1988).

By the mid-twentieth century, and at a time where countries disputed rights to territorial claims to Antarctica, South Africa's involvement with the Antarctic was negligible. The government had little interest in Antarctica. This inaction can be understood as a lack of vision and political drive from a regime under international condemnation for its systematic racial segregation, which did not see the advantages that Antarctica offered within diplomatic forums (Roberts et al. 2013). However, under pressure from the South African science community, in 1959 South Africa organised its first Antarctic expedition from Cape Town, led by Hannes La Grange, a meteorologist who had participated in the crossing of Antarctica with the Trans-Antarctic Expedition in 1955–8 (Cooper and Headland 1991). Apartheid also impacted upon who had access to Antarctica. Popular representations of the whiteness of Antarctica mirrored the whiteness of its expeditioners and the government's connections to the Commonwealth (van der Watt and Swart 2016).

Today, other NAPs including those of Germany, India and the UK use Cape Town's facilities to launch their maritime Antarctic expeditions. Cape Town's modern international airport allows for an air link to Antarctica during the summer months, which facilitates the operations of

the multinational consortium Dronning Maud Land Air Network (DROMLAN), providing logistics for Belgium, Finland, Germany, India, Japan, the Netherlands, Norway, Russia, South Africa, Sweden and the UK NAPs (COMNAP 2015). The relatively short travel distances from Europe to South Africa, compared to other countries with gateway cities, coupled with the use of similar time zones, gives Cape Town a competitive advantage when offering services to those operating in the Queen Maud Land area of Antarctica. In addition to science-motivated Antarctic travel, Cape Town hosts high-end tour operators who organise private expeditions and offer inland south polar adventures in specialised vehicles and luxury camping options. These are sophisticated and expensive ways to visit Antarctica, which build on the international reputation of the city (and surrounding attractions) as an exotic tourism destination.

In contrast with the multiple Antarctic activities that launch from its shores, Cape Town offers limited opportunities for cultural and educational engagement with Antarctica. Although Antarctic education, research and technological advances have been identified as core priorities for the success of South Africa's leadership in Antarctic matters (Ansorge et al. 2017), Antarctica is still missing in school and undergraduate curricula in the Western Cape. Education and outreach efforts by the Antarctic Legacy of South Africa (ALSA) project, an initiative to preserve South Africa's human history in Antarctica, seek to address the absence of Antarctic connections in the wider community. ALSA's multifaceted tasks attempt to bridge the gap between the past and the present of South Africa in Antarctica, collaborating with SANAP's social and public outreach activities, supporting the new generation of Antarctic expeditioners and enthusiasts, and working closely with Cape Town's City Council to lift the city's Antarctic gateway profile. Cape Town is closer to Antarctica than its people can sometimes feel in present times.

Performing an Antarctic connection

Antarcticness is performed by these cities in a range of ways, from signage to festivals to statues to the hosting of Antarctic secretariats. The varied manifestations are revealing of the character of each place and the importance of the Antarctic association within the gateways. Hobart and Christchurch share Commonwealth links and both make use of this to perform Antarctic connections through polar heritage. Mawson's hut and the Scott statue both celebrate Heroic Era figures, and the cities use these

historical connections to bolster modern-day links with Antarctica. Cape Town also hosts a statue of Scott, but this vestige of the colonial past is not celebrated in the same way. Instead, the most visible reminders of South Africa's Antarctic connections are the national and foreign-flagged icebreakers that visit the port, vessels which highlight the polar international community's reinstated confidence in the Rainbow Nation's logistical capacity.

Making visible the distance to Antarctica is another way to perform Antarcticness at the gateways. Geographical separation from the White Continent is represented through signs and narratives that foreground closeness with Antarctica rather than the void of the Southern Ocean. The billboard at the port of Punta Arenas proclaims an identity as an 'Antarctic City', the Cape Town waterfront includes a signpost to the 'South Pole', and in Ushuaia a sign showing distances to Antarctica establishes the city's precedence in terms of proximity to the southern continent. In all these locations, the intended audience for the signs is the high-end tourism market, including those who transit en route to Antarctica. The signs are therefore for the benefit of visitors and situate them within a relational connection to Antarctica. Antarcticness manifests in other ways for those who call the Antarctic cities home. Maps in Punta Arenas and Ushuaia include Chile and Argentina's Antarctic territorial claims respectively, while addresses include 'Magallanes and Chilean Antarctic region' or Ushuaia as the capital of 'Tierra del Fuego, Antarctica and the Islands of the South Atlantic'. Antarctic cities are often depicted as transitory hubs for people travelling to Antarctica, with ships coming and going a common theme, but the manifestations of Antarcticness are far more wide-ranging than simple transportation for the local communities.

Choices about how Antarcticness is represented and celebrated can be made on a number of levels, with involvement from individuals, local stakeholders from the private and public sectors and national governments. In some cases, the visible markers have a very personal story, as is the case with the Scott Statue in Christchurch that was carved by Scott's widow. Others have emerged as the result of grassroots projects. The bust of Gerlache that was placed in Ushuaia to mark the centenary of the *Belgica* expedition was supported by the local Maritime Museum and then sparked the development of an entire walkway of Antarctic pioneers along the waterfront. In some instances, such as the Antarctic festivals in Christchurch and Hobart, visible Antarctic connections are driven by local governments, but rely heavily on local volunteer organisations. In other instances, the national government drives decisions. Domiciling NAPs in these Antarctic rim cities signals high-level interest in supporting Antarctic

connections and identity within particular domestic locations, especially supporting them as gateway cities. Similarly, the hosting of CCAMLR in Hobart and COMNAP in Christchurch connects the cities to both Antarctic science and diplomacy, as the cities act as ambassadors for their countries on the world stage of Antarctic affairs. Regardless of the origins of these visible connections to Antarctica, they become part of the urban landscape, embedding Antarcticness within each city in multiple ways.

Into the future

While European history has dominated the Antarctic region, the sites of all five Antarctic cities were inhabited prior to the arrival of European settlers. Indigenous connections with the far south (including oral histories about the place) that have often been overlooked should be more explicitly acknowledged in the future, especially for interpreting Antarcticness. Looking forward, there are opportunities for domestically marketed tourism to bring Antarctica to the forefront at each of the Antarctic gateway cities. Marketing existing attractions and connections to domestic audiences will raise the profile of the continent internally and is a particularly important proposition in the context of the Covid-19 global pandemic during which this chapter was written. Dialogue between the Antarctic cities will be useful for understanding how others connect with Antarctica and perform their Antarcticness. For instance, in 2009, representatives of the five Antarctic gateways met officially for the first time in Christchurch to sign a statement of intent (SOI) aiming at maintaining international partnerships, collaboration and the sharing of best practices that could benefit all cities (Christchurch City Council 2009). Although the commitment evident in the SOI was interrupted by subsequent events (e.g. the Canterbury Earthquakes in 2010–11 and the Covid-19 pandemic starting in 2020), the Antarctic gateways acknowledge that collaboration between cities is the way forward to realising the potential of their roles as entry points to Antarctica.

There is also scope for more community-based engagement and understanding of the region. The Antarctic Youth Coalition (AYC) is an example of this. Formed in 2018 as a legacy of the Antarctic Cities Project (a multidisciplinary and international research project funded by an Australian Research Council Grant and multiple partners; see https://antarctic-cities.org), the AYC aims to 'build a network of young custodians across the five Antarctic Gateway cities, advocating for Antarctica's future, by promoting sustainable communities and connected urban identities'

(Antarctic Youth Coalition 2020). This aim explicitly links Antarctica to the lives of those back home, helping to make the continent meaningful for a wider range of people, particularly younger generations.

Popular representations of Antarctica embody purity, wilderness and untouched nature, all symbols of a place that lacks human presence, interference and history. Antarctica's isolation from people and civilisation is bridged through the Antarctic gateways, the closest neighbours and entry points for humans to this environment. Therefore, performing 'Antarcticness' in the gateways – by foregrounding the quality of being inherently linked to Antarctica – is a way of asserting the distinctive character of portals to the southern polar world. 'Antarcticness' need not be an exclusionary concept, reserved only for those who have had the privilege of travelling to the southern continent. Rather, once a connection with the place has been established – be that via festivals, books, weather patterns or historical narratives – it is possible to sit anywhere in the world and engage with Antarctica in a meaningful way. From this perspective, 'Antarcticness at the ends of the world' is really just the beginning.

References

Alexander, Alison, and Stefan Petrow. 2005. 'Hobart'. Accessed 14 August 2021. http://www.utas.edu.au/tasmanian-companion/biogs/E000482b.htm.

Allen, Rod. 2006. 'How did we get here? A bumpy ride from Melbourne to Hobart'. Accessed 23 May 2019. http://www.antarctica.gov.au/magazine/2006-2010/issue-10-autumm-2006/feature/how-did-we-get-here-a-bumpy-ride-from-melbourne-to-hobart.html

Ansorge, Isabelle J., Paul Skelton, Annie Bekker, P.J. Nico De Bruyn, Doug Butterworth, Pierre Cilliers, John Cooper, Don A. Cowan, Rosemary Dorrington, Sarah Fawcett, Susanne Fietz, Ken P. Findlay, P. William Froneman, Geoff H. Grantham, Michelle Greve, David Hedding, G.J. Greg Hofmeyr, Michael Kosch, Peter C. le Roux, Mike Lucas, Keith MacHutchon, Ian Meiklejohn, Werner Nel, Pierre Pistorious, Peter G. Ryan, Johan Stander, Sebastiaan Swart, Anne Treasure, Marcello Vichi and Bettine Jansen van Vuuren. 2017. 'Exploring South Africa's southern frontier: A 20-year vision for polar research through the South African National Antarctic Programme'. *South African Journal of Antarctic Research* 113: 5–6.

Antarctic Youth Coalition. 2020. 'Strategic overview'. Accessed 12 September 2021. https://antarctic-cities.org/wp-content/uploads/2020/07/AYC-Strategic-Overview.pdf.

Australian Antarctic Division. 2020. 'Naming Australia's icebreaker'. Accessed 14 August 2021. https://www.antarctica.gov.au/antarctic-operations/travel-and-logistics/ships/icebreaker/naming-australias-icebreaker.

Australian Bureau of Statistics. 2021. 'Population Australia: Hobart population 2021'. Accessed 14 August 2021. http://www.population.net.au/hobart-population.

Barr, Susan, and Cornelia Lüdecke. 2010. *The History of the International Polar Years*. Heidelberg: Springer.

Berguño, Jorge, and Aant Elzinga. 2010. 'The achievements of the IGY'. In *The History of the International Polar Years*, edited by Susan Barr and Cornelia Lüdecke, 259–78. Heidelberg: Springer.

Bertram, Esther, Shona Muir and Bernard Stonehouse. 2007. 'Gateway ports in the development of Antarctic tourism'. In *Prospects for Polar Tourism*, edited by John Snyder and Bernard Stonehouse, 123–46. Wallingford: CABI.

Biblioteca del Congreso Nacional de Chile. 2017. 'Región de Magallanes'. Accessed 14 August 2021. https://www.bcn.cl/siit/nuestropais/region12.
Capdevila, Ricardo, and Santiago Comerci. 2013. *Los tiempos de la Antártida: Historia de la Antártida Argentina'*. Ushuaia: Editora Cultural Tierra del Fuego.
Cooper, John, and Robert K. Headland. 1991. 'A history of South African involvement in Antarctica and at the Prince Edward Islands'. *South African Journal of Antarctic Research* 21(2): 77–91.
Christchurch City Council. 2009. 'Southern rim gateway cities to the Antarctic. Statement of intent'. Accessed 15 August 2021. http://archived.ccc.govt.nz/Council/proceedings/2009/September/CnclCover24th/Council24thFullAgenda.pdf.
ChristchurchNZ. 2018. 'Explore Christchurch'. Accessed 15 August 2021. https://www.christchurchnz.com/explore.
COMNAP. 2015. *Proceedings of the COMNAP Symposium 2014: Success through international co-operation, Auckland, New Zealand, 25 August 2014*. Christchurch: COMNAP Secretariat.
Day, David. 2012. *Antarctica: A biography*. North Sydney: Knopf.
Diaz Saldivia, Milton. 2009. 'La identidad Magallánica, una perspectiva desde la revisión bibliográfica de nuestra historiografía regional'. In *Identidad regional y desarrollo para Magallanes*, 22–32. Punta Arenas: Gobierno Regional de Magallanes y Antártica Chilena.
Dodds, Klaus. 2012. 'The Falkland Islands as a "strategic gateway": Britain and the South Atlantic overseas territories'. *RUSI Journal* 157(6): 18–25.
Elzinga, Aant. 2013. 'Punta Arenas and Ushuaia: Early explorers and the politics of memory constructing Antarctic gateway cities'. *Polar Journal* 3(1): 227–56.
Evans, Kathryn. 2006. 'Whaling in Tasmania'. Accessed 15 August 2021. http://www.utas.edu.au/library/companion_to_tasmanian_history/W/Whaling.htm
Fox, William L. 2005. *Terra Antarctica: Looking into the emptiest continent*. San Antonio, TX: Trinity University Press.
Garbe, Julius, Torsten Albrecht, Anders Levermann, Jonathan F. Donges and Ricarda Winkelman. 2020. 'The hysteresis of the Antarctic ice sheet'. *Nature* 585: 538–44.
Gilbert, Neil. 2015. 'A continent for peace and science'. In *Exploring the Last Continent: An introduction to Antarctica*, edited by Daniela Liggett, Bryan Storey, Yvonne Cook and Veronika Meduna, 327–59. Cham: Springer.
Hall, C. Michael. 2000. 'The tourist and economic significance of Antarctic travel in Australian and New Zealand Antarctic gateway cities'. *Tourism and Hospitality Research* 2(2): 157–69.
Hamilton, James. 2020. *Captain James Cook and the Search for Antarctica.* Barnsley: Pen & Sword.
Haward, Marcus, and Tom Griffiths. 2011. *Australia and the Antarctic Treaty System: 50 years of influence*. Sydney: University of New South Wales Press.
Hince, Bernadette. 2000. *The Antarctic Dictionary. A complete guide to Antarctic English*. Melbourne: CSIRO.
International Association of Antarctica Tour Operators. 2020. 'IAATO Antarctic visitor figures 2019–2020'. Accessed 15 August 2021. https://iaato.org/wp-content/uploads/2020/07/IAATO-on-Antarctic-visitor-figures-2019-20-FINAL.pdf.
Jensen, Marie, and Marisol Vereda. 2016. 'The origins and development of Antarctic tourism through Ushuaia as a gateway port'. In *Tourism in Antarctica: A multidisciplinary view of new activities carried out on the White Continent*, edited by Monika Schillat, Marie Jensen, Marisol Vereda, Rodolfo A. Sanchez and Ricardo Roura, 75–99. Cham: Springer.
Kriwoken, Lorne. 1993. 'Hobart, Tasmania: Antarctic and Southern Ocean connections'. *Polar Record* 29(169): 93–102.
Kriwoken, Lorne K. 2011. *Polar Pathways: Exploring Tasmania's Antarctic heritage*. Hobart: self-published.
Lavery, Charne. 2019. 'Antarctica and Africa: Narrating alternate futures'. *Polar Record* 55(5): 347–50.
Leane, Elizabeth. 2016a. *South Pole: Nature and culture.* London: Reaktion.
Leane, Elizabeth. 2016b. 'Tasmania from below: Antarctic travellers' accounts of a southern "gateway"'. *Studies in Travel Writing* 20(1): 34–48.
Leane, Elizabeth, and Hanne Nielsen. 2019. 'Gateway tourism: Exploring Antarctica in Tasmania', in *Tourism in Tasmania*, edited by Can Seng Ooi and Anne Hardy, 88–100. Hobart: Forty South.
Leane, Elizabeth, Tim Winter and Juan F. Salazar. 2016. 'Caught between nationalism and internationalism: Replicating histories of Antarctica in Hobart'. *International Journal of Heritage Studies* 22(3): 214–27.

Mancilla, Alejandra. 2018. 'The moral limits of territorial claims in Antarctica'. *Ethics and International Affairs* 32(3): 339–60.
Mawson, Douglas. 1988. *Mawson's Antarctic diaries*, edited by Fred Jacka and Eleanor Jacka. Sydney: Allen & Unwin/Haynes.
Mayer, Larry, Martin Jakobsson, Graham Allen, Boris Dorschel, Robin Falconer, Vicki Ferrini, Geoffroy Lamarche, Helen Snaith and Pauline Weatherall. 2018. 'The Nippon Foundation–GEBCO Seabed 2030 Project: The quest to see the world's oceans completely mapped by 2030'. *Geosciences* 8(2): 63. https://doi.org/10.3390/geosciences8020063.
McFarlane, Turi. 2008. 'Māori associations with the Antarctic: Tiro o te Moana ki te Tonga'. Accessed 15 August 2021. https://ir.canterbury.ac.nz/bitstream/handle/10092/14205/Turi%20McFarlane%20project.pdf?sequence=1.
McNish, Kenneth T. 1971. *The Eternal Ice*. Cape Town: Tafelberg.
Mosti, Patricia, and Jorge Luis Sallies. 2016. 'Las imágenes inducidas de Tierra del Fuego (Argentina). Cambios y permanencias en el contenido de la promoción turística oficial (1990–2012)'. *Revista de Turismo y Patrimonio Cultural* 14(4): 859–74.
Mountevans, Edward Ratcliffe Garth Russell Evans. 1953. *South with Scott*. London: Collins.
Nattrass, Gail. 2018. *A Short History of South Africa*. London: Biteback.
Nielsen, Hanne, Chloe Lucas and Elizabeth Leane. 2019. 'Rethinking Tasmania's regionality from an Antarctic perspective: Flipping the map'. *M/C Journal* 22(3). https://doi.org/10.5204/mcj.1528.
Nielsen, Hanne E.F. 2020. 'Identifying with Antarctica in the ecocultural imaginary'. In *Routledge Handbook of Ecocultural Identity*, edited by Tema Milstein and José Castro-Sotomayor, 225–39. London: Routledge.
Parker, Miles, and Daan Steenkamp. 2012. 'The economic impact of the Canterbury Earthquakes'. *Reserve Bank of New Zealand Bulletin* 75(3): 13–25.
Prior, Stuart. 1997. *Antarctica: View from a gateway*. Wellington: Centre for Strategic Studies, Victoria University of Wellington.
Quartermain, Leslie B. 1971. *New Zealand and the Antarctic*. Wellington: Government Printer.
Retamales, Jose. 2016. 'Punta Arenas, world capital for Antarctic Research'. *ILAIA, Advances in Chilean Antarctic Science* 3: 30–33.
Rice, Geoffrey, and Jean Sharfe. 2008. *Christchurch Changing: An illustrated history*, 2nd edition. Christchurch: Canterbury University Press.
Riffenburgh, Beau. 2004. *Nimrod: Ernest Shackleton and the extraordinary story of the 1907–09 British Antarctic Expedition*. London: Bloomsbury.
Riffenburgh, Beau. 2007. 'Appendix I: Chronology of Antarctic exploration'. In *Encyclopedia of the Antarctic*, edited by Beau Riffenburgh, vol. 2, 1109–14. New York: Routledge.
Roberts, Peder, Klauss Dodds and Lize-Marié Van der Watt. 2013. '"But why do you go there?" Norway and South Africa in the Antarctic during the 1950s'. In *Science, Geopolitics and Culture in the Polar Region*, edited by Sverker Sörlin, 79–101. Farnham: Ashgate.
Roberts, Peder, Lize-Marié Van der Watt and Adrian Howkins (eds). 2016. *Antarctica and the Humanities*. London: Palgrave Macmillan.
Stephens, Tim. 2019. 'Governing Antarctica in the Anthropocene'. In *Anthropocene Antarctica: Perspectives from the humanities, law and social sciences*, edited by Elizabeth Leane and Jeff McGee, 17–32. New York: Routledge.
Solar, Rosamaría. 2013. *Traces of Antarctica around Punta Arenas and the Straits of Magellan*, translated by Robert Runyard. Punta Arenas: Instituto Antártico Chileno.
Storey, Bryan, and Yvonne Cook. 2005. 'A long journey south: Unravelling Antarctica's geological history'. In *Exploring the Last Continent: An introduction to Antarctica*, edited by Daniela Liggett, Bryan Storey, Yvonne Cook and Veronika Meduna, 29–49. Cham: Springer.
Van der Watt, Lize-Marié, and Sandra Swart. 2015. 'Falling off the map: South Africa, Antarctica and empire, *c*.1919–59'. *Journal of Imperial and Commonwealth History* 43(2): 267–91.
Van der Watt, Lize-Marié, and Sandra Swart. 2016. 'The whiteness of Antarctica: Race and South Africa's Antarctic history'. In *Antarctica and the Humanities,* edited by Peder Roberts, Lize-Marié Van der Watt and Adrian Howkins, 125–56. London: Palgrave Macmillan.
Vega, Edgardo. 2018. 'Antarctic spirit: Building an Antarctic culture'. *ILAIA, Advances in Chilean Antarctic Science* 4: 46–9.
Wehi, Priscilla M., Nigel J. Scott, Jacinta Beckwith, Rata Pryor Rodgers, Tasman Gillies, Vincent Van Uitregt and Krushil Watene. 2021. 'A short scan of Māori journeys to Antarctica'. *Journal of the Royal Society of New Zealand*. DOI: 10.1080/03036758.2021.1917633.

4

Dealing with Antarcticness: the ABC of effective Antarctic teams

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Simultaneously beautiful and dangerous, Antarctica's environment is harsh. Weather conditions change within minutes, especially during the Antarctic winter when the continent is almost completely cut off from outside contact, making resources scarce. In this extreme volatility, scientists, expeditioners, staff and managers face unprecedented challenges that hardly compare with other environments. This dynamic, dangerous and, at the same time, beautiful environment captures how we define 'Antarcticness'. In Antarctica, things often do not go according to plan. Teams have to deal with Antarcticness, which means they must quickly adapt and improvise to ensure mission success (Chapter 9). Shackleton's Imperial Trans-Antarctic Expedition represents the quintessential team that dealt with unexpected events and came up with new plans on the fly to survive.

On 5 December 1914, Ernest Shackleton and his crew left the UK's southernmost whaling village on South Georgia Island in their quest to be the first to cross the Antarctic continent. The Imperial Trans-Antarctic Expedition consisted of one ship, the *Endurance*. The team planned to travel into the Weddell Sea and deposit a crew of six men, who would then journey overland across the continent to the Ross Sea. The *Endurance* would then sail around the mainland to the Ross Sea, where another team would be dispatched to lay supply depots for Shackleton and his crew to complete the second half of their overland trek. The ship would await the first team's arrival on the Ross Sea. However, everything turned out differently. The *Endurance* never reached the Weddell Sea. Only 44 days

into the mission, the ship got stuck in pack ice. Shackleton and his crew waited on board the vessel for almost ten months from January until October 1915, when they abandoned the ship in a calculated decision to take refuge on the ice. After camping on a drifting ice floe for three months, they saw Elephant Island appear on the horizon. With their three remaining lifeboats, the crew opted to sail to Elephant Island, a gruelling seven-day sea journey. After their arrival, Shackleton announced that he and two others would sail 1,280 kilometres to South Georgia in one of the small lifeboats to seek assistance. After 17 days, the tiny lifeboat and its three-person crew miraculously arrived on South Georgia's west coast. Back on the island, they mobilised help. After three unsuccessful rescue missions, in August 1916, the Chilean government offered the ship *Yelcho*, which ultimately rescued the remaining team members of the Trans-Antarctic Expedition. All members of the crew survived (Koehn et al. 2003; Lansing 2015).

Shackleton displayed extraordinary leadership and teamwork in a crisis which enabled him and his team to deal with Antarcticness successfully. Even during illness and confinement to his sleeping bag while camping on the ice floe, Shackleton regularly monitored the crew for breakdowns in morale or discontent. He knew that only a highly functioning team could deal with and adapt to this extreme situation and survive. Even today, despite technological and engineering progress, Antarctica remains a challenging environment where teams must deal with the unexpected to fulfil their mission. Extreme weather changes may prevent planned outside work for weeks, or broken equipment may impede sample collection from the ocean bottom (Marques-Quinteiro et al. 2020). These moments force teams to adapt and improvise. However, many groups mismanage Antarcticness and threaten mission success, while others rise to the occasion and devise the most creative solutions to achieve their mission goals. But what mechanisms make an extraordinary team in Antarctica and help teams successfully deal with the unexpected?

In this chapter, we aim to answer this question and present the ABC of effective Antarctica teams (i.e. **a**nticipation, **b**uilding social relationships, **c**ollective reflection). First, we provide a thorough definition of teams and teamwork and offer a rationale for teamwork's crucial nature, especially for teams in extreme environments. Then we present three teamwork processes which help Antarctic teams improve teamwork and better deal with the unexpected. Although most of our examples come from Antarctic teams, the lessons in this chapter are relevant for teams in other extreme environments and professional

occupations where unexpected events abound. We base our findings on our six-year-long research programme exploring social aspects of Antarctic research teams, including interviews with numerous individuals and groups that visited different parts of Antarctica and our own experience from two field missions to King George Island. We will share selected excerpts from our interview data to add richness to our descriptions.

Definitions of teams, teamwork and team performance

'Teams' impact life everywhere. Today most big triumphs are achieved by teams of experts rather than lone individuals. Especially in Antarctica, we see a variety of teams (Chapters 10 and 16). During Antarctica's summer, hundreds of research teams from all over the world visit the continent to conduct their research projects. These teams work as part of a bigger ecosystem, which demands close coordination and works with base station staff to receive logistical support or share lab space. During winter in the southern hemisphere (the austral winter), fewer teams remain on the continent. A small number of people, often consisting of individuals with different experience, expertise and cultural backgrounds, work and live in research stations with limited private space. Although summer and winter teams face varying challenges, both must deal with and adapt to an extreme environment; they all must deal with Antarcticness.

We define teams as identifiable social work units consisting of two or more people with multiple unique characteristics (Salas et al. 2007). These characteristics include (a) dynamic social interaction with meaningful interdependencies, (b) shared and valued goals, (c) a discrete lifespan, (d) distributed expertise and (e) assigned responsibilities and roles (Salas et al. 2007) Antarctic science teams often study various aspects of climate change and thus investigate soil and ice samples; these teams nurture meaningful interactions and interdependencies since in the field they work together towards the common goal of collecting and analysing samples. They may even collaborate on a research paper about their findings. Such team members share multiple explicitly shared goals. During their work, they distribute tasks (such as sample collection and lab work), some of which are interdependent and require coordination. Usually, a team consists of a senior scientist and a PhD student. The senior scientist leads the team and assumes responsibilities different from the PhD student.

Teams must reflect on and explicitly discuss shared goals, obligations and roles. Whereas misaligned understandings can quickly lead to conflict due to differing expectations (Thomas 1992), shared understanding about these aspects forms the basis of good teamwork (DeChurch and Mesmer-Magnus 2010).

'Teamwork' is a common term we intuitively understand. We immediately recognise good teamwork in the same way we immediately notice when a team underperforms. However, we often struggle to clearly define 'good' teamwork or even just 'teamwork'.

Teamwork is a process that describes interactions among team members who combine collective resources to resolve a task. We can distinguish teamwork or team processes from taskwork. Taskwork is defined as a team's interactions with tasks, tools, machines and the system (Brannick et al. 1997). Taskwork captures *what* a team is doing, whereas teamwork comprises *how* team members do it. For example, in our research team studying climate change, one team member acting *alone* analyses soil samples would be considered taskwork. However, the way how the two team members coordinate each other's action while drilling for soil samples *together* is considered teamwork.

We have learned a great deal about team science in the past decades. An increasing body of scientific evidence underscores the positive effects of teamwork on team outcomes (Gully et al. 1995; LePine et al. 2008; Tannenbaum and Cerasoli 2013; Schmutz et al. 2019). Teamwork has been investigated and trained in various industries, including aviation (O'Connor et al. 2008), astronaut teams (Larson et al. 2019) and medicine. In healthcare specifically, about 70 per cent of medical errors arise from poor communication or teamwork (Kohn et al. 1999; Schmutz et al. 2019). Since evidence widely suggests that teamwork contributes significantly to good performance, processes related to training and maintaining teamwork effectiveness demand more attention.

This realisation also applies to teams travelling to Antarctica. We can pull together the best experts, but a team of experts does not necessarily make an expert team. Individual team members must also perform well together. Below, we will present three specific teamwork processes that are especially important for teams to deal with Antarcticness successfully (Table 4.1): anticipation, building social relationships and collective reflection. Our research programme about team adaptation has identified these three teamwork processes that promote team effectiveness in Antarctica (Marques-Quinteiro et al. 2020; Schmutz et al. 2020). We define and illustrate these processes by

Table 4.1 The ABC of effective teamwork in Antarctica teams

Teamwork process	Definition	Effect on team
Anticipation	Anticipation is defined as identifying the situations that might happen in the future and defining the corresponding courses of action. Teams can anticipate in the form of team planning.	Anticipating well gives the team a broader repertoire of action plans that will enable a quicker response and better goal-directed coordination efforts.
Building social relationships	Building social relationships is defined as the collective process of engaging in social interaction that builds and sustains social ties. Teams can build social ties by having social time.	Building social relationships will accelerate establishing cohesive and trustful relationships within the team and with others.
Collective reflection	Collective or team reflection is defined as shared reflection on the team's objectives, strategies and processes and adapt accordingly. Teams can reflect in form of debriefings.	Collective reflection will help a team learning from experience and making adjustments during the process to improve performance.

Application/training	**What does it look like?**
Follow three points to conduct effective planning: 1. Learn about the work environment of the place where you are going. 2. Learn about the social environment of the place you are going. 3. Plan the work: a. Define plan A (i.e. the main plan). b. Define contingency plans (i.e. alternative plans if plan A does not work). c. Define plans on the fly (i.e. if situational requirements make a and b impossible).	'When it comes to fieldwork, we always have a plan A, a plan B, a plan C . . . We do backup plans so that if we can't do it as we have planned [use a motor pump], we do manual sample dragging.'
Follow four points to build social relationships: 1. Know your team members personally. 2. Take a genuine interest in other people's work. 3. Get involved in the station's routines. 4. Engage in social time.	'We always try to go together, we try to eat meals together, waiting for each other and going together and when there are researchers who do not do that, it is a sign that there is something that is not going very well.'
Follow four points to conduct an effective debriefing: 1. Schedule a regular time and place. 2. Create an open team climate. 3. Answer five key questions: - What were we trying to accomplish? - Where did we achieve/miss our goals? - Why did we achieve/miss our goals? - How was our teamwork? - What should we start, stop or continue doing? 4. Write down implications and future directions.	'We evaluated the day, we did a debriefing on the way back [from the field trip] and asked ourselves what went well, where can we improve, and what will we do differently in the future? We both were talking about how we reached the goals that we got more done than expected. I definitely felt proud, and we were in a good mood.'

synthesising the scientific literature and including representative quotes from interviews we conducted with Antarctic expeditioners.

The ABC of effective teamwork in Antarctic teams

Imagine a team prepared for a two-month expedition. They prepared all their equipment, clarified goals, distributed responsibilities and developed a shared understanding of what to do. In the first two weeks, everything goes according to plan, and they hit their first milestones. In the third week, the team gets behind schedule due to bad weather and broken equipment; objectives seem harder to meet, and now two team members are at odds, which impedes work and creates awkward situations within the team.

Common stories such as these impact many teams travelling to Antarctica. Antarcticness entails various stressors to which teams must adapt in order to remain productive or, in extenuating circumstances like Shackleton's team, to survive. Stressors in Antarctica can be categorised as follows: isolation, confinement and environment (Palinkas 1992). Stations are physically isolated from the outside world, especially during winter. Social restrictions abound due to limited communication with friends and family back home and often impossible travel to and from the continent due to weather conditions. This isolation from the outside world also leads to a scarcity of resources. Tools and equipment are finite, and people must make do with supplies available at the stations (Chapter 5). However, within the station itself, teams face confinement combined with a lack of privacy and often new and unaccustomed challenges. Further, the lack of separation between work and leisure amplifies this sense of confinement because living and working spaces are in close proximity. Finally, the hostile environment represents a significant stressor in itself. Antarctic teams face extreme light-dark cycles, low humidity and extreme cold.

These stressors together pose significant risks for individual physiological and psychological wellbeing. Also, teamwork can break down. Individuals, as well as teams, must adapt to these stressors to remain functional. Individual reactions and adaptation strategies to stressors have been discussed extensively (Palinkas 1991, 1992, 2003; Palinkas et al. 2004). Therefore, we focus on three team-level adaptation strategies to assist groups in adapting to stressors and maintaining good teamwork in Antarctica.

Anticipation

We engage in the cognitive behaviour of 'anticipation' to perform our everyday activities. We anticipate when we check tomorrow's weather forecast or make a grocery list. Human beings are generally quite good at intuitively predicting some events or situations and adjusting accordingly. However, anticipation as a purposeful, intentional and structured behaviour comes less naturally to most of us since it requires deliberate thought and demands structured planning.

The teamwork literature states that 'planning is an essential process whenever a collection of individuals is required to coordinate the effort to accomplish tasks more complex and challenging than could be individually tackled' (DeChurch and Haas 2008). As previously mentioned, team activity can be divided into taskwork (what a team does) and teamwork (how team members do it). Hence, effective anticipation requires that team members plan taskwork (to enable coordination of actions and do the job) and teamwork (to clarify roles and team relations and keep the team together).

In Antarctica, effective anticipation of taskwork and teamwork ensues if team members use planning behaviours that are both long-term and short-term focused. Furthermore, these behaviours should account for what team members will be doing and how they will be doing it. Long-term actions include deliberative planning and contingency planning (DeChurch and Haas 2008).

Deliberative planning involves defining the main course of action, such as the primary research protocol in science projects or core maintenance activities in station management. Deliberative planning should happen several months before the mission when the team drafts the application requesting time on a station or a ship in Antarctica. This often includes the main work plan in which the team defines main goals, roles and desired activities. This represents plan A.

Long-term behaviours also include contingency planning, which ideally occurs several months before the mission and with continual refinement towards the mission's end. Contingency plans help the team prepare for events such as broken equipment, a shortened campaign or difficulties in obtaining the desired data. Teams need to anticipate potential risks and formulate possible solutions beforehand (contingency planning). By mapping out potential threats and mitigation strategies, teams become much faster at adapting to these

events. Contingency plans ensure that teams elaborate on different goals, roles and activities to help them adapt to different situations. These represent plans B, C, D and so on. This comment from a Chilean researcher who tried to anticipate potential challenges during a field trip illustrates the importance of contingency planning:

> When I planned it, I thought it was a good idea, I knew, okay, how long is it going to take me to take her to the closest medical centre in case she gets all wet, and she gets cold, and she starts getting hypothermia. Can I take her by myself? Can I radio to the nearest station? Can they come quick? How quick can they come? . . . The first couple of times, I went with an additional person . . . She was not crossing the platform. She was just staying there with a radio [to call for help] and . . . in case the radio was not working, to run to the next station [to ask for help].

By defining both deliberative and contingency plans, team members develop richer cognitive maps of the different response protocols to deal with multiple scenarios. Even if an unanticipated event occurs, the richness of the various established plans gives team members the psychological resources they need to formulate a new plan on the fly. This process is called reactive planning (DeChurch and Haas 2008). Not every eventuality can be anticipated. Reactive planning involves short-term planning, which happens during missions when teams face unexpected events for which no deliberate or contingency plan exists. Reactive planning can include modifying existing plans to adapt them to the new reality or developing new ones. To plan successfully, teams should take three steps:

1. Learn about the work environment at your destination (e.g. what tools and equipment do they have that you will need?).
   Learning about the work environment at your destination means gathering as much quality information as possible about the characteristics of the facilities in which your team will reside. This means learning about laboratory equipment (if any), available transport (e.g. zodiac boat; snow trucks), weather, station size, etc. This can be achieved by contacting stations or designated polar programmes to ask about the workplace or even seeking discussions with people who previously worked at that specific station.

2. Learn about the social environment at your destination (e.g. are the station staff civilians or military?).

Find out if you will know anyone working at the station or areas nearby. Such acquaintances can supply valuable information about local social dynamics where you will be staying (e.g. norms, rituals). Such acquaintances can also help you contact key people who will support you through the mission. Learn about the culture, habits and routines expected from people in your role or position. This advice becomes especially beneficial if you visit a station managed by a polar association from a culture that is significantly different from your own. As in point 1, contact stations or designated polar programmes and ask about the workplace or other people who have been there before.

3. Plan what you want to do, how you want to do it and who might help you (besides your team members).
   Once you have gathered relevant information about your destination's work and social environment, you should combine that knowledge with your work schedule and start planning. Start with Plan A (this should be your primary course of action), with as much detail as possible. Define what you aim to do, when you want to do it and who is involved in the process. Define also the tools and the resources that you will need. If possible, bring extra equipment just in case something breaks or gets lost. Define contingency plans (identify the top major threats to Plan A and plan accordingly). Ask yourself: what could possibly go wrong? Consider multiple scenarios, best to worst, define diverse courses of actions and, if you can, test them before the campaign.
   Plan on the fly (be ready to adapt your plans many times during the mission; collective reflection can help you). Be open to changing your plans completely the moment you land in Antarctica. Discuss this within your team so that everyone anticipates that things might change.

Building social relationships

Working successfully in Antarctica requires a support network on which individuals and teams can rely to solve task-related and team-related problems. Even if no issues arise during missions, such a network remains necessary to conducting most of the work in Antarctica, given dependencies on logistics staff, guides or other researchers. A researcher from Spain who has been in Antarctica numerous times highlights this fact:

> You need a network here to do the job well, within a project. Several small groups, working together, share certain tasks. Then there is the station staff, doctors, military etc. who support us.

In the teamwork literature, strong social relationships are conceptualised as characterised by cohesion and trust (Edmondson 2012; Gully et al. 1995). Cohesion is defined as the glue that keeps team members working together no matter the circumstances. Trust is defined as the extent to which team members are willing to be vulnerable to others they work with. Both cohesion and trust relate closely to team outcomes such as mission success, and strongly influence how team members coordinate to solve unexpected challenges that threaten mission success or team members' wellbeing. Therefore, cohesion and trust in teams are essential to deal with Antarcticness.

Cohesion and trust should be nurtured amongst team members before the mission. During the mission, trust should also be established with other people at the station. We present four strategies that foster good social relationships:

1. Get to know your team members on a personal level.
   Before you embark on a mission, schedule time to meet your fellow team members. This means going beyond the formal working relationship and getting to know your colleagues on a personal level. The better you get to know each other, the more likely you will be able to trust each other; you know more precisely what you can expect from the other person and create an open and inclusive team climate. You will also learn what your team members need and do not need. Be aware that some people open up quickly, others need more time, and some may not open up at all.
   Although building meaningful relationships can be beneficial, take individual needs into account; do not force it. For instance, even if you have an ambitious work plan, you might realise that some team members appreciate an hour or two of private time per day while others need to be around people all the time to avoid loneliness. This knowledge helps you plan your days and avoid conflicts. Missed opportunities to get to know your team members beforehand can lead to unpleasant realisations during the missions where you cannot escape any more. By building social relationships with your team members early, you will be less likely to experience conflicts during the mission.

2. Take a genuine interest in other people's work.
   Genuine interest builds good social ties with others, even strangers on whom we must rely. Ask them about their work, what they do, how they do it, and their motivations. If you engage in open conversations with other people, you build cohesion and trust that enable mutual support in times of need. Also, when you take a genuine interest in other people's work, you show that you care, promoting trust. This full circle of trust and cohesion increases social support and lets you build good social relationships.

3. Get involved in the station's routines.
   Many stations have routines that foster social interactions. These routines might include inviting scientists to take their turn at cooking and cleaning, presenting their work at research seminars, or even helping other colleagues who need their expertise. Becoming involved in all these activities reduces social and psychological barriers and hierarchies amongst people from different workgroups (e.g. staff vs scientists) and results in a more inclusive environment. The 'contact hypothesis' explains how increased contact between groups decreases inter-group conflict and prejudice by bringing people from different groups together in time and space (Pettigrew and Tropp 2006). Therefore, we suggest seizing the stations' opportunities to interact with other groups as much as possible.

4. Engage in collective social time.
   Finally, many stations also have formal and informal social activities. These include sitting with colleagues who you do not know well at mealtimes, playing sports like table tennis or having a karaoke night. Social activities have the power to break up team dynamics and bridge the gap between hierarchies or different social groups in a playful manner. Judicious social time does not detract from work time; social time creates the foundations for collaborative support systems that allow you to complete your mission successfully.

Collective reflection

Let's again imagine the previous preparation phase for a two-month research mission to Antarctica. The first two weeks go according to plan, but in the third week, lousy weather gets your team behind schedule, and

objectives seem harder to meet. Two team members slow down the work due to their intermittent conflict, which creates awkwardness in the team. In this situation, you can either (a) muddle through and hope for improvements in weather and the two team members' relationship, (b) abandon the mission altogether or (c) recalibrate, adapt and jump back in. Given the investment of time and money, abandoning the mission is not an option. Muddling through while hoping for the best usually does not help either; the situation will likely deteriorate. Only recalibration, adaptation and resumption drive your team towards growth by addressing potential weaknesses within the team. This is where collective reflection comes in.

Collective or team reflection is defined as shared reflection on the team's objectives, strategies and processes and adapting accordingly (West 2000). Reflection means taking time to step back from the task at hand, looking back and recapping what has been done, evaluating what went well and looking to the future, and deciding what processes or strategies will be maintained and what should be done differently (as is done throughout Chapter 16). Typically reflection takes the form of a debriefing.

Debriefings effectively promote learning from experience and originate from the military as a means to learn quickly in rapidly changing situations and address mistakes or changes in the field (Lacerenza et al. 2015). Results from two meta-analyses suggest that teams and individuals who do regular debriefings have more than a 20 per cent increase in performance compared to those who do not (Tannenbaum and Cerasoli 2013; Keiser and Arthur 2020). However, not all debriefings are necessarily effective. Certain factors influence debriefings' effectiveness, such as the frequency or timing, team climate, debriefing structure and formulation of implications (Sundheim 2015). Another researcher from Portugal explains how they conducted debriefings during a long walk back from a field trip:

> We evaluated the day, we did a debriefing on the way back [from the field trip] and asked ourselves what went well, where can we improve, and what will we do differently in the future? We both were talking about how we reached the goals [and the fact] that we got more done than expected. I definitely felt proud, and we were in a good mood.

There are four steps to conduct effective debriefings that help the team to adapt and deal with the unexpected. Reflection is not something that we

do naturally. Therefore teams must learn how to conduct effective debriefings. Over time, when teams get used to debriefings, they will become more and more efficient.

1. Schedule a regular time and place.
   The right time and place for a debriefing are crucial. This depends mostly on the nature of your work. Debriefings can be held after significant events or project milestones. Both too many or too few sessions diminish the value of debriefings. Discuss the issue within your team and agree on the right frequency and place. Make the debriefing an expected part of the team function to get team members into the right mindset. When people expect an upcoming debriefing, they will start gathering potential topics to discuss. During field missions in Antarctica, it might make sense to schedule a debriefing after every field trip to recap key events and discuss possible steps for the next one. We also recommend longer debriefings, typically once a week, to devote more time to reflecting on larger teamwork issues. Think: what should we start doing, stop doing and continue doing?
   Although daily debriefings can last as little as 10–15 minutes, 30–60 minutes seems to be more optimal for weekly debriefings (Keiser and Arthur 2020). If possible, schedule enough time to avoid rushing the process. Especially in the beginning, teams need to get used to this new, open form of communicating and sharing ideas and concerns. Eventually, effective debriefings will require less time.

2. Create an open team climate.
   An open learning environment is vital for an effective debriefing (Kolbe et al. 2020). In recent decades, psychological research has focused on the concept of team climate, referring to 'the set of norms, attitudes, and expectations that individuals perceive to operate in a specific social context' (Pirola-Merlo et al. 2002). This shared view specifically originates within a team. People in proximal work teams are exposed to common events and processes. They interact and share interpretations, which may converge to form consensual views of the team climate over time.
   Along these lines, psychological safety is a specific team climate element related to the belief that the team is a safe environment for interpersonal risk-taking (Edmondson 2012). Team members feel able to speak up when needed and share relevant ideas, questions

or concerns without fear of being shut down by others. Many factors influence psychological safety (Kolbe et al. 2020). Before the debriefing begins, set expectations and highlight the growth orientation with the goal of learning and improvement rather than blaming and shaming individuals through pointing fingers. The most senior leaders set the tone. They should be open, make themselves vulnerable and also admit to errors. This permits everyone else to do the same. Whether good or bad, every team member has a hand in the debriefing, which itself represents a strong team outcome (Sundheim 2015). Further, define a moderator who guides the team through the debriefing and makes sure the team addresses key questions. The moderator also ensures equal contribution and inclusiveness.

3. Address five key questions.
   Use a predefined structure in your debriefing to help guide the discussion: set the stage and address five key questions:

a. What were we trying to accomplish?
   Every debriefing should start with recapping the goals and what was achieved. You need to agree on the plans to judge the success of the work.

b. Did we achieve our goals? Did we miss our goals?
   If the goals are clear, your team will be easily able to judge which goals were achieved and which were not. If the goals are not clear, clarify them right away.

c. Why did we achieve (or miss) our goals?
   This is the analysis part of the debriefing. Here you explore the root cause of why something went well or didn't work. Try to go deep here and ask why, over and over again. A useful technique often used to get to the root cause of things is the five whys technique (Ries 2021; Gangidi 2019). You simply ask the question 'why?' five times. By the time you have asked multiple whys, you will have uncovered the root cause of a problem.
   Make sure that you start with what went well. It is usually easier to talk about positive aspects than negative ones. This also sets a more positive tone and encourages team members to share thoughts and experiences. Debriefing aims to improve potential weaknesses and foster learning from positive experiences to future events. Naturally, we tend to focus on negative aspects. However, equal benefit can be found in elaborating and getting to the root cause of team successes. This will make the contributing factors for positive outcomes

explicit and enables the team to learn and grow more from positive experiences (Hollnagel 2014).

d. How was our teamwork? (Don't talk only about taskwork).
We tend to talk mainly about the taskwork and not so much about teamwork. Make sure that you also discuss how you worked together in your team. How was the coordination or communication among team members? What worked well, and where can you improve teamwork?

e. What should we start, stop or continue doing?
Based on your analysis of what went well and where your team can improve, you need to decide how to continue. The team needs to look ahead and determine if they need to change or maintain plans and/or certain behaviours.

4. Write down implications and future directions.
Make sure that you capture lessons learned and implications for the future in a written format. As a team, write down briefly what the main points are to maintain or change in the following days. With this method, you make the learning explicit and visible for all team members. The future directions can be evaluated in the next debriefing.

Conclusion

Effective teamwork promotes success in extreme environments such as Antarctica. Drawing from research on teamwork, we have offered fundamental ABC strategies for Antarctic teams to influence their team effectiveness. We hope ABC not only raises team awareness on these issues but also provides team members with practical advice on caring for their own team. Anticipation, building social relationships and collective reflection are powerful strategies for teams to deal with the volatile, dangerous yet beautiful environment that is Antarcticness.

References

Brannick, Michael T., Eduardo Salas and Carolyn Prince. 1997. *Team Performance Assessment and Measurement: Theory, methods, and applications*. New York: Psychology Press.

DeChurch, Leslie A., and Craig D. Haas. 2008. 'Examining Team planning through an episodic lens effects of deliberate, contingency, and reactive planning on team effectiveness'. *Small Group Research* 39: 542–68.

DeChurch, Leslie A., and Jessica R. Mesmer-Magnus. 2010. 'Measuring shared team mental models: A meta-analysis.' *Group Dynamics: Theory, Research, and Practice* 14: 1–14.

Edmondson, Amy C. 2012. *Teaming: How Organisationsns Learn, Innovate, and Compete in the Knowledge Economy*. San Francisco, CA: Jossey-Bass.
Gangidi, Prashant. 2019. 'A systematic approach to root cause analysis using 3 × 5 why's technique'. *International Journal of Lean Six Sigma* 10: 295–310.
Gully, Stanley M., Dennis J. Devine and David J. Whitney. 1995. 'A meta-analysis of cohesion and performance effects of level of analysis and task interdependence'. *Small Group Research* 26: 497–520.
Hollnagel, Erik. 2014. *Safety-I and Safety-II: The past and future of safety management*. Farnham: Ashgate.
Keiser, Nathanael L., and Winfred Arthur. 2020. 'A meta-analysis of the effectiveness of the after-action review (or debrief) and factors that influence its effectiveness'. *Journal of Applied Psychology* 106: 1007–32.
Koehn, Nancy Fowler, Erica Helms and Phillip Mead. 2003. 'Leadership in crisis: Ernest Shackleton and the epic voyage of the *Endurance*'. *Harvard Business School Case Collection*: 1–39.
Kohn, L.T., J. Corrigan and M.S. Donaldson. 1999. *To Err Is Human: Building a safer health system*. Washington, DC: National Academy Press.
Kolbe, Michaela, Walter Eppich, Jenny Rudolph, Michael Meguerdichian, Helen Catena, Amy Cripps, Vincent Grant and Adam Cheng. 2020. 'Managing psychological safety in debriefings: A dynamic balancing act'. *BMJ Simulation and Technology Enhanced Learning* 6: 164.
Lacerenza, Christina N., Megan Gregory, Alyssa D. Marshall and Eduardo Salas. 2015. 'Debrief: The learning meeting'. In *The Cambridge Handbook of Meeting Science*, edited by Joseph A. Allen, Nale Lehmann-Willenbrock and Steven G. Rogelberg, 617–33. Cambridge: Cambridge University Press.
Lansing, Alfred. 2015. *Endurance: Shackleton's Incredible Voyage*. New York: Basic Books.
Larson, Lindsay, Harrison Wojcik, Ilya Gokhman, Leslie DeChurch, Suzanne Bell and Noshir Contractor. 2019. 'Team performance in space crews: Houston, we have a teamwork problem'. *Acta Astronautica* 161: 108–14.
LePine, Jeffery A., Ronald F. Piccolo, Christine L. Jackson, John E. Mathieu and Jessica R. Saul. 2008. 'A meta-analysis of teamwork processes: Tests of a multidimensional model and relationships with team effectiveness criteria'. *Personnel Psychology* 61: 273–307.
Marques-Quinteiro, Pedro, Jan B. Schmutz, Walter J. Eppich, Mirko Antino and Travis M. Maynard. 2020. 'Teamwork in Antarctica'. Lisbon: Zenodo. http://doi.org/10.5281/zenodo.3831000.
O'Connor, Paul, Justin Campbell, Jennifer Newon, John Melton, Eduardo Salas and Katherine A. Wilson. 2008. 'Crew resource management training effectiveness: A meta-analysis and some critical needs'. *International Journal of Aviation Psychology* 18: 353–68.
Palinkas, Lawrence A. 1991. 'Group adaptation and individual adjustment in Antarctica: A summary of recent research'. In *From Antarctica to Outer Space: Life in isolation and confinement*, edited by Albert A. Harrison, Yvonne A. Clearwater and Christopher P. McKay, 239–51. New York: Springer.
Palinkas, Lawrence A. 1992. 'Going to extremes: The cultural context of stress, illness and coping in Antarctica'. *Social Science & Medicine* 35: 651–64.
Palinkas, Lawrence A. 2003. 'The psychology of isolated and confined environments: Understanding human behavior in Antarctica'. *American Psychologist* 58: 353.
Palinkas, Lawrence A., Jeffrey C. Johnson and James S. Boster. 2004. 'Social support and depressed mood in isolated and confined environments'. *Acta Astronautica* 54: 639–47.
Pettigrew, Thomas F., and Linda R. Tropp. 2006. 'A meta-analytic test of intergroup contact theory'. *Journal of Personality and Social Psychology* 90: 751–83.
Pirola-Merlo, Andrew, Charmine Härtel, Leon Mann and Giles Hirst. 2002. 'How leaders influence the impact of affective events on team climate and performance in R&D teams'. *Leadership Quarterly* 13: 561–81.
Ries, Eric. 2021. 'The five whys for start-ups'. *Harvard Business Review*, 25 February. Accessed 16 August 2021. https://hbr.org/2010/04/the-five-whys-for-startups.
Salas, Eduardo, M.A. Rosen and H. King. 2007. 'Managing teams managing crises: Principles of teamwork to improve patient safety in the emergency room and beyond'. *Theoretical Issues in Ergonomics Science* 8: 381–94.
Schmutz, Jan B., Pedro Marques-Quinteiro, Walter J. Eppich and Mirko Antino. 2020. 'How do you feel today? Team Intervention strategies to cope with extreme affect during an Antarctic summer campaign'. Unpublished paper presented at the 12th Portuguese Polar Conference, Lisbon.

Schmutz, Jan B., Laurenz L. Meier and Tanja Manser. 2019. 'How effective is teamwork really? The relationship between teamwork and performance in healthcare teams: A systematic review and meta-analysis'. *BMJ Open* 9: e028280.

Sundheim, Doug. 2015. 'Debriefing: A simple tool to help your team tackle tough problems'. *Harvard Business Review*, 2 July. Accessed 16 August 2021. https://hbr.org/2015/07/debriefing-a-simple-tool-to-help-your-team-tackle-tough-problems.

Tannenbaum, Scott I., and Christopher P. Cerasoli. 2013. 'Do team and individual debriefs enhance performance? A meta-analysis'. *Human Factors* 55: 231–45.

Thomas, Kenneth W. 1992. 'Conflict and conflict management: Reflections and update'. *Journal of Organizational Behavior* 13: 265–74.

West, Michael A. 2000. 'Reflexivity, revolution and innovation in work teams'. In *Advances in Interdisciplinary Studies of Work Teams*, edited by Michael M Beyerlein, Douglas A. Johnson and Susan T. Beyerlein, 1–29. Bingley: Emerald.

5

Island of confusion, frontier of madness: the agony and ecstasy of Antarctic base life, 1942–82

Andrew J. Avery

Beginning with the launch of Operation Tabarin in 1942, the British government committed to colonising the Antarctic Peninsula by building bases and staffing them with an all-volunteer, all-male organisation called the Falkland Islands Dependency Survey (FIDS). At first, FIDS enforced British sovereignty over the peninsula by building bases, working as postmasters at post offices, and serving protest notes to 'trespassing' Argentinian and Chilean parties. They also conducted vital scientific research in the field. FIDS was later renamed the British Antarctic Survey (BAS) in 1961. Even after the organisation altered its name, the men working for it referred to themselves as 'Fids'.

This chapter examines life on FIDS and BAS bases during the first four decades of sustained British colonisation of the Antarctic peninsula. It is organised around the stages of a man's journey, in his becoming (or not becoming) a 'Fid'; from boyhood encounters with Heroic Era (1893–1922) culture to the application and interview process, through training, the voyage south, the two-year long stay on Antarctic bases and, finally, the return voyage home. Antarcticness to men who served in FIDS was about a way of life. It was about a type of rugged masculinity, one specifically based in the empire, that was becoming increasingly rare as the twentieth century continued. Antarcticness was about toughness, fortitude and adventure.

Being a Fid was more than a job, it was a test of one's masculinity. It was an identity. Volunteering for the Survey also meant living and working within the British Empire, a political entity that shrank

increasingly during the latter half of the century. Therefore, Fids were a late addition to a long tradition of colonial masculine archetypes. Despite the slow death of the once glorious empire, and often because of it, Fids focused on the coloniality of their work and experience.

Fid identity was based on suffering, isolation from the metropole, and performances of masculine and feminine behaviour alike. Like many other men who served in the British Empire, Fids were often fleeing from domesticity. For the majority of the twentieth century, Antarcticness was synonymous with masculinity (Chapter 7). In the British context, it was about men exclusively. Upon arriving in Antarctica, however, they quickly discovered they needed to help create a domesticity on base that would keep men's moods as stable as possible. Ensuring that an Antarctic base functioned both as a workplace and a home, men had to fill dynamic roles. They had to be hard workers, but also to know when it was time to loaf or blow off steam. It was not enough to shovel snow and drink pints, however. Fids often performed domesticity to create as much of a sense of home and community as they could, given their limitations. An examination of Fids not only shows how the culture of imperialism shaped masculinities throughout the twentieth century but also illustrates the complex emotional and physical journey of men working in Antarctica, all of which fed into and helped to define conceptualisations of Antarcticness.

In addition to their masculine identities, Fids feuded among themselves and with their superiors in England. Divisions among Fids formed along class boundaries, between working-class and middle-class men. Base leaders, later known as base commanders, came to represent unwelcome and ill-informed overreach from the metropole, further compounding the suffering of Fids. This led many men to foster social bonds with the very people they were supposed to warn of trespass, Argentinians and Chileans. Therefore a Fid's identity worked horizontally, across national boundaries, when the situation called for it.

This chapter is based on primary research conducted at BAS archives. The main source material is drawn from oral histories and from the pages of magazines published on bases by Fids. These magazines provide a rich glimpse into the everyday existence of these men, of the agony and ecstasy of base life.

Hero myths

Examining how Heroic Era books and films influenced the Fids of the 1940s and 1950s illustrates the effectiveness of the hero myths that

appealed to these men. In doing so, one can better see how the myth connected the Heroic Era and the culture of an imperial epoch to the post-Second World War age of imperial decline. Books written by members of Heroic Era expeditions created a potent myth that was taught in schools throughout Britain, and led some men to answer advertisements for Antarctic employment in the hopes of realising childhood dreams. Antarcticness in the context of this chapter can be understood as the pursuit of heroic dreams and a heroic type of masculinity, either literally or tongue-in-cheek as the century drew on and the pureness of Edwardian archetypes like Scott waned in influence. To go to Antarctica, to engage or create Antarcticness, was to grapple with a mythic example.

Several future Fids first encountered the mythical Antarctic in school. John Huckle, who later worked in Antarctica in various capacities from 1946 to 1957, recalled his headmaster at Berkhamsted School in the mid-1930s: 'He was telling us the stories of both Scott and Shackleton . . . I mean he was advocating [that] a most heroic Englishman should be followed' (Huckle 2009, 2). Huckle's introduction to the Antarctic hero myth illustrates one of the more common paths to interest in the continent. Peter Starling, Arthur Mansfield, Raymond Berry and Lionel Shirtcliffe recalled a similar introduction to these great deeds of British Antarctic history. Future Fids encountered the hero myth in schools in Britain and the Commonwealth, but others were introduced to it in the home. The pathways from boyhood to Antarctica could begin within the home, blending the domestic and scholastic, both of which could prove effective vessels for communicating the hero myth of Scott.

Other Fids were introduced to Antarctica by family members. Dudley Jehan pored over his mother's book about Scott, which she had been awarded as part of a school history prize. He loved the book. In the case of Duncan Boston, general assistant and later base leader at Danco Island, he recalled, 'I can remember as a pretty small boy lying on the rug in front of the fire reading a children's edition of *Scott of the Antarctic: The Great Journey* with tears falling down my face and I thought "What such brave men, I would like to go there"' (Boston 2012, 2). The story of Scott transcended David Petrie's strict religious upbringing in Edinburgh. Although he was normally not allowed to go to the theatre or to see films, his parents made an exception for Ealing Studios' *Scott of the Antarctic* (1948; for more in-depth analysis about the making and legacy of this movie, see Barczewski 2009 and Dodds 2002). When asked why they made such an exception, Petrie speculated, 'I think basically because it was something that was not made up or

contrived. It was, as they saw it, a documentary of what had really happened' (Petrie 2011, 2). The myth created patriotic and emotional ties between Britons, especially young boys, and Antarctica, the scientific frontier.

The introduction of boys to the hero myth of Scott served as an emotional touchstone when, years later, they were given the opportunity to travel and work in Antarctica. Many Fids embarked on their Antarctic careers after seeing an advertisement in a newspaper, such *The Times* or *Daily Mail*, or a trade publication. In those job postings were listed the character traits required, which they had been told to admire. One advertisement, published in *The Times* in July 1955, read: 'Candidates, single, must be keen young men of good education and high physical standard who have a genuine interest in polar research and travel and are willing to spend 18 or 30 months under conditions which are a test of character and resource' (*The Times*, 14 July 1955). The Antarctic remained one of the few corners of empire where a young man could escape in order to find adventure, to travel, and to seek a unique experience, away from post-war austerity Britain.

The recollections of Fids are significant because they reveal the effectiveness of Heroic Era myths and they show how these books became part of an accepted professional library. Through books, film and school lessons, several Fids were influenced to consider working in the Antarctic, on the edge of empire and science. Many of them served in the British military and had already lived in the empire during the Second World War, Malayan Emergency or Suez crisis. This experience, combined with knowledge of the right books, made these young men ideal candidates for life in the scientific colony. Beyond this 'social capital', Antarctic works also held great practical value to men reading them 40 years later.

Men often applied to work for BAS to escape Britain. David Petrie went to Antarctica following the death of his mother, a journey he described as 'liberating' (Petrie 2011). Shortly after earning his dental degree, Ron Hubbard decided to go abroad before opening his own practice. Ian Rose's father told him to travel and avoid working in insurance (Rose 2013). Douglas Allan likened Antarctica to the 'two other big frontiers' of the 1960s: space and deep-sea exploration (Allan 2011). An interest in the latter led him to serve as a diver for BAS. Many of these men came to employment with BAS for very practical reasons: they needed a job. A desire for excitement, something to take them away, prevailed. After months in the Antarctic, this desire to leave Britain matured into full-blown feelings of alienation: they would never be the same again.

Selecting Fids

The BAS interview and hiring policy attempted to replicate a type of man, a 'Fid'. Given that BAS continued an all-male policy for their bases into the 1980s, each interview constituted a test of one's masculinity. While the background of an applicant could vary widely, they still needed to embody the ideal attributes of a Fid, namely an ability to fit in socially and willingness to work. David Limbert, a meteorologist, started sitting in on interviews in the 1970s. He described the process as 'trying to find people who would fit in' (Limbert 2004, 37). When one applicant, a musician with the Halle Orchestra, sat for an interview, Limbert recalls thinking the man wanted a break from music, but would find base life unsuitable after a few months (Limbert 2004).

The interview relied on the interview panel's impressions of the applicant's suitability. Education and connections were important: they could assist the interviewers in locating this man on their imagined map of British masculinity. By retaining these specialised hiring parameters, BAS attempted to find the best man for the job. Not all Fids on base agreed that their bosses hired the best men, but those realisations often dawned too late, after the ships had sailed home. The importance of 'fitting in', whether to the directors or to Fids, cannot be overstated. Even once they had been hired, aspiring Antarctic explorers could still be scrubbed from the journey south if they did not prove to be the right type. To be part of Antarctica and Antarcticness, one had to be a certain type. In the context of Britain, Antarcticness was hardly an inclusive term.

Successful interviewees usually spent two to three months preparing for their Antarctic work before departing England in September or October. Training took two forms, a specialised course in fieldwork, usually meteorology or a related skill, and a conference in Cambridge. The training was inadequate (Thompson and Jones 2007). The Cambridge conference offered little more in the way of practical training, at least at first. It created community with BAS by connecting new hires to heroes of the Heroic Era and senior figures at the Scott Polar Research Institute (SPRI). Richard Kressman, a 30-year veteran of BAS, described the Cambridge conference as a series of lectures and discussions led by Heroic Era veterans such as Raymond Priestley, who 'sort of held court' (Kressman 2012, 4–5).

A story called 'The prodigal FID' (BAS 1970–1, xx), published in and circulated amongst the men at Signy base, described the conference: 'The son was called to the place that [was] called Cambridge, and there

was given much wise instruction from the Senior Pharisees, and was shown many etching and illustrations of being a FID.' There was little offered in the way of 'health and safety' training until the 1970s, at the earliest. Ex-Fids, when asked about the existence of such a curriculum during the course of the conference, laughed. 'Health and safety' practices are viewed by many as just another cumbersome piece of baggage that accompanied the growth of BAS as an institution. The conferences also provided the opportunity for men to foster rapport with fellow Fids. David Fletcher, a general assistant and base leader from 1971 to 1983, remembered 'an incredible camaraderie really from all the new Fids who I had never met before and this mix with these wonderful names and new people' (Fletcher 2012, 11). The Cambridge conference was an opportunity to connect new hires with veterans from the Heroic Era, solidifying ties between the imagined adventures of boyhood and the adventurous job of manhood.

In the autumn of the year, the junior Fids, nicknamed Fidlets, boarded a BAS ship and sailed south, calling at Montevideo and Port Stanley. The voyage constituted an extension of the interview, a final opportunity to make sure the newest men would fit in. Ken Doyle, general assistant 1965–68, said, 'There was always this possibility of being sent back if they weren't fitting in' (Doyle et al. 2009, 6). If they did not, they could be sent back to England. Life aboard ships, and later on base, hung on a single workplace philosophy, which one Fid described as an 'all hands to the pump mentality' (Doyle et al. 2009, 6). Everyone was expected to lend a hand when needed, whether painting the wheelhouse or working in shifts for 24–48 hours straight, unloading months of supplies for the bases. Men who could not hack life aboard ship or proved too irksome were sent home from Port Stanley. This rarely happened. Of the single person sent back on his voyage, Doyle said, 'Without realising it he got people's backs up, it was just his way of speaking, asking questions, making silly statements' (Doyle et al. 2009, 6). Getting rid of such people was necessary for ensuring the most stable base environment possible, one that would not be divided.

The voyage also afforded Fids a last chance for female companionship. Fids frequented brothels in Montevideo and Rio de Janeiro, one 'last romp before enforced celibacy' according to Edward Clapp (2005, 19). BAS is a priesthood, and bases are monasteries, places in the world but not of the world. The voyage down kept homosocial community and heterosexuality hand in hand. After the ships departed the Falklands and dropped Fids at their assigned base,

there was little opportunity to evacuate them and what chances did exist were limited by the weather and season.

The Falkland Islands were the colonial metropole of the British Antarctic. 'Stanley was the mother base for all our Antarctic bases,' said Edward Clapp, a 20-year veteran of BAS (Clapp 2005, 19). Between 1960 and 1982, the population of the Falklands hovered around an average of 2,000 people. Ivor Morgan, who worked for BAS in the late 1960s, described the Falklands as a place that might have been created by William Golding, author of *The Lord of the Flies* (Morgan 2012, 4). There were four pubs in Stanley, and Fids wasted no time getting thrown out of some of them. The Rose Hotel and Pub, managed by Velma and George Malcolm, became a favourite hangout for the Fids as well as a conduit for purchasing extra alcohol from Britain to take south (Fids cursed Crown Agents for limiting the alcohol supply).

BAS ships docked in Stanley for the final kitting out of the men and drawing supplies for the bases. Traditionally, the governor of the Falkland Islands hosted a cocktail party for incoming Fids at Government House. Meeting the governor also had a political purpose: base leaders were sworn in as magistrates, ensuring a chain of power between London and the Antarctic, at least in theory. Some Fids picked up on the more glaring colonial ceremonies performed in the Falklands at the time. Dick Kressman described the governor's full dress uniform worn to the festivities of Fete Day in the late 1960s: 'Cosmo Haskard strutting around complete in full uniform with his ostrich feather hat or whatever . . . so it was very colonial era just the last vestiges of the colonial service' (Kressman 2012, 8). Kressman was not the only Fid aware of the crumbling empire in which they were serving, of the dimming imperial sun. The governor of the Falkland Islands was a Fid's nearest figurehead of metropolitan authority and often drew their ire in the form of rebellious pranks, but Fids maintained regular contact with Stanley via radio and, therefore, constantly operated within the network of the governor. Once BAS ships departed Stanley, Fidlets still had to learn the intricacies of life on base.

Colonialism and classism

Fids identified as being part of the British Empire into the 1980s, building on concepts of suffering and isolation, and performing coloniality through their social practices. For instance, above the group photo of the ten men who celebrated midwinter at Signy in 1970, someone pasted a newspaper

clipping reading 'Frontier of the Empire' ('Signy Island' 1970–1). The realities of base life, physical distance from loved ones, restricted diet, limited alcohol supplies and constricted communications could create a place of suffering, but Fids socialised in order to counteract negative emotions by being cheerful, camp and downright silly. The socialising fostered stronger bonds between men, ensuring the base remained a welcoming home. Antarcticness was about masculine comradery, about creating a masculine environment where toughness and adaptability were treasured.

As a way of enforcing their own identity within the colonial hierarchy, Fids continued criticising BAS and the British government from afar, just as Fids had before the Antarctic Treaty System (ATS), the first document of which was signed in 1959, and continued small rebellions by socialising with foreign nationals. Antarctica continued to be a space of colonial competition after the inauguration of the ATS. Fids expressed frustrations and anxieties when comparing themselves to the better-funded United States Antarctic Programme (USAP). BAS had historically operated on a tighter budget and the accounting bogeyman lurked around every corner. The Americans brought out British anxieties about their role as the premier polar power. One Fid wrote in the base magazine, *Halley Comet* (1968): 'While the American Antarctic has maintained inexorable growth – like uncontrollable fungus – the British have retracted, tortoise-like, from all attempts to move forward at all.' This lack of guidance, of institutional motivation and abilities, reflected poorly on BAS, and by extension, Fids.

When comparing themselves to their colleagues from the USA, Fids viewed themselves as the superior type of Antarctic explorer due to their lack of creature comforts. Austerity became a point of pride, a badge of masculinity. In response to an editorial in *Halley Comet* briefing Fids at Halley Bay about a forthcoming visit by members of the USAP, 'Golly' criticised the insistence on cleaning uniforms and shaving beards. 'We are, one hears, the rugged men of the Antarctic; even the Americans admit this!' Golly wrote, 'Let them see what the true inhabitants are like, who have been living here for up to two years without many of their superfluous luxuries of everyday life' (*Halley Comet*, 1968. The proposed preening discomforted Golly. He ended on a powerful note, 'We are "the cream of the British Empire" and this is our last outpost of civilisation, so let's not run around like 15 year old school-girls on heat trying to impress these "Damn Yankees"' (*The Feenix* 1968). This would be no way for the 'rugged' British men of the Antarctic to act, needing to seduce and impress these well-funded Yankees with their fresh meat and home comforts.

Antarcticness was proprietary, something to be feuded over. For Fids, Antarcticness belonged primarily to the British. Beyond competition, though, the social practices of Fids were influenced by Britain's imperial past.

Fids reflected the coloniality of their experience in their leisure practices as well, performing so-called 'nativism' in numerous racist manifestations. Between 1966 and the 1980s, Fids dressed in Arab clothing and sometimes darkened their skin for entertainment. Members of Scott's expedition had performed plays in blackface, creating a precedent. The origin of these 'Arab nights', as they were later called, goes back to a November 1966 notice in *The Pengwinge*, the base magazine. The author of this particular piece suggested that 'Arabian dress', which was extrapolated to mean 'any wog gear', be worn to a party (*Pengwige* 1966). Eight years later, photos of a Saturday 'Arab Night' party were published in Signy's 1974 magazine. The existing pieces of evidence leave more questions than answers, but these events illustrate, at the very least, imagined links between the desert of Antarctica and the deserts of the Middle East, once the roaming ground of one of Britain's most famous imperialists, T.E. Lawrence. The British Empire was the furniture of the men's imaginations and these events reflect the influence empire had on their leisure practices. In the absence of any of human natives, the Fids dressed as their own, playing Arab in the winter desert.

Suffering continued to be a key part of Fid identity and served as a metric by which different generations of Fids measured themselves against British polar history. Throughout the 1970s, Fids not only located themselves within the Empire, but also created representations of bases as prisons, work colonies, mental institutions and, paradoxically, luxury vacation resorts. In the 1973 and 1974 editions of Signy's base magazine, Antarctica was simultaneously an 'island of confusion', 'the frontiers of madness', a winter holiday paradise and the 'World Centre of Erotic Entertainment' (*Groans* 1974). For men who had fled as far from Britain as was possible on Earth, the Antarctic could be a hard place to spend two years. Still, Fids working in the 1960s and 1970s felt their quality of life on base had improved since the early days of FIDS and Scott.

Fids parodied their suffering as a way of expressing anxiety about British decline and to promote their Antarctic masculine identity, reassuring themselves they were (or were not) the tough explorers they had read about. Fids realised the British public still viewed Antarctica as a frontier. The following quotation appeared in *Halley Comet* in the 1960s and was reprinted the following decade in another iteration of the base magazine, *Mushroom* (1970, 4):

> AFTER MANY YEARS of effort the BBC and the Press have at last convinced the great British public of the ABSOLUTE HELL of life in the Polar Regions. They hope you will co-operate in maintain[ing] this myth and to see your reports speak of frost-bite and starvation, of primeval blizzards and intolerable cold. NO MENTION shall be made of the great advances of our doctors, engineers and physicists have made which enable one to regard the Antarctic as just somewhere else to live.

By continuing to exist as a scientific frontier, Antarctica would continue to remain untouched and unsullied by the rest of the world, who would bring all their problems south and ruin it all. It was not just the sea ice that needed protecting, but life on base, as well. Antarcticness, according to these men, centred on the idea of science and suffering, even if their conditions were relatively better compared to those endured by Scott and Shackleton.

The Fid's reliance on suffering was grounded in his distance from London; the distance was part of the identity. Fids were who they were because they worked in dangerous places doing dangerous jobs. To fit in, you also had to survive and not endanger others through carelessness. At the end of this spectrum of masculinity, then, was BAS and senior British government officials, who were *distant* from danger. Andrew Spearey, a diesel mechanic, thought Fids and UK-based BAS personnel often prioritised different things: 'You know when you are sat thousands of miles away, twiddling your thumbs at times, you do think of things that maybe don't have as much importance as they should' (*Mushroom* 1970, 4). Cartoons featuring persons stabbed in the back appeared often in base publications, always with new or altered captions spelling out the obvious: Cambridge was always giving Fids the short end, and being stabbed in the back was the norm for those working in Antarctica.

To some Fids, London was sabotaging any chance Britain had at maintaining polar pre-eminence, most often choosing to bind BAS with an impossibly tight budget. In July 1968, *The Feenix* ran an editorial mocking the 'hard lot' of those in London. Not to let an opportunity pass to remind comrades of how London was constantly shorting them, the editor wrote, 'The blue pencil comes swiftly into action deleting item after item, items considered too expensive or non-essential things like petrol, engine spares and cable' (*The Feenix* 1968, 2). The proximity to danger and their isolation from London meant Fids could find themselves dealing with shortfalls in parts or supplies, and they would have no choice but to improvise. Fids enjoyed a sterling reputation for 'bodge jobs', as they

called them, making do with what they had. Rebellions against London usually took a social form, based on criticisms of the government's influence in scientific work.

A simmering dislike of BAS meant Fids disobeyed directives telling them not to fraternise with South Americans. The spirit of criticism and political awareness had hardly disappeared from base magazines since the International Geophysical Year (IGY). Writing in 1970, one Fid described BAS as 'a well-established double-purpose procedure which satisfies a social obligation while disguising the primary motivation of protection of territorial claims. Just like everybody else we play at flag-flying, stamp-selling, and other nationalist games' (*Mushroom* 1970, 1). Fids ignored this directive, choosing to socialise with their equivalents from Argentina and Chile, with whom they had more in common in the Antarctic. Fids traded what they had with Argentines and Chileans, usually extra cigarettes (500 per man, per month) and gin for red meat and wine, sometimes sheep. Not that all such interactions were so transactional. The trend of exchanging protest notes, formal notices of trespass between Argentina and Great Britain, once so common in the 1950s, waned after the Treaty started, and some Fids used the political spectacle as justification for a party. Antarcticness was a flexible idea. In some contexts, it was exclusively the domain of the British. In the larger context, though, Antarcticness was seen as international – Antarctic suffering united people of all nations.

John Tait, diesel mechanic from 1962 to 1966, described the relations between Fids stationed at Deception Island and their Argentine and Chilean equivalents. Fids were often invited to the South Americans' bases to celebrate national holidays. In the event a protest note were to be served, the base commander radioed a couple of days in advance to inform the recipient of his trip. Notes were exchanged between parties and then transmitted to London or Buenos Aires. In the meantime, Fids and Argentines socialised, with the visiting group always invited to spend a night or three. Tait said the exchange of notes 'was always an excuse for a party' (Tait 2001, 7). Visits by Antarctic workers from other nations remained a tradition into the late 1970s, but generally occurred every few years rather than months.

The reasons for bucking against official protocol were ideological and practical. For some Fids, they had considerably more in common with the Chileans wintering 8 kilometres away than someone working in London or Cambridge. Practically, Fids might need help from their neighbours. An Argentine doctor may travel to a nearby British base to help treat an injured or sick Fid. On one occasion, Argentine pilots made

a heroic rescue of an ill Fid and helped transport him to hospital. National differences were often put to one side when somebody nearby was in trouble. Antarctica continued to be a place where the rules of interaction were flexed and noses thumbed at those who were too far removed or too comfortably situated to be listened to.

Fids could unite against rivals like the USAP and criticise BAS, but Fids created hierarchies based on seniority, sub-divided along class lines, disputed with each other over job duties and performance, and ostracised base leaders for fear of disloyalty to the 'working' Fids. Base leaders could hardly force anyone to do much of anything if they did not want to, which could make keeping order difficult. By the 1980s, being a loyal Fid or serious base leader had turned into the trait that would alienate you from the other men.

The strategy for relieving men at Antarctic bases was designed with stability in mind. Fids who had finished their two years boarded ships for home, and those who had finished their first season remained behind to teach Fidlets the routines of work and the intricacies of base life. The hierarchy on Antarctic bases was flat. Men who had worked more than two or three years with BAS were deemed 'Super Fids.' Super Fids were often the seasoned non-commissioned officers of the bases and, on voyages by ship, the senior 'King Fid' served as a liaison for the group and often resolved disputes. Second-year men were expected to teach Fidlets, but a year of base life and work routine turned many Fids into 'apathetic pragmatic disillusioned cynics' (*Mushroom* 1970, 1). Base leaders, later called 'commanders', ruled over the bases, and were often chosen for their experience.

Second-year men could make a base leader's life hell. They had a tendency to 'stir the shit' on base and spent the day 'creating hostility and rumour and in writing articles for the base magazine *Mushroom* to satisfy the unproductive expectant editor' (*Mushroom* 1970, 1). 'Stirring the shit' was a way of creating conflict where none existed or exploding small differences into big ones, making the reality of Antarctic life worse than it already was. Fids insisted that men should work out their problems between themselves rather than talking about the problem to someone else.

Class differences as embodied in job titles and duties could contribute to discord. For the first 30 years, the number of people with university degrees on Antarctica paled in comparison with the number of general assistants or support personnel. There were few graduates among Fids in the 1950s and early 1960s. Graham Jones, diesel mechanic and engineer from 1965 to 1969, described the background of Fids: 'an awful

lot of us came from a similar background, either grammar school or technical schools, middle class, [or] working class but from professional families' (Jones 2013, 6). Alan 'Big Mac' McManus, a BAS cook for 13 years, recalled he had never met a university-educated student before joining Fids in 1970. His preconceived notions of what a university student was proved incorrect over time. The number of scientists and men with PhDs grew over the 1970s and 1980s, but a balance between scientists and support staff remained the norm well through the Thatcher premiership from 1979 to 1990.

Class differences became most apparent in disagreements over job duties, some of which escalated. At certain moments, scientists chafed under the 'all hands to the pump' credo of the Fids. Not everyone who went to the Antarctic wanted to be a Fid. Nicholas Beer, ship's master and later captain of the Royal Research Ship (RRS) *James Clark Ross*, characterised these disagreements as a 'clash of cultures'. On several occasions, Beer said scientists did not want to help unload the ship upon arriving at a base, for example: 'The scientists did not want to be Fids; did not want to be part of that' (Jones 2013, 24). The refusal of scientists to buy into the Fids' 'all hands to the pump' credo and, at times, lack of respect for Fid hierarchies could lead to rancour.

Being promoted to base commander turned perceptions of those men from dependable Antarctic veterans to spineless bureaucrats in the eyes of Fids. Additionally, the connotation of being deemed a 'BAS man' or 'Super Fid' changed drastically over the 1970s and 1980s to being negative rather than positive. A contrived quiz entitled 'Are you a BAS Man?' published in 1985 described a 'pure' BAS man (for those who scored 400 points or higher): 'beyond humanity . . . a gutless supine lapdog . . . a pusillanimous niddering Janus . . . a specious puppet . . . a shifty yes-man . . . The very thought of you makes human beings want to vomit' (*Halley Comet* 1985, 55–7). In the same issue, each of the 18 men on base answered a 'personality questionnaire'. When asked if they were a 'BAS man', only three said they were. The base commander had become as untrustworthy as London to Fids, the informant in their midst; or, worse still, he could be totally incompetent. Antarcticness was not supposed to be streamlined like a business, but rather a redoubt for amateurish adventures. Anyone who took the mission or the organisation too seriously risked ruining the continent by prioritising power politics over adventure.

Class differences and rifts exacerbated Fid frustration over how bases should function. Scientists who were unwilling or reluctant to perform certain labour or adhere to the informal hierarchy established by

Fids risked alienation and retribution. In the 1970s and 1980s, bases tended to produce more critiques of base leaders. Using FIDS and Fids as their cornerstone, the BAS now had multiple generations of employees, including Antarctic veterans, working for them. With this slow evolution came criticism of younger employees who lacked a military background and had not seen colonial service. Despite that, they continued to identify with the Empire. By turning the base leader and later the Super Fid into an object of derision, a symbol for the technocrat, they were simultaneously reaffirming their exclusive identity.

Sexualisation and sexism

On the all-male base, Fid behaviour oscillated between performances of masculinity and femininity. Polar manliness could only be shown in contrast to femininity and was preserved through domesticity. Given the absence of women, Fids used their 'mend and make do' mindset to inject fantastic, often highly sexualised, representations of femininity into the base. Dodds (2009) wrote how on Antarctic bases, men performed roles traditionally associated with women. Each member of a base took his turn cooking and cleaning the quarters, a role nicknamed (disparagingly) 'gash-hand'. If the man failed to live up to imagined standards of femininity, they faced ridicule from their comrades. Dodds (2009, 507) writes, 'To be a man in this setting, then, was to be someone who could control his emotions and who participated fully in the routine of base life.' This expectation held true after the ATS began to operate. Dennis Allsopp, a visiting scientist at Signy from 1980 to 1981, recalled that Fids took pride in keeping the base clean. At Signy, Saturday mornings were usually reserved for a 'scrub-out' of the entire base. Boots were removed downstairs and men walked around the living quarters in slippers, socked feet or house shoes (Allsopp 2007, 9). The staircase at Signy formed the boundary between work and home, toughness and comfort.

In an article entitled 'A guide to living at Halley Bay', veteran Fids offered 11 tips to Fidlets. Several of them detailed proper upkeep and established standards of cleanliness within the base. They encouraged 'gash-hands' to tidy the dining room throughout the day, to rearrange magazines and keep the floor clean. Men who drank tea or coffee between meals were instructed to clean up after themselves to save men from having to work extra (*Mushroom* 1970, 9). Printed just as often in the base newsletters were similar articles offering advice on how a Fid could best shirk their duties, pointing out which days of the week were the

worst (Saturdays, following the weekly party). For example, a contributor to the 1983 edition of *Halley Comet* devised a *Cosmopolitan*-type quiz entitled (pejoratively) 'How Slack is your Gash?' A Fid could find out how bad he was by answering the ten multiple-choice questions (*Halley Comet* 1983, 25). The same edition included grades for each Fid's abilities, including written feedback.

Traditions were created around the receipt of 'Dear John' letters that provided the aggrieved party with a public forum to express their anger and, at the same time, affirm their place amongst the men. The most common tradition usually entailed the John in question pinning the letter to the community noticeboard or dartboard, perhaps alongside others, for all to see. Next, the alcohol was broken out and served. At one base, all work was stopped immediately and drink consumed, most of them by the letter's recipient. If a Fid was broken up with by a wife or girlfriend back home, bases created an atmosphere of public grieving and reassurance that his place within the all-male universe was secure. The offending letter was displayed and, on occasion, destroyed publicly.

The creation of these traditions speaks to how the men reacted to the severing of ties with the feminine and affirmed the Fid's unfitness for normal life and relationships, thus ensuring his place within the all-male Antarctic periphery. At the same time, public displays like this reminded a man of his location beyond the societal and cultural norms of England. There was no need to keep a stiff upper lip, especially when intense introspection could lead to moroseness or cause men to self-isolate. The safe place, mentally and emotionally, was on base with your mates. Protect the base and its mateship at all costs. Once again, we see how important masculine community is to the concept of Antarcticness to British men over the twentieth century (cf. Chapter 10).

Midwinter Day has been celebrated in the Antarctic since Scott and Amundsen. Every June, winterers celebrate the middle of what one Fid called 'the dreaded hundred days of darkness' (*The Feenix* 1968). John Gallsworthy, a carpenter and builder at Halley, had the idea of dressing up in the iconic *Playboy* bunny outfits for the midwinter meal. He gathered three other men and they sewed the costumes, 'making the ears and all that' (Gallsworthy 2011, 33–4). On 21 June, Gallsworthy and three other Fids tramped into the mess hall wearing their bunny ears, cuffs, costume with bust, bunny tails and boots to serve the midwinter feast. 'Well it went down really well. People kept playing with your tail. "Get your hand off my tail,"' said Gallsworthy years later (Gallsworthy 2011, 33–4).

Through regular celebrations, some Fids performed these elaborate parts of feminine fantasy for the enjoyment of their peers. A review of the

midwinter festivities printed in *The Feenix* a week later recounted the actions of several handsy, 'weak-willed' Fids: 'This caused the Bunny Girls no little embarrassment with patrons touching their knees and other unmentionable places. (I'll tell you something Chaps, if you touch my knees you'll touch anything)' (*The Feenix* 1968). Jeremy Light, who performed a slight alteration of this a year later at Signy, recalled the reaction of Fids to his improvised water balloon breasts: 'I do remember others getting quite interested, shall I say' (Light 2007, 8). The performance of femininity by some of 'Britain's finest' was necessary to ensure good cheer on the all-male bases, the masculinity of which was continually extolled in the pages of the base magazines.

When discussing the possibility of women working on base, Fids viewed the issue as being more about sex and maintaining masculine community rather than competence or ability, though some Fids certainly thought women could not survive in the harsh environment. The women working at BAS had become objects of fantasy, already. One base leader from the late 1970s said Fids used to look at photographs of female BAS staff, which 'would be duly sent down there to bolster the morale of the men on base' (Ellis-Evans and Wynn-Williams 1996, 29). The possibility of sex threatened the camaraderie, the celibacy and the pureness of this egalitarian, all-male base. The inclusion of women into Antarctic bases could cause discord between men, they argued, because inevitably sex would occur. Borders of Antarctic masculinity were maintained in the mind. Even hypothetically, women were not seen as potential colleagues on base, but rather as potential partners or objects of conflict or dispute, a tear in the communal masculine fabric. Fids' views on women working on base may have softened over time, but their memories of the all-male base varied.

Returning home

In a January 1968 issue of *The Feenix*, an article cautioned Fids about the difficulties in adjusting to life outside of an Antarctic base. You could not help yourself to a cigarette from anyone's pack. Worse still, you had to *pay* for party nights. The article ends with a cartoon of an open maintenance hole cover. A Fid has sought to replicate his troglodyte existence at Halley by taking the sewers. A flag protrudes from the sewers, marking his place. A menacing caption reminds Fids, 'But cheer up. Remember; it's always there' (*The Feenix* 1968). Antarctica was always there, and would be there if the Fid still felt out of place back in Britain. Antarcticness was the

opposite of civilisation. It was simple where life at home in the metropole was complicated and exhausting. Because survival was the key to existing in Antarctica, returning home confused one's priorities. Antarcticness was about simplicity; going home left one dizzied and exhausted.

Fids were bound to miss things back in Britain during their two years in the Antarctic. One of them said music changed completely while he was gone. He had missed the initial wave of the Beatles. Graham Jones said that he 'missed the drugs' (Jones 2013, 22). Halley Bay's *Z* (1977) said Fids would be terrified at the speed of cars on the motorway, overwhelmed by the amount of intelligent conversation to be had, and suffer embarrassment at the hands of their best friends: 'He can't wait to tell everyone in the pub that you "out-ticked" Amundsen, made Scott look like a paraplegic, and the *Bransfield* sound like the *Manhattan*' (*Z* 1977, 46). Antarctica was a place for heroes. This backfired on Fids, who were at a loss to explain their time to civilians. They could buy cigarettes whenever the shops were open, could walk to the local pub and buy as many pints as they could afford, and probably had to wake up at a given hour. In the same way Heroic Era explorers lampooned the performative aspects of their jobs, Fids in the 1960s and 1970s faced the possibility of being painted as some kind of hero, which of course they were in their own minds.

In 1969, Fids wrote a farcical boilerplate letter to send loved ones in Britain about how to help their Fid readjust to life in Britain. The list, titled 'Rehabilitation of Explorers Returning from the Great White Polar Wastes', was 25 points long, and was later reprinted in *Sigmopolitan*, the Signy base magazine, in 1986, showing the durability of its themes. Some of the more telling and revealing points include:

1. Sleeping is an art, to which all Fids are artists; comas of 16 hours are a daily occurrence.
2. Work is the Fids' natural enemy and brings out a state of acute anxiety.
3. Women are only figments of the imagination to Fids but a few slaps and scratches and plenty of encouragement will soon bring him back to reality.

10. Always put food on the table before allowing him into the room. Many parents have been stabbed in the hand with a fork in the rush to get at it being served.

15. Don't take him to the zoo, as all seals are shot and gutted on the spot, and all penguins will immediately be bodged (i.e. hit on the head) and quickly made ready for the pot.

19. Alcohol should be administered as medicine at least five times a week, with large doses on Saturday night.

The list painted Antarctic bases as dens of deprivation, violence, drunkenness, sloth and slumber. It is a continuation of many themes in writings from Heroic Era explorers, mainly focusing on privation and the threat of violence against animals. The opening of the letter incorporates the language of struggle and it is notably not farcical; the men 'lived the life of a Spartan for the scientific advancement of Britain, sparing nothing and caring not for the immense hardships and dangers'. Such a rugged, masculine lifestyle made mundane routines in Britain seem daunting, if not alienating.

Jeremy Light returned home in the early 1970s. He later commented, 'I remember being absolutely exhausted going shopping for the first time. Just the whole experience of going out, of traffic, of roads, the shops' (Light 2007, 16). Speaking to their families and friends about their experiences may have helped, but a Fid writing in *Z* thought this was a waste of time, as 'they are not interested' (*Z* 1977, 46). If alienation drove them to Antarctica and festered on base, it now could drive them back again. Many Fids returned to Antarctica because they enjoyed base life and the escape it provided. John Gallsworthy said that 40 years of living an Antarctic lifestyle made adjusting to work sites in England difficult (Gallsworthy 2011, 36). 'Remember you are part of a privileged minority,' an article in *Z* reminded home-bound Fids. 'Many people would love to winter in the Antarctic or just "tick it"' (*Z* 1977, 46). Fids were unique, and soon they would have to spend time answering for what went on in the Antarctic – not always an easy task. If the company of the public proved too obnoxious, the Fid could always sign up for another stint down south. One Fid suggested, 'There is only one reason for coming to the Antarctic, temporary insanity. There is only one reason for returning to the Antarctic, permanent insanity' (*Groans* 1985). The Antarctic could alter someone fundamentally. The experience and space were so powerful that Fids no longer felt they functioned well at normal jobs or within daily routines. The desire to be in a place far removed from anything resembling normalcy sent many Fids back to the Antarctic.

Conclusions

Over the first 40 years of the British occupation of the Antarctic Peninsula, men turned their bases from ramshackle footholds on the inhospitable

continent into strong but small communities with long traditions, intricate hierarchies and dynamic conflict. As the decades progressed, men cared as much about preserving the existence of the all-male base and the camaraderie it represented as much as any issues of sovereignty. Imperial decline heightened men's anxieties about their worth when compared to certain Antarctic rivals, such as the United States, but also reinforced the coloniality of the work. Because the Empire was shrinking and Antarctica remained one of its remaining bulwarks, men built their Fid identity on the colonial nature of their service.

As seen in other parts of the British Empire, the culture created on the periphery mattered as much to the men serving there as the political motives of their work, if not more so. Fids complained about the lack of women, about the 'forced celibacy' they endured for their jobs, but many stubbornly refused to imagine incorporating women into base life for fear their presence would ruin the camaraderie of the base. Antarctic masculinity, with all its suffering and hardships, ensured that the all-male colonial experience lasted well beyond the independence of India in 1947, Harold Macmillan's 'Wind of Change' speech in 1960 and the closure of the Colonial Office in 1966. It endured into the 1980s. Only the heroic and sustained efforts of Janet Thomson – the first British woman to complete scientific fieldwork in Antarctica – and many other women at BAS broke the ice ceiling, though Antarctica remains a predominantly masculine place. The bulk of experience for 40 years shows that Antarctica, and the concept of Antarcticness, endured as one of the last redoubts of colonial masculinity, one that was preserved for much longer than other parts of the Empire.

References

References to 'BAOHP' below are to transcripts from the British Antarctic Oral History Project, which are accessible via https://basclub.org/oral-history (accessed 17 August 2021). The base magazines cited below were consulted at the British Antarctic Survey in Cambridge; shelfmarks for these copies are given in each case (beginning 'AD7').

Allan, Douglas George. 2011. Interviewed by Christopher E. Lee, 19 June 2011, transcript AD6-24-1-128. BAOHP.

Allsopp, Dennis. 2007. Interviewed by Christopher E. Lee, 15 September 2007, transcript AD6-24-1-26. BAOHP.

Barczewski, Stephanie. 2009. *Antarctic Destinies: Scott, Shackleton, and the changing face of Antarctic Heroism*. London: Continuum.

Boston, Duncan. 2012. Interviewed by Christopher E. Lee, 7 June 2012, transcript AD6-24-1-171. BAOHP.

Clapp, Edward C.J. 2009. Interviewed by Christopher E. Lee, 1 November 2005, transcript AD6-24-1-19. BAOHP.

Dodds, Klaus. 2002. *Pink Ice: Britain and the South Atlantic Empire*. London: I.B. Tauris.

Dodds, Klaus. 2009. 'Settling and unsettling Antarctica'. *Signs: Journal of Women in Culture and Society* 34(3): 505–9.
Doyle, Ken, Phil Wainright, Ian Sykes, Ian Smith and Edward Creswell. 2009. Interviewed by Christopher E. Lee, 6 November 2009, transcript AD6-24-1-59. BAOHP.
Ellis-Evans, John Cynan, and David D. Wynn-Williams. 1996. Interviewed by Margaret A. Martin, 14 August 1996, transcript AD6-6-24-1-8. BAOHP.
Fletcher, David. 2012. Interviewed by Christopher E. Lee, 25 April 2012, transcript AD6-24-1-161. BAOHP.
Gallsworthy, John. 2011. Interviewed by Christopher E. Lee, 17 June 2011, transcript AD6-24-1-123. BAOHP.
Groans. 1974. AD7/14/3/1974. Cambridge: British Antarctic Survey.
Groans. 1985. AD7/14/3/1985. Cambridge: British Antarctic Survey.
Halley Comet. 1965. AD7/2/3/1965/1. Cambridge: British Antarctic Survey.
Halley Comet. 1983. AD7/Z/3/1983. Cambridge: British Antarctic Survey.
Halley Comet. 1985. AD7/Z/3/1985. Cambridge: British Antarctic Survey.
Huckle, John. 2009. Interviewed by Christopher E. Lee, 22 June 2009, transcript AD6-24-1-36. BAOHP.
Jones, Graham. 2013. Interviewed by Christopher E. Lee, 30 January 2013, transcript AD6-24-1-207. BAOHP.
Kressman, Richard. 2012. Interviewed by Christopher E. Lee, 4 April 2012, transcript AD6-24-1-158. BAOHP.
Light, Jeremy. 2007. Interviewed by Christopher E. Lee, 15 September 2007, transcript AD6-24-1-29. BAOHP.
Limbert, David. 2004. Interviewed by Christopher E. Lee, 1 March 2004, transcript AD6-24-1-17. BAOHP.
Morgan, Ivor P. 2012. Interviewed by Christopher E. Lee, 26 October 2012, transcript AD6-24-1-193. BAOHP.
Mushroom. 1970. AD7/Z/3/1970. Cambridge: British Antarctic Survey.
Pengwige. 1966, 12 November. AD7/2/3. Cambridge: British Antarctic Survey.
Petrie, David. 2011. Interviewed by Christopher E. Lee, 18 June 2011, transcript AD6-24-1-125. BAOHP.
'Rehabilitation of Explorers returning from the Great White Polar Wastes'. 1969. *Winter '69*. AD7/H/3/1969/1. Cambridge: British Antarctic Survey.
Rose, Ian. 2013. Interviewed by Christopher E. Lee, 29 January 2013, transcript AD6-24-1-206. BAOHP.
'Signy Island'. 1970–1. *Winter '70–'71*. AD7/H/3/1970. Cambridge: British Antarctic Survey.
Tait, John E. 2001. Interviewed by Christopher E. Lee, 13 November 2001, transcript AD6-24-2-10. BAOHP.
The Feenix. 1968. AD7/Z/3/1968/3. Cambridge: British Antarctic Survey.
'The Prodigal Fid'. 1970–1. *Winter '70–'71*. AD7/H/3/1970. Cambridge: British Antarctic Survey.
Thompson, Russell, and Neville Jones. 2007. Interviewed by Christopher E. Lee, 15 September 2007, transcript AD6-24-1-30. BAOHP.
Z. 1977. AD7/Z/3/1977/1. Cambridge: British Antarctic Survey.

6
The land of letting go

Jean McNeil

I began this poem a long time ago, exactly 15 years in fact, as I write this note, when I first went to Antarctica with the British Antarctic Survey (BAS) as writer-in-residence in 2005–6.

The poem begins on the Royal Research Ship *James Clark Ross*, which conveyed us to the Antarctic continent from the Falkland Islands. However, by the point I joined the ship and the narrative of the poem begins, I had been in Antarctic World for around a week, since meeting my fellow Fids (Antarctic staff are still known colloquially by BAS's previous nomenclature, Falkland Islands Dependency Survey, a charmingly retrograde custom; see Chapter 5) at Heathrow Airport. Together we flew to Madrid, then to Santiago de Chile, where we stayed for a night before continuing on the hopscotch LAN-Chile flight to Puerto Montt, Punta Arenas and then, finally, to Mount Pleasant (a misnomer!) military airfield in the Falkland Islands.

We were supposed to join the *James Clark Ross* almost immediately, but 'delay' is the second most popular word in the Antarctic realm, after 'weather' (see Chapter 14). Our ship voyage to BAS's Rothera Base was supposed to take five days but ended up being two and a half weeks long. In fact, we almost didn't make it. The ship was beset by pack ice for four days on the western edge of Adelaide Island. Through those long stalled hours in pack, I wrote in my cabin, as our anxiety about ever reaching the continent increased. This poem was born in those silverprint nights I stayed up to write, when 3 a.m. looked identical to 3 p.m. and no one got any sleep for days.

'The land of letting go' sits in conversation with two other texts: R.D. Laing's famous case study, published as Chapter Five, 'The coldness of death', in *Self and Other*, and William Blake's poem 'The sick rose.' I'd read

the Laing case study many years before going to Antarctica and it stayed with me. In it, an otherwise ordinary woman in her early thirties has a bizarre nervous breakdown. She feels herself being 'claimed' by her family and her ancestors, her body literally torn apart by them. As she travels through the chapters of her distress, she has archetypal experiences and visions: a ship, a storm at sea, a rose.

The Blake poem is famously enigmatic. I had always taken it to be about a love affair, and the rancid bad faith that follows the failure of love. The connection between the Antarctic, my poem and these two texts is still mysterious to me, but I think it has something to do with the fact that Antarctica was for me an identical experience to falling in love. It provoked a similar raw infatuation and spiritual ransack. To live and work in Antarctica can elicit a requestioning of the nature of self. I don't think anyone returns from a stint on the continent (I'm not talking about tourism; the place has to become home on some level to qualify) as they arrived. I'd go so far as to say that Antarctica requires you to both relinquish and regain your humanity. 'The land of letting go' charts that journey.

1. The ship

The captain holds a cocktail party on the bridge
the night before we set sail South. Uniforms
slide through blue twilight. It is summer
in the Falklands, the sun a low red flush.
Navigation screens show us alongside
the harbour. Weather systems lie in wait.

The ship hums with capability.
A ship is a family: we eat together
sleep in adjoining beds. Each others' captives
we are at the mercy of proximity.

Our first day at sea is lush, the ship lunges,
famished for motion. Just north of Burdwood Bank
we go up to Monkey Island to stargaze. The Seven Sisters
fade in and out of view on the horizon
strobe-lit, electric. Orion is reversed, his sword points north.
We pass a seismic ship – off to blow up the seabed
in search of natural gas. Later

we will play Scrabble, drink wine as the ship
begins to grapple with the Drake Passage.

2. The storm

Black roses flourish
on this wave-crasher,
drinking the night.

The sea slews, dark as tar.
Books topple from my shelf, shampoo
bottles must be harnessed
behind a mirror and the shower
has a little handle
in case we should slip.

Everything we touch
shocks us. Ships generate static electricity –
too much kinesis in an enclosed space. Fire is
the real threat on ships, not sinking.
(Although sinking, we agree, is to be avoided.)

Our days are taken up with drills: abandon ship,
cold water survival, fire, burns, acid spill,
running out of beer drill. All night we work, performing
insomniac experiments, calibrating salinity
tracking the depth and density of the water column
learning a new language which sounds
like an amalgam of Greek and a fire alarm:
thermohaline circulation; plankton; krill; salps.

A ghost prowls the corridor outside my cabin, a
hermitage filled with silver shadows.
Everyone goes a bit mad in Antarctica
the old-timer tells us in the bar.
The ship is a wolf loping over the waves.
The continent pulls us closer. Soon
we will labour in the iron fields
of luck. Soon the oceans will write stalemate epics.
Elephant Island, Clarence Island pass

as apparitions. Sentinels to the underworld,
like the Assyrian lions in the British Museum
which the guards say cool the air around them
making passing visitors shiver.

3. Wanderer

He appeared somewhere over Burdwood Bank,
a chaperone flying outside my porthole. He stayed
for three days. I called him my mini-Cessna, with
his moon-silver ailerons, his
butterscotch sere. From time to time he swivelled
and gave me a stern stare. I stared back.
He saw me, I know he did. What is it you want?
You must be a messenger. Why stick by me otherwise?

Somewhere near Clarence Island we ran
out of night. He remained flying in the diurnal
glare. I would wake in my cabin at three
in the morning, raise the night shade and there he would be.
Black polyp for an eye, torque and tether of wing.
I never saw them flap. I never saw him leave.

4. Blue-blackness

The announcement comes on the PA from the
Officer of the Watch: *Blue whale sighted*
off the beam. We struggle into four jackets
two hats, rigger boots, three pairs of socks.

She emerges from an obsidian ocean.
(At least we think it is a she.) The sea
itself given shape. So smooth! we cry. No barnacles.
The sea foams, creamy, from her lapidary back.
She breathes with the ship. She speaks the same
language. *Hoo. Hah. Russssh.* It sounds
like regret. An eye emerges, three
wrinkled folds above a black-glass stare
like a Claude mirror. We see ourselves in it,
upside-down goblins, our ship a matchstick. We crave

her wet ignition. Then she submarines
south-south east, and we steam to the west.

I stay on deck wearing her blue-blackness
a mind-cloak, willing the dense citadel
to emerge once more, a citizen of Atlantis.
Much later, an hour after civil twilight
has fallen, I am still on deck to see my first
tabular berg, a white wall of severed forever.

5. The wreck

On board the most popular films are
A Perfect Storm and *Titanic*. In the bar
we talk of the break-up of the *Endurance*
as if our hearts have been crushed in the ice vise.
Or of the *Bremen*, walloped by a wave
out of nowhere only a few years ago. She
drifted, engineless, right where we are now.

Wreck-worries become totems. The ocean
has infinitude, but we have stories.
There's more than one way to run aground, I say.
Did you know the Spanish for shipwreck
is *naufragio*? No, the officers say. *Is that so?*
We talk for hours. We say, we know we are
travelling to a terrestrial Pluto, to the
outer edges of the known world. We know
we are here only through luck. We ask
will the Earth end in fire or ice
or will it simply wear away?

6. The rose

Yes the rose is sick
its watersilk cult of wilt

Blooming in thin migrant days
hung on the sigh of his face

A beautiful censor
he has been here through the long years
when we were still animals.

With his rapture eyes
the hot pearl sting
of his lips.

He is the rose the sentry and the letter
all together

He is panic streets in mummer cities
Like Venice in summer
– verdigris, carmine, ochre –
he makes me think
of vanity
and gifts and sorrow

Love

some
raw scavenger

7. Arrival

We spent a week trapped in pack. The world
fastened around us, a cold fist. We waited
to see what the ice wanted to do, holding
summits, negotiations, listening to its mutter
in silverlight cabins at 3 a.m.

Now we glide through strange layers of mist
that float toward us like the albatrosses
who abandoned the ship weeks ago
when they understood how insane we were,
how far we would go to get to the bottom of things.

Now we are here. White lipids, ice-cataracts,
moulins, cirques, sastrugi. A katabatic wind
Bansheeing through comms cables, strung

like a giant dream-catcher, the Sat dome
a sphere on an Orthodox cathedral.

We have been trying to outrun ourselves
but look, who is that waiting on the jetty?
Now we will begin our declension.
We are our own replacements, come here
to rehearse the future. Our lovers cannot follow.
We have found somewhere they can not destroy us.

And so we float, terrestrial astronauts
besotted by strata. Alone in time, at last,
among the icebergs, their moody detonation,
saints practicing for oblivion.

7

A decolonial perspective of Antarcticness

Rosa Jijón

In 2013 at the Umberto I Hospital in Rome, the gallerist and neurosurgeon Francesco Nucci told me:

> You know, we come from far away. The memory of snow and white can even date back to the glacial era, when ice covered most of the planet. Hence, we have a baggage of experiences of those places. Indeed, they are dangerous, because it goes without saying that it is hard to detect a danger when you are in an absolute and overwhelming colour.

A huge ice cap, white and unreachable, that conceals the history of the Earth and possibly its future: Antarctica has always been imagined as the furthest south, the last frontier of human conquering (Chapter 5), beyond which an indefinite and unfathomable, mysterious space exists. Throughout the history of humankind, undiscovered lands have always represented the unknown, the fear of darkness, the awareness of human limits. The dark and impenetrable forest was home to the 'foreigner', and the associated perceived threat. Indeed, the human body has managed to reach down to the centre of Antarctica, confronting itself with extreme cold and weather, in a sledge, a tiny submarine, or more recently metal boxes packed with scientific instruments (Chapter 4). Nevertheless, science has not yet managed to fully explore, record and archive the wholeness of the Big White South. Antarctica, without polar bears that could revive our childhood imagination, is a territory without people, for people of science and government: a wild continent that some people believe has to be tamed, controlled.

Gaps remain in our knowledge about the devastating impact of climate change on southern ice, but much is known about its key role in keeping the planet in balance. Similarly, in the past little was known of the geography of Antarctica and its contours, of the true extent of this land. Aristotle imagined it as a hypothetical continent, Terra Australis Incognita. The Greco-Egyptian astrologer and mathematician Ptolemy attributed to the continent a central role to balance the weight of the Eurasian continent in the northern hemisphere. It is strange now to read this narrative with a geopolitical key, in a world where the old 'north' suffers the consequences of a civilisation crisis (cultural, political, economic), and the old 'south' will need to help ensure a hypothetical rebalancing. The south polar world is a symbol of the unknown future, which still has to unfold from deep inside. It was an untouchable borderland before, and today becomes accessible.

Land of extremes, at the end of the Earth. The challenge for the artist is that of attempting to offer an original reading of the whole range of these possible leads for investigation. The fear of the immense ice is brilliantly rendered, with quasi-esoteric nuance, in H.P. Lovecraft's novel *At the Mountains of Madness* (1936), where black and white – the lack of colour and the sum of all colours – are compared to Dante's *Inferno* (1320) in a text that suggests an awareness as well as a rejection of the limits of humans and of planet Earth.

Too often in traditional representations of Antarctica the southern space has been considered as the last frontier of human conquering, predominantly for the Western Caucasian hero – masculine, white, fearless and courageous. The challenge therefore is to unveil other narratives, trans-feminist and decolonial, to propose a reversed reading of Antarcticness, made of women, indigenous peoples, 'mestizos' or unknown heroes in dugout canoes. As the first ever artist-in-residence from Ecuador in Antarctica, my intention was to put myself on the ice surface, following the eyes of those South American women aboard the *Yelcho* vessel sailing towards the unknown that Ursula Le Guin described in her story 'Sur' (1982) – or the legendary Māori seafarer Ui-te-Rangiora, who sailed south from Rarotonga around the year 750 in his canoe *Te Iwi o Atea*.

My art project at the Ecuadorian Scientific Station 'Pedro Vicente Maldonado' in 2013 was to create a series of artistic actions in order to 'un-conquer' the Antarctic territories and to provide a different point of view of the quest for Antarctica. *Flags* was a participatory action where I brought together coloured Antarctic flags and took pictures of all participants in the 2012–13 Ecuadorian Antarctic Campaign, as a way of deconstructing Antarctic identity (see Figure 7.1 and also Chapter 11).

With *Tribute to Hurley* (Figures 7.2–7.5), I decided to archive the unarchivable ice, honouring the story of the Australian photographer Frank Hurley, who spent time in Antarctica and decided to destroy most of his work from Shackleton's *Endurance* expedition in order to help save the men.

The Line was a number of performances aimed at tracing the equator with a red ribbon over the white landscape (Figures 7.6–7.9).

More paradoxical than ever is *Risso Patron*, documenting an abandoned Antarctic station (Figures 7.10–7.13). With this work I wanted to dismantle a number of conventional ideas on the purity and emptiness of the Antarctic landscape.

This visual essay aims at assembling a different point of view of Antarctica and Antarcticness, one made of contradictions, conflicts, fragilities and scientific data that makes it urgent to reclaim our world heritage and demand the urgency to keep this white continent intact. Furthermore, this set of images questions whether Antarctica should in fact be left alone, to allow it to take breath, and to continue being the repository of our universal memory and to save all living species. A southern, decolonial, feminist, mestizo Antarcticness could well mean opening the possibility of walking the other way, not exploring any further, not taking any more pictures, not allowing any more tourism, not collecting any more information.

Most of my work is based on the element of displacement or being displaced, be it people or landscapes. I go to Antarctica and become a territorial claim: Antarctica, one of the places on Earth where territories do not exist, where frontiers are forbidden, where borders fade for ever.

All pictures were taken during the artist-in-residence programme Artea, Ministry of Culture, Ecuador in 2013.

Tribute to Hurley

Ice is not a book that can be read or from which information can be obtained. it is a protagonist subject to the formation of the Earth. In her book *Antarctica as a Cultural Critique*, the feminist writer Elena Glasberg attributes a subjectivity to ice – 'living ice' whose materiality cannot be represented or reached by ordinary mortals, but only through the confrontation of the body itself on the Antarctic continent. This piece is part of the 'Archivo del Hielo' ('Ice Archive'), an archive of the impossible and of melting matter, a body of work made as a metaphor for raising awareness on global warming and the dissolution of the financial system.

Tribute to Hurley is also a work that wants to remember the Heroic Age of Antarctic exploration, as Hurley abandoned most of his work in order to save his own life and that of the others. I want to address a point of view that is feminine, postcolonial, and from the south, in which the territory of Antarctica is not a space of conquest, but a repository of the possible future of humanity.

La Linea – The Line

To walk the line means:

1. To maintain a fragile balance between one extreme and another; i.e., good and evil, sanity and insanity, decency and decadence.
2. To behave; to abide by the law and/or to abide by moral standards; to walk a straight path of decency by following the rules; to 'walk the straight and narrow'.[1]

For the last ten years, I have been following the equator, the imaginary line that crosses my home country, Ecuador. At first a documentation project, since 2011 it has also been a work of performance research.

At times a borderline, at times a frontier, most times an idea in the middle of an unpacked landscape, the line is an obsession and a reason to transit, move, escape, wander around. A line can be employed to trace a path, to separate, to unite, to cross, to divide, to inhabit. Imaginary lines are also barriers built by power relationships, or by forms of discrimination, fear of the Other, isolation.

A line is a non-existent figure. It is the continuity of a series of dots that our mind puts together.

References

Glasberg, Elena. *Antarctica as Cultural Critique: The gendered politics of scientific exploration and climate change* (Basingstoke: Palgrave Macmillan, 2012).

Le Guin, Ursula. 'Sur'. In *The Compass Rose* (London: Panther, 1982).

Lovecraft, H.P. *At the Mountains of Madness* (1936). https://www.hplovecraft.com/writings/texts/fiction/mm.aspx, accessed 14 August 2021.

1 https://www.urbandictionary.com/define.php?term=Walk%20the%20line, accessed 14 August 2021.

7.1 *Flags*. Photograph by Rosa Jijón, 2013.

7.2 *Tribute to Hurley*. Photograph by Rosa Jijón, 2013.

7.3 *Tribute to Hurley*. Photograph by Rosa Jijón, 2013.

7.4 *Tribute to Hurley*. Photograph by Rosa Jijón, 2013.

7.5 *Tribute to Hurley*. Photograph by Rosa Jijón, 2013.

7.6 *The Line*. Photograph by Rosa Jijón, 2013.

7.7 *The Line*. Photograph by Rosa Jijón, 2013.

7.8 *The Line*. Photograph by Rosa Jijón, 2013.

7.9 *The Line*. Photograph by Rosa Jijón, 2013.

7.10 *Risso Patron*. Photograph by Rosa Jijón, 2013.

7.11 *Risso Patron*. Photograph by Rosa Jijón, 2013.

7.12 *Risso Patron*. Photograph by Rosa Jijón, 2013.

7.13 *Risso Patron*. Photograph by Rosa Jijón, 2013.

8

The ant-architecture of religion and spirituality in Antarctica

Ellen C. Frye

Writings about Antarctica represent a relatively untouched field of study, as compared to the physical and natural sciences, political science and, more recently, tourism, throughout the nineteenth, twentieth and into the twenty-first century. Likewise, other cultural perspectives on Antarctica are lagging behind scientific studies, but they are quickly gaining traction, each of them leading us to a greater understanding of 'Antarcticness.' One of the largest professional organisations dedicated to Antarctic Studies is SCAR (Scientific Committee on Antarctic Research), which was founded in 1958, and one of their newer subgroups, HASSEG (Humanities and Social Sciences Expert Group, started in 2014), became the Standing Committee on Humanities and Social Sciences (SC-HASS) in June 2018, with the directive 'to contribute directly and substantially to the challenges of describing and managing human impacts in Antarctica'.[1]

As research in music, the arts, literature and other aspects of culture in and of Antarctica increases, it is exciting and motivating to further the investigative agenda. To that end, one can explore detailed themes and specific topics, as related to the culture(s) of Antarctica and Antarcticness, such as religion and spirituality. This heretofore completely unexamined field of research is ripe with subcategories, all of which deserve a more thorough analysis than what is possible here. Indeed, the religion and spirituality of Antarctica represent microcosmically, or in miniature, the immense diversity of what Antarcticness is. This introductory chapter on religion and spirituality in and of Antarctica is offered as a springboard for future investigation.

Concurrently with Antarctic writings, I have been examining various aspects of culture that frequently appear in Antarctic literary texts, with a special emphasis on religion and spirituality. When I participated in the SC-HASS biannual conference in Ushuaia, Argentina, in 2019, where more than 150 people attended from over 25 different countries, the theme of religion and spirituality in Antarctica skyrocketed in value and importance to me. Many participants readily shared their experiences of being in Antarctica, and a silent subtheme that emerged, underpinning their travels as tourists (Chapters 9 and 14) or researchers (Chapters 4 and 16), was indeed spirituality (also Chapter 10).

This is in addition to the many people I have met through the years, who answered my queries about their Antarctic experiences, whether as researchers, staff, adventurers or tourists. In many of these stimulating conversations, spirituality often surfaced as an afterthought, sometimes grounded in a major world religion (that the person practised regularly, or had abandoned and perhaps later returned to). For others, who struggled to express it as a spiritual connection, perhaps viewing their experiences as Antarcticness, in all its breadth and depth, becomes helpful as a contextualisation. All this has highlighted for me an underlying current apparent in many of the Antarctic literary texts, that of spirituality, in a wide variety of aspects. Springboarding off this finding, I have recently found myself researching the practice of religion and spirituality in Antarctica, and there is a wealth of information, but hidden in the ice, as it were.

Why is it hidden? Religious and spiritual beliefs are often quite private and sometimes deeply buried in the subconscious. Some people do not like to speak about them at all, but for others, in their writings, there are often veiled references, symbolic objects, occasionally bold statements, about religion and spirituality. In writings about Antarctica, there is one religious-spiritual theme that appears most frequently, in nearly every piece: death. Death is always nearby, in the crevasse of a glacier, swirling in a whiteout, or drowning in the sea. Death is intricately and explicitly linked to religion and spirituality.

Although most corpses lay buried where the person died, there are, remarkably, several tiny cemeteries on Antarctica, as well as eight dedicated houses of worship (at current count). The first part of this chapter is dedicated to these places of worship, and then I will examine the shrines, crosses and cemeteries in Antarctica. Last, as a starting point for future studies, and linked intricately to the actual 'architecture' of religion, I will suggest accompanying musical and artistic components of spirituality, as well as an overview of religion and spirituality in Antarctic literary texts. In

all and in its totality, this could be conceived of as Antarcticness. This chapter is basically an overture for a future symphony, an exciting foundation from which to begin further examination of this invaluable topic.

Ant-architecture

What exactly does the term 'ant-architecture' mean? First, at SCAR, there is the AntArchitecture Action Group, whose goal is 'to develop a continent-wide, age-depth model of Antarctica's ice using the internal layers and surfaces imaged by radar-sounding. The product underpins a wider goal to determine the stability of the Antarctic Ice Sheets over past glacial cycles.'[2] (Curiously, there is also an architecture and planning company in the United Kingdom called Antarchitecture.) The designer David Galbraith explains his definition of 'antarchitecture':

> Antarctic architecture provides imagery of the closest thing that people will be able to see to a moon base, within their lifetimes. The extreme nature of the environment, combined with its bizarre statelessness, provides the location for a freezing architectural expo, with each country having its own icy pavilion. Since the early days of wooden huts, the architecture has converged on a style which consists of a pod on legs, somewhat reminiscent of *Thunderbird II*'s cargo bay or the *Space: 1999* freighter. In addition large scale experiments such as the south pole telescope or ice cube neutrino detector (which is technically a telescope at the north pole since it watch for particles which have traveled through the Earth) provide equally interesting accidental architecture, in that their designs are purely functional.[3]

This definition of 'antarchitecture' serves several functions simultaneously, for the study of religion and spirituality of Antarctica. First, some of the churches on Antarctica have the typical, Antarctic architectural style cited above, a pod on legs. Second, because of the extreme natural environment, in some cases the church designs are purely functional, as will be discussed below. Third, it is the statelessness of Antarctica itself that serves to highlight more precisely the nature of spirituality itself: a freely practised situation of unworldliness, or conditions ripe for the mystical, or perhaps in yet another manifestation of the word, it is Antarcticness. Thus, we have a contender for point of departure for the first examination of religion and spirituality of Antarctica: the architecture itself.

Antarctic places of worship

What exactly is religion anyway? Spirituality? There are many ways to define both terms, but here, we will refer to Merriam-Webster's dictionary, to keep it simple: 'Religion is a cause, principle, or system of beliefs held to with ardor and faith', and 'Spirituality is the quality or state of being spiritual, [which means] of, relating to, consisting of, or affecting the spirit; of or relating to sacred matters; and, of or relating to supernatural beings or phenomena'.[4] For some people, religion is practised regularly in a house of worship, whether a temple, mosque, synagogue, cathedral, church or chapel. Thus, it should be of no surprise whatsoever that small, dedicated places of worship have been constructed in Antarctica. The first known religious celebrant to travel to Antarctica was Reverend Arnold Spencer-Smith, an Anglican priest, who served as both chaplain and photographer for the Ross Sea party of Shackleton's Imperial Trans-Antarctic Expedition which started 1914. He established a chapel with an altar in the darkroom of Scott's Hut at Cape Evans, and there he both celebrated the Eucharist and heard confessions (Paveley 2019). Unfortunately, Spencer-Smith was also the first clergyperson to die on Antarctica, in 1916.

Within the Antarctic Treaty's zone, there are currently eight places of worship, constructed as such, in addition to spaces dedicated to religious services on many bases that do not have a formal, separate location for religious services (Messynessy 2014; Nag 2017; Woolley 2020; with almost no academic research on the topic, journalistic articles such as these are the main sources available). First, the Christian Chapel of the Snows is not affiliated with any particular denomination and it is located at the United States' McMurdo Station on Ross Island. The original plans for building McMurdo Station did not include a church, but as leftover construction materials began to pile up on a hill overlooking the nearby glaciers and mountains, staff from the US Naval Construction Battalion began to build the first ever religious house of worship in Antarctica. Today, it is a white building with greyish trim, with a front door which is balanced with a window on each side, and closely resembles a typical church. It harkens back to the original church on the site, built in 1956, which was destroyed by fire in 1978 ('Chapel of the Snows Destroyed' 1978).

On the original structure, there was a more prominent cross at the top. The current Chapel of the Snows was consecrated in 1989, and it has custom-designed stained glass windows, depicting a cross, Antarctica

itself, and a penguin. At the Chapel of the Snows, both Catholic and Protestant services are given on a regular basis by various chaplains, and it has McMurdo's (and possibly Antarctica's) only organ. For nearly 50 years, the Catholic priests were organised by New Zealand's Diocese of Christchurch, but now the US Archdiocese for the Military Services fulfils that role. The responsibility of the supply of Protestant chaplains is with the US Air National Guard. Sacred services of other religions are also held at the chapel, which can accommodate approximately 63 worshippers. For example, photographs appear of a menorah in the Chapel of the Snows, and it known that Buddhists, Baha'is and secular groups such as Alcoholics Anonymous hold their meetings at this chapel.

The first Roman Catholic Church built in Antarctica is the Chapel of St Francis of Assisi, which was consecrated on 18 February 1976, on Argentina's Esperanza Base, on the northern tip of the Antarctic Peninsula. Its first priest was an Italian Jesuit, Father Buenaventura de Filippis, and this chapel is the site of Antarctica's first religious ceremony of marriage, the first Mass to celebrate a First Communion, and the first Catholic baptism. This was the baptism of Emilio Palma, who was the first recorded birth on Antarctica. The Chapel of St Francis of Assisi is a small, red steel building (matching those located at this base, basically the antarchitectural pod on legs) with windows on the sides and yellow painted front steps and foundation. This church is significantly smaller than McMurdo's Chapel of the Snows, with only four rows of pews. As a Roman Catholic church, the interior has an altar covered with a liturgical linen, a crucifix, a tabernacle and monstrance, and small statues and paintings. On the exterior, next to the front door adorned with a cross, is a replica of the Virgin of Luján, enclosed in a glass case, and on the side of the church, there is a small bell tower.

Established in 1979, the Capilla de Nuestra Señora de las Nieves, or the Chapel of Our Lady of the Snows, is a Roman Catholic place of worship excavated in an ice cave (rather than constructed as a building) near the Argentine Belgrano II Base. It is frequently referred to as the southernmost site of worship in the world. To reach this unique Catholic chapel, there is a system of ice tunnels or hallways, and the entrance to the chapel looks like a trapdoor into the snow and ice, which can stay propped open temporarily with a pole. The floor, walls and ceiling of the chapel are made of ice, with what appears to be a glistening effect of many shades of blue. It looks like one could almost sense the divine presence in the sheen of crystal-ice lining the entire chapel. Inside, there are the requisite seats serving as traditional pews, one on each side of the short ice aisle, leading up the altar. On the walls are the Stations of the Cross, which consist of

the 14 images of Christ on the way to Calvary and ultimately, his crucifixion and subsequent resurrection. To find the Stations of the Cross at the 'end of the world' must be tremendous, indeed, for Catholic Christians.

Founded in 1984, the Chilean settlement Villa Las Estrellas has a Catholic chapel, Santa María Reina de la Paz (Saint Mary Queen of Peace). Broadly similar to the typical Antarctic pod, but without the 'legs', this structure is a white building that has both electricity and heat, and the Catholic deacon, a permanent resident of Villa Las Estrellas, offers regular Mass. The exterior of Santa María Reina de la Paz has several windows on each side. Interestingly, and in a welcoming fashion, there is a front porch, reminiscent of the idea of church as a community gathering spot. The inside has wood-panelled walls, a small altar with the requisite candles and altar cloth, a Virgin Mary and Child statue to the right corner of the altar and another statue to the left, along with a dedicated pulpit, unlike some of the other churches on Antarctica. Right in front of the altar are two flower arrangements, and one must speculate that they are fake, because it seems impossible to grow flowers in Antarctica, and indeed it might be illegal to import them to the continent. Another interior feature that stands out in Santa María Reina de la Paz, as compared to other Antarctic churches, is that there is purple carpeting on the floor. There appears to be almost a small stage, or niche, in the area behind the altar, which is one step up from the aisle and the church body itself. Four rows of pews line both sides of the aisle, and the Stations of the Cross are on the walls. This particular Catholic church is unique in that it is actually for entire families, including spouses and children, since Villa Las Estrellas was a governmental initiative established in 1984, to create a real town of inhabitants on Antarctica. Some of the other buildings include homes, offices, a school, a bank, a gymnasium and this church. For the Chilean citizens and their children, living and working in Villa Las Estrellas, this church must be part of their bedrock or foundation, offering a modicum of normality to their daily lives.

In 1996, the Capilla de la Santísima Virgen de Luján (Chapel of the Blessed Virgin of Luján) was consecrated at the Argentine base Marambio on Antarctica's Seymour-Marambio Island. This chapel was a latecomer to the research base, in that Marambio base was installed back in 1969. The Chapel of the Blessed Virgin of Luján is a permanent structure, painted red and made of steel, and it features both a bell tower and a steeple, with a cross. There are strong steel girders, almost like arches every half-metre or so, along the sides and over the roof of the church, obviously to strengthen the structure even further, as most of the

buildings on this base seem to be. This church holds the current record of being the third most southern house of worship on the planet. Because this research base is smaller than some of the others mentioned above, the chapel itself appears smaller, and of course, it is the researchers, other staff members and any visitors who frequent this chapel. Presumably, this Catholic chapel is named after the Virgin patroness of the countries of Argentina, Paraguay and Uruguay.

The interior of the chapel is a small space, and it has reddish wood-panelled walls. A stained glass window, a small statue of the Virgin dressed in lace, not even four pews, a pulpit, an altar and Stations of the Cross (these appear to be small oil paintings) are most of the interior features, except for something extraordinary. On 23 October 2014, a box with a glass cover was displayed, holding a skullcap and a rosary from Pope Francis. It was offered along with his written blessing to the Antarctic (Varetto 2020).

Completed in 2003, the St Ivan Rilski Chapel is located on Livingston Island's Bulgarian research base, St Kliment Ohridski, which was founded in 1988. It is Antarctica's first Eastern Orthodox structure and holds the record of being the world's southernmost Eastern Orthodox building. The chapel features a bell, a cross and icons of St Ivan Rilski and Jesus Christ the Bridegroom. Approached from the outside, St Ivan Rilski Chapel has a set of steps to climb up to it, and it appears to be a grey, steel triangle, with the top portion sliced off and replaced by the cross (with a bell below it). The chapel is embedded in the snow on four sides and is tethered to nearby rocks on all four corners. The bell was donated by a Bulgarian physician who worked at the research station in the 1993–4 season. On the inside, the walls are planks of wood and at the two ends, they appear to be concrete. There is a candelabrum, decorative sconces on the walls, crosses and – as is customary in Christian Orthodox churches – iconic images of the Virgin, Child Jesus and other important figures and saints on the walls. In 2012, a new building was constructed on a hill overlooking the research station, seemingly to watch over and guard the research station, and it is the exact antarchitectural pod on legs, painted red, with a cross erected at the top, over the front door. The new chapel has a much larger altarpiece, with icons painted in bright colours.

St Volodymyr Chapel, built in 2011 and named after Vladimir the Great, who Christianised Russia in the tenth century, is a Ukrainian Orthodox chapel located in the Ukrainian Antarctic Station of Vernadsky Research Base. It is a simple construction, made of wood, and it was consecrated by the Archbishop of Lviv. The exterior is a very light brown, almost tan colour, and there is a gold-coloured Orthodox cross on top.

Located next to one of the other research base buildings, the chapel seems quite small in comparison, but what it may lack in size is made up for in the interior. Inside, the pale blond wooden walls allow the chapel to light up. There are several objects of religious use, such as for incense, on the altar, and there is an icon of St Nicholas on the wall, as well as other figures. The Director of Ukraine's National Antarctic Scientific Centre, Valery Litvinov, said: 'When we send polar explorers to the South Pole we don't ask about their confession. But every person can have a wish to stay alone, to pray. Why don't we build a church?' (quoted in Varetto 2017b). The Archbishop of Lviv commented: 'When you pray there you get unspeakable impressions. It is zero altitude, but you have such a feeling that the church almost flies above Earth' (quoted in Varetto 2017b).

Consecrated on 15 February 2004 was the Trinity Church, another Eastern Orthodox church, on King George Island at the Bellingshausen Russian research station, which is quite exquisite, elaborate and unique. Having been constructed in Russia, it was dismantled, shipped to Antarctica, and then installed on a solid foundation, church bells and all, said to be able to withstand winds of up to 144 kilometres per hour. Trinity Church is over 15 metres high, constructed of wood, and designed in the traditional style of Russian churches. There is a flight of steps leading up to the entrance, and at night, there are beautiful spotlights that can light up the church magnificently. Two Orthodox priests are regularly in residence all year, and the church can hold 30 worshippers. The residing priests are charged with praying for the Russian citizens who died in Antarctica and they meet the religious and spiritual needs of this and other nearby research stations, sometimes offering services in Spanish. The interior of Trinity Church almost resembles a log cabin, with light-coloured wood beams made of pressurised Siberian pine, and there are icons, paintings, a candelabrum, a bookcase, a pulpit and an altar. There is gold decoration at the altar, too, lending the space a luxurious and regal feel.

Patriarch Kirill of Moscow and all Russia, when visiting Antarctica and Trinity Church, stated: '*You are here on the top of the planet . . . When I sanctified the water in Antarctica today, I thought about the whole globe below us, and prayed for God's creation. Praying in this temple for relatives and all who work here in Antarctica, for their countries and the whole world*' (quoted in Varetto 2017a). Curiously, in Russia's Novgorod region, the city of Valdai has a nature reserve, and in 2007, an exact replica of this Trinity Church was built there, the Church of St Sergius of Radonezh.

Although these are eight actual church structures, as noted above, many other research stations and bases hold regular religious services,

although not in an 'official' house of worship. Noteworthy, as an example, is that there is no Jewish synagogue, Hindu temple or Islamic mosque. Muslims are conducting research at the Pakistan research station, Jinnah, but because of the lack of sunrise or sunset at different times of the polar year, they might endure some difficulties with religious practice, for example, during Ramadan.

Antarctic shrines and burials

Moving past the idea of a specific building as a house of worship, for further thought is the idea that one's own sleeping bag is a site of worship, if you are praying or are in some way engaged in a spiritual exercise. Another matter altogether would be the notion of Antarctica itself as simply a place of worship, a sacred site worthy of awe, praise and gratitude, which might be another manifestation of Antarcticness. Antarctica is accumulating a growing number of shrines and solitary crosses, in some cases memorials, which leads to the notion of cemeteries.

First, however, shrines. What is a shrine, as opposed to a chapel, church or other religious temple? A shrine is a sacred place where a religious relic might be held, or where a religious apparition or historical event took place, or simply a place that is designated to help foster devotion to a saint or a place that is dedicated to a specific devotion limited to commemorating a person or event.[5]

Perhaps the most famous shrine on Antarctica is affectionately known as Roll Cage Mary, at McMurdo Station. This statue of the Virgin Mary, protected inside a steel cage to protect her from the Antarctic weather, is perched on a hill overlooking the research station, watching over the people currently working there and over the souls of those whose lives were lost during the construction of the station. Included by the shrine is a plaque, commemorating Richard Williams of the US Navy, who died when his tractor plunged through the ice and his body was never recovered. There are several other shrines dedicated to the Virgin Mary scattered around Antarctica, such as the Wayside Shrine, which penguins have regularly visited.

At the Argentine research base Matienzo, there is a shrine dedicated to Our Lady of Loreto, who is known as the patroness of their air force. They enthroned her at their base to protect them, witness their efforts and offer hope and guidance. During an expedition to the ECO Nelson Base, a Czech crew constructed a shrine dedicated to St Wenceslaus, St Ludmila and St Agnes of Bohemia. Researchers at the Arctowski Polish Antarctic

Station have erected two shrines to the Virgin Mary carved into niches in nearby rocks. In 1980, it was illegal under the Polish communist government to construct a space for worship, so the second, larger statue had to be smuggled out of Poland. At the San Martín Station run by Argentina, up the hill is the shrine (sometimes referred to as a chapel) to Cristo Caminante, or Walking Christ. Either a big shrine or a very small chapel is Stella Maris, at the Orcadas del Sur Observatory at the Orcadas research base, currently owned by Argentina but originally established in 1903 by the Scottish National Antarctic Expedition. Here, the first Catholic Mass in Antarctica was celebrated on 20 February 1946, officiated by Felipe Lérida (Pittaro 2015). A message was telegraphed to Pope Pius XII at the Vatican, and a 7.6 metre tall cross was erected at the site.

A shrine of a different nature, and now seemingly religious, is Robert Falcon Scott's hut on the north shore of Cape Evans on Ross Island, where canned food and a London newspaper left by Scott's men still lie in place. Erected in 1911 by his British Antarctic Expedition, and used sporadically afterwards by other expeditions until 1917, it remained unused until 1956, when US expeditioners dug it out of the snow, and then England and New Zealand restored it, with visitors now arriving regularly. Similarly, a hut survives from Ernest Shackleton's British Antarctic Expedition of 1907 on Ross Island, still much in its original state over 100 years later. Visitors come as though on pilgrimage, to pay homage.

In fact, it is through Shackleton and Scott that we have evidence of the first cross erected on Antarctica. On the cliffs of Ross Island, to commemorate the death of George Vince in 1902, during the *Discovery* Expedition, an oak cross was inscribed and erected on the cliffs of Ross Island, where it still stands today, near the McMurdo Research Base (Woolley 2020). Similarly, on Wind Vane Hill at Cape Evans, the Ross Sea Party of Shackleton's Imperial Trans-Antarctica Expedition of 1914–17 erected a cross in honour and memory of three of their members who perished nearby. A modern equivalent of a commemorative cross was the one erected in 1982, in recognition of the three members of the British Antarctic Survey who perished while crossing the sea ice between Faraday Station and Petermann Island.

Circling back to Shackleton and crosses, and leading to the question of cemeteries on Antarctica, on South Georgia Island at the end of King Edward Point stands the memorial cairn and cross for Shackleton. There are three official Antarctic cemeteries. First, Buromskiy Island, discovered and mapped by Douglas Mawson's Australasian Antarctic Expedition in

1911–14, and then a subsequent Soviet expedition in 1958 that photographed the island. There is a cemetery here for citizens of Czechoslovakia, East Germany, the Soviet Union and Switzerland who died while serving as members of Soviet and Russian expeditions to Antarctica. The Argentine research station in Hope Bay, the Esperanza Base, has a cemetery with a stele, or monumental slab, to commemorate the Argentinian expeditioners who died in Antarctica. There is one tall cross, and smaller crosses stand nearby.

On the south side of Laurie Island, in the South Orkney Islands of Antarctica, is Scotia Bay, which was discovered and charted by Captains George Powell and Nathaniel Palmer in 1821. It was later surveyed by the Scottish National Antarctic Expedition in 1903, under the command of William Speirs Bruce, who named the bay after the ship, *Scotia*. Near to the bay stands a stone hut built by the Scots in 1903 and a cemetery with 12 graves, with the oldest dated to 1903.

What about all of the other many scientists, staff, researchers, adventurers and others through the decades, who fell into a crevasse, plunged into the freezing sea or were caught in an avalanche or blizzard? Can one consider the entire continent one big graveyard? Certainly, Scott and some of his companions lay in state for about eight months, until another expedition came and found the bodies. Henriques (2020) explains, 'For those who experience the loss of colleagues and friends in Antarctica, grieving can be uniquely difficult. When a friend disappears or a body cannot be recovered, the typical human rituals of death – a burial, a last goodbye – elude those left behind.' It is this aspect of religion and spirituality, death, which serves as a turning point for examining other manifestations of religious practice and spirituality.

Religion and spirituality for Antarcticness

Linked closely to the actual 'architecture' of religion are the accompanying musical and artistic components of spirituality. Indeed, in several non-fiction texts about Antarctica, such as early explorers' diaries and journals, we read about the sailors and the polar party members singing hymns and carrying pictures of God, Christ and the Virgin Mary. Similarly, the use of prayer is accounted for in many pieces of Antarctic literature, both fiction and non-fiction. Of the forms of prayer, the most prevalent seem to be prayers of supplication and gratitude, followed by adoration and, seemingly least of all, forgiveness. In addition to the pealing of church bells in Antarctica and the Christian hymns sung by some early explorers

and adventurers, there are other examples of religious and spiritual Antarctic music, worthy of a future research project.

As Philpott (2015) notes, there is a little-known opera based on the death of Lawrence Oates, a member of Scott's South Pole expedition. There are other early explorers' inspirational tunes, composed to encourage their companions. More recently, we have Douglas Quin and Jay Needham's *Resonant Evidence* (2012), Cheryl E. Leonard's *Antarctica: Music from the Ice* (2019), Bruce Watson's *Made and Played in Antarctica: People's Music in a Far-Flung Place* (2015), and Claire Beynon and Rupert Summerson's *A Vast Scale: Evocations of Antarctica* (2015).

Just as religious architecture and spiritual music evoke worship, the visual arts are sometimes meant to, such as sculptures, murals, drawings, etchings, paintings and photography (see Chapters 2 and 13). In the eight churches on Antarctica, there are religious icons and paintings of saints, the Virgin Mary and Christ the Saviour. Most strikingly, in Chapel of Our Lady of the Snow, literally an ice chapel, the crucifix is usually frozen, and on the ice walls are the 12 Stations of the Cross. In photographs of all eight churches, one notes the sparseness of decoration, which is to be expected, as one could not construct a massive stained glass mural along an entire wall and hope for it to remain pristine. In the other artistic renderings of Antarctica that capture a spiritual side, we have some of Edward Wilson's works from *c*.1911, when he accompanied Scott's expedition to the South Pole, and contemporary pieces such as Kimberly Baranowski's *The Frozen Field*, a series of sculptural installations (begun in 2007, with hopes for shedding light on the fragile ecosystem in the Antarctica Peninsula), Art Wolfe's photographic images (2016) and Lisa Goren's watercolours (especially 2013–18).

Circling back to religion and spirituality in general, if Antarcticness promotes hope and faith, then Antarctica looms large – literally – for scientific researchers, their accompanying support staff, tourists or adventurers. The spectre of death lightly shadows every step, for it lurks in the crevasses, approaches in the avalanches, and sweeps in with the weather and wind, whether on land, ice or sea. Running alongside the presence of death is the tandem team of hope and faith. Most people remark about being awestruck upon seeing Antarctica for the first time (Chapter 10), and some who openly speak of being agnostic or atheist admit to their beliefs being tested, upon seeing and being in Antarctica, for numerous reasons: the unbelievable beauty, the majestic natural magnificence, surviving harsh weather or somehow escaping certain death. Remarkable, indeed. The awe-inspired descriptions of travelling to, seeing for the first time, visiting, walking on or working in Antarctica

are often offered with a deep sense of reverence (Chapter 9), which in turn make one think in spiritual terms. This impression of reverence evokes a sense of spirituality, indeed admiration for, worship of and devotion to, Antarctica.

Finally, to offer additional ideas for future exploration, drawing upon research on the literature of Antarctica, there are many texts that use religious hymns and make mention of religious objects, such as paintings and drawings, and there are several books about Antarctica, all of which have a unifying theme of death.

Sara Wheeler's *Terra Incognita* (1996) is a memoir of the seven months that she spent in Antarctica, suffering from darkness in her soul, but searching longingly for peace. David Grann's book *The White Darkness* (2018), about Henry Worsley's Antarctic trek, is replete with images of suffering and eventually, death. Jonathan Franzen's *The End of the End of the Earth* (2018) is a series of essays, weaving several themes together, including both climate change and death. In the title essay specifically, the harrowing death of a child is seen as parallel to Antarctica as the death zone, the metaphorical dying of the Earth. However, as Crown (2018) explains in her review of Franzen's final essay, 'by refusing to hope for the impossible, Franzen, improbably, manages to produce a volume that feels, if not hopeful, then at least not hopeless'.

For anyone who has lost a child, the incomprehensible agony is staggering, and it is an hourly struggle to find the worth of life. Unlike a mirror, the ice of Antarctica reflects a shattered image, like that of a broken heart, and perhaps that is the pull to Antarctica, for many of these writers, scientists, staff, adventurers and tourists. Being in Antarctica might give those who are incapacitated by grief a small taste of heaven, because it is so remote, so beautiful, so peaceful and so impossible to describe. Franzen himself concludes, 'Even in a world of dying, new loves continue to be born' (Franzen 2018, 225). Truly, Antarctica might be where mourning dawns, and there is no way around it, only through it. Sometimes, the only way through is to touch death yourself – and then maybe hope arises.

In the end, all this points to a possible application of Antarcticness. Perhaps it allows all of humankind to arrive at a glorious point of gratitude for everything: life, love, Antarctica, our planet Earth, and all the stars and glories of the universe.

Notes

1 https://www.scar.org/science/hass/about (accessed 18 August 2021).
2 https://www.scar.org/science/antarchitecture/home (accessed 18 August 2021).
3 http://www.oobject.com/category/antarchitecture (accessed 18 August 2021).
4 https://www.merriam-webster.com/dictionary/religion, https://www.merriam-webster.com/dictionary/spirituality (accessed 18 August 2021).
5 https://www.merriam-webster.com/dictionary/shrine (accessed 18 August 2021).

References

'Chapel of the Snows Destroyed'. *Antarctic Journal of the United States* 13 May 1978: 6.

Crown, Sarah. 2018. 'The End of the End of the Earth by Jonathan Franzen review: *Hope in an age of crisis*'. *Guardian*, 9 November. Accessed 18 August 2021. https://www.theguardian.com/books/2018/nov/09/the-end-of-the-end-of-the-Earth-by-jonathan-franzen-review-hope-in-an-age-of-crisis.

Franzen, Jonathan. 2018. *The End of the End of the Earth: Essays*. New York: Farrar, Straus and Giroux.

Grann, David. 2018. *The White Darkness.* New York: Doubleday.

Henriques, Martha. 2020. 'A frozen graveyard: The sad tales of Antarctica's deaths'. *BBC Future*, 12 June. Accessed 18 August 2021. https://www.bbc.com/future/article/20180913-a-frozen-graveyard-the-sad-tales-of-antarcticas-deaths.

Messynessy. 2014. 'The seven churches of Antarctica'. *Accessed* 18 August 2021. https://www.messynessychic.com/2014/03/19/seven-churches-antarctica.

Nag, Oishimaya Sen. 2017. 'Are there any religious buildings in the frozen continent of Antarctica?' *World Atlas*, 9 August. Accessed 18 August 2021. https://www.worldatlas.com/articles/are-there-any-religious-buildings-in-the-frozen-continent-of-antarctica.html.

Paveley, Rebecca. 2019. '"Inspiring" eucharist held in Antarctica'. *Church Times,* 31 May.

Philpott, Carolyn. 2015. 'Antarctica: Sonic reckonings'. Accessed 18 August 2021. http://ecite.utas.edu.au/124767.

Pittaro, Esteban. 2015. 'Conoce las capillas católicas de la Antártida'. *Aleteia*, 31 July. Accessed 18 August 2021. https://es.aleteia.org/2015/07/31/conoce-las-capillas-catolicas-de-la-antartida.

Varetto, Gianni. 2017a. 'Antarctica: Inside the southernmost Russian Orthodox church'. WAP World Antarctic Program. Accessed 18 August 2021. http://www.waponline.it/antarctica-inside-the-southernmost-russian-orthodox-church.

Varetto, Gianni. 2017b. 'St Volodymyr Chapel at Ukrainian Vernadsky Base'. WAP World Antarctic Program. Accessed 18 August 2021. http://www.waponline.it/st-volodymyr-chapel-at-ukrainian-vernadsky-base.

Varetto, Gianni. 2020. 'Anniversary of the blessing and inauguration of Marambio Base chapel'. WAP World Antarctic Program. Accessed 18 August 2021. http://www.waponline.it/anniversary-of-the-blessing-and-inauguration-of-marambio-base-chapel.

Wheeler, Sara. 1996. *Terra Incognita: Travels in Antarctica*. London: Jonathan Cape.

Woolley, Sarah. 2020. 'God in a cold climate'. *Church Times*, 27 March. Accessed 18 August 2021. https://www.churchtimes.co.uk/articles/2020/27-march/features/features/god-in-a-cold-climate.

9

The southernmost wilderness: rhythms of the interior Antarctic expedition experience

Wilson (Wai-Yin) Cheung

The continent of Antarctica is said to be our last frontier of wilderness on Earth. Remoteness, landscape, extreme environmental conditions, enormous ice shelves and myriad life forms construct the public's perceptions of this southernmost wilderness. In light of its uniqueness and remoteness, our white continent attracts numerous visitors to gaze at its veil annually. In most cases, the vast majority of visitors are taking the 200-passenger expedition cruise voyage to set foot on the Antarctic Peninsula, which comprises about 2 per cent of Antarctica's land mass, for a short period of time only. A small number of intrepid visitors also explore the Antarctic interior, such as the geographic South Pole (Figure 9.1), emperor penguin colonies (Figure 9.2), overnight camping or climbing in the trans-Antarctic mountain range. Unlike the visitors cruising along the Southern Ocean's seashore, the interior Antarctic visitors have to confront deep-frozen land and to experience vast, deep wildlands, expedition-style, with comparatively primitive equipment. While Antarctica serves as a physical *space* for exploring and visiting, does it have any meanings for and contributions to societal identity as a *place* for human beings? And how do people process their experiences of the place? I answer these questions through considering my ten years of Antarctic deep field experience in this chapter.

Expeditions in Antarctica can never be thoroughly planned in advance, but need to be improvised according to in situ conditions. The experience is constructed through a web of human and more-than-human agency. Antarctica embodies a unique set of wilderness values. This

9.1 The Amundsen-Scott South Pole Station is a United States scientific research station at the geographic South Pole, Antarctica. Photograph by Wilson (Wai-Yin) Cheung, 2019.

element of wilderness represents the most substantial value associated with Antarctica for the global public. Given that visiting Antarctica offers an extraordinary wilderness experience, when people spend time in this sort of close-to-wilderness setting, both the embodied experience of Antarctica and the role of expedition living tactics become highlighted. Thus, one is able to observe the manifestation of the environmental sensitiveness that we develop when we spend time in wilderness settings. From a practical perspective, the Antarctic interior expedition can be viewed as a set of possibilities for humans and non-humans to enact, (re) assemble and organise. In this chapter, I analyse the possibilities that emerge from the material interactions of human corporeality and the more-than-human world during expeditions in this southernmost wilderness.

Grateful for my privilege as a polar expedition guide/leader over ten seasons, I am able to earn the precious tangible experience inside the deep field of the Antarctic continent, which is rarely visited. Accordingly, in this chapter I employ the technique of ethnomethodologically informed ethnography: the study of people who are engaged in practical action

9.2 Since interior Antarctica is rarely visited by human beings, the presence of people drives the curious emperor penguins to investigate who are they and what they are doing. Photograph by Wilson (Wai-Yin) Cheung, 2015.

(Randall et al. 2021). With elements from rhythmanalysis (Lefebvre 2004), this chapter aims to provide insights into the material interactions of human corporeality and the more-than-human world in the interior Antarctic expedition through practice perspectives, and to unveil this affective environmental sensitiveness on our frozen continent.

The wisdom of Antarctic wilderness

Wilderness is commonly understood as undeveloped land, with harsh conditions and minimal human involvement (Nash 2001 [1967]; Tin et al. 2016). Given that Antarctica has a unique set of wilderness values, there are different experiences and perceptions among visitors from different cultural backgrounds (Cheung et al. 2019; Shah 2015). Yet this notion of wilderness always calls up the human intuition of exploration on the frontier of the unknown, untouched land. As human beings are a curiosity-driven species, the instinct of exploration is not only an essential tool to keep one species sustainable temporally and spatially, but also the

only way to access new resources or knowledge. Since the first human being, Norwegian explorer Roald Amundsen and his party, reached the geographic South Pole on 14 December 1911, we have been discovering for Antarctica less than 120 years, and a vast area of the space remains rarely visited. Even though different cultures have various interpretations of Antarctica as a destination for travel, to discover the unknown of Antarctica is the primary motivation for the majority of tourists (Cheung et al. 2019; Chapter 14). Owing to this value of wilderness in Antarctica, human beings' inherent need or desire for exploration is often evoked when discussing their interest in exploring the edge of the frontier of discovery.

Armed with this understanding of the notion of Antarctic wilderness, I shall return to the question of how human beings perceive the setting of wilderness as such an environment around us physically, and to see how wilderness integrates into a human–environment relationship. To begin with, we should define what wilderness is. The space of wilderness is an imaginary concept, commonly defined as a pristine, untouched place, absent of human beings and their activities (DeLancey 2012). Once a human being presents oneself into the context, this space no longer fulfils the wilderness definition and converts into a place where we spend time (Tuan 1979). In this regard, wilderness is an imaginary projection of the destination, where it cannot be reached physically. With Ingold's (2002) concept of environment, we can fully understand how wilderness integrates into our experience. He emphasised that 'environment' is a relative term. Just as it is hard to understand how to be an organism without an environment, so too there can be no environment without an organism (Gibson 2014). In other words, the environment has to exist and takes on meaning in relation to me. And this relation comes into existence and undergoes development with me and around me (Ingold 2002). Once the environment is related to the activities of living beings, it is never complete, as life goes on and is under construction continually. Hence, once we set our first step into and leave the first footprint in the wilderness, this space will become our place and this place will be unified with us in a dynamic, interactive relationship.

This relationship between surroundings and perceiver can be seen in the dynamics of the interior Antarctic expedition, as 'the dynamics of bringing things into your presence' (Ingold 1997). In light of the specific material conditions in the wilderness, such a setting offers a potential to disclose the relational world of wilderness, where living creatures, materials and practices interact (Olafsdottir 2013). In order to reveal the mundane, sensory and emotional enactments of wilderness on the

southern continent – where the relations are constituted between expedition visitors and 'with the "things" or "non-humans" in the world that surround them' (Walsh and Tucker 2009, 224) – ethnomethodologically informed ethnography is employed in this chapter. This method adheres to the essentialness of being a skilled practitioner, who is constantly undergoing reflexivity and descriptions of the experienced order without the restriction of sociological explanations or conceptualisation (Pollner and Emerson 2001). Additionally, with the tool of rhythmanalysis (Lefebvre 2004), the certain reality of affective experience and practice from being a representation in our head of a set of tasks would be unfolded (Vannini and Taggart 2013). On this subject, the rhythmanalytical examination has helped in identifying what it can mean when the rhythm of familiar practices changes. Within this approach, this chapter goes on to explore the possibilities for environmental sensitiveness by analysing the practical concerns related to exploring the deep field of Antarctica.

Adapt to the rhythm of wilderness: navigate with the sun

The tempo of the interior Antarctic expedition is mostly constructed with the elemental influence of the weather at hand. In Lefebvre's rhythmanalysis, the dynamic between cyclical and linear time is central, and this dynamic dominates the ordering of daily life in Antarctica (Lefebvre 2004). Once the visitor begins the expedition in the wilderness setting, daily practices have to obey the cyclical rhythms of sunlight, bodily rhythms and weather. For instance, there is no official time zone in Antarctica. The time setting thus usually follows the time zone of the departure country or a closer national station for logistics and communications.

Higher than 66°S in the Antarctic summer, the sun will never set and it orbits around, on top of us (Figure 9.3). In my skiing expeditions to the geographic South Pole as a guide, once I know I am facing the sun, I know where south is. I can turn off my GPS and watches to save the batteries in the cold conditions, as I have already obtained a reliable reference for this wilderness landscape. Thus, the position of the sun serves as a reliable time reference for the rhythm of everyday life in Antarctica, while this natural timing information brings substantial relief for navigation. These human and more-than-human worlds can be connected and related to each other. According to Ingold (2011), our

9.3 The halo is an optical phenomenon produced by light (typically from the sun or moon) interacting with ice crystals suspended in the atmosphere. Ice crystals can also float near the ground under cold-weather conditions, in which case they are referred to as diamond dust. Thus, the halo is often found in the polar regions. Photograph by Wilson (Wai-Yin) Cheung, 2019.

9.4 On the top of Antarctica – Mount Vinson at 4,892 metres (16,050 feet). A surreal experience gives a view of the endless white landscape from the highest peak on this frozen continent. Photograph by Wilson (Wai-Yin) Cheung, 2015.

being-in-the-world has been constructed along the paths where our lives are lived, skills developed, observations made and understandings grown. All the wisdom I learnt from the wilderness not only helps to be the place, but is also an integral part of the system by being-in-the-world. This human–nature interaction also seems to enhance human wellbeing by enabling the visitors to listen to the rhythms of one's body and how the rhythms are in balance with the surrounding environment (Figure 9.4).

Caring more than human

The environment of Antarctica is too harsh for permanent human settlement to be worthwhile at the moment (Figures 9.5 and 9.6). There can also be no permanent buildings for tourism purposes according to the Antarctic Treaty. For this reason, most visitors to the Antarctic interior have to reside in a winter tent with primitive, simple equipment due to complicated logistics and geographical remoteness. Under these conditions, the organisation of wilderness expeditions becomes constructed with respect to scarce resources and the improvised use of available resources, including an opportunistic attitude towards the resources (Rantala 2018). Consequently, the environmental sensitivity of visitors becomes based on being open towards different ways of being, doing and knowing with nature (Höckert 2018).

For instance, once we finish the day's work and decide to overnight (overday in the summer), the first thing we have to do is to build a protective snow wall in the upwind position for our only-one-tent as 'home' space. The harsh natural habitat makes it extremely hard to get any assistance and support from third parties, and can be life-threatening in the worst-case scenario. Based on this situation, our relationship with materialities around us has more than instrumental value in this wilderness context. We have to delicately take care of the limited things around us, in which the potential for emotional engagement with objects, which could even be regarded as rubbish, is formed (Kinnunen 2016). When environmental sensitiveness is about being, doing and knowing, together with the equipment of expedition, the importance of caring for these objects emanates. We develop care towards the non-human world in the wilderness of Antarctica. Such a relationship opens up possibilities not only for human wellbeing, but also for the wellbeing of the more-than-human world, which derives from the mundane orientation towards caring (Kinnunen 2017).

9.5 Extreme weather conditions often happen during Antarctic expeditions. Photograph by Wilson (Wai-Yin) Cheung, 2019.

9.6 Extreme cold conditions strengthen affective relationships between humans, but also with the more-than-human world. Photograph by Wilson (Wai-Yin) Cheung, 2019.

9.7 Rare good weather during the expedition on the Weddell Sea ice shelf, Antarctica. Photograph by Wilson (Wai-Yin) Cheung 2015.

Affectiveness of land and people

Unlike some other forms of tourism and destinations, conducting an expedition in the wilderness involves a significant amount of time and energy for preparation, including collecting related information and knowledge. This prior knowledge and experience of the place or event – and thereby expectations – influence the multiple experiences of affect (Edensor 2016). Compared with wild camping, the sensation of the Antarctic expedition may offer deeper intensity in the 'sacred' realm of nature. With our naked eye facing in front of us heavily glaciated terrain or a snowy but featureless landscape with frozen, blowing wind, visitor responses have to correspond to the degree of environmental power.

Under icy conditions, we feel genuinely cherished and comfortable by the slightest warmth from the sun inside our tent. In some cases, even a cup of hot tea or a piece of luxury food could make the expedition tourist's satisfaction correspond with the surroundings. This affective quality may also transfer from more-than-human agency to the surrounding humans, supporting the process of feelings emanating from one's body or the feelings of the company in connection to one's own emotions (Rantala 2018). Such sensitivity is a rhythmic embodiment that

derives from the process of becoming in relation to the wilderness environment and in connection with the people with us. Given that modern, up-to-date materials and equipment barely sustain our life in this inhuman wilderness, it is hard to believe that the early pioneers employed even more simple primitive tools to explore this wilderness land, although of course many perished during the Heroic Era of Antarctic exploration. We, therefore, use their acquired knowledge and techniques to explore this land with a more comfortable, advanced approach. Such configurations form spatio-temporal affective fields that prompt affective atmospheres on this landscape's emptiness (Figure 9.7).

The frontier of discovery: of Antarctica and I?

Even though the practices of expeditions to the Antarctic interior are carried out within the rhythm of nature, they are very much human-centred. All those practices are orientated towards the embodied agency of the human or towards materialities that relate to the embodied being in the wilderness. The practitioner has to be constantly aware of the substantial risks at all times due to the extreme environmental conditions as well as the inaccessibility of medical care. This awareness does not only limit oneself, but also one's companions. Explorers are concerned with keeping themselves, and their companions, safe. The complexity of Antarctic logistics and the seriousness of the risks' consequences mean that we have to be fully aware of the changing environment, in which we construct intense environmental sensitivity to more-than-human agency through the whole body.

Apart from that, we are also concerned about limited life support resources, such as electricity (mainly from solar energy) and water (melting the ice with fuel). Thus, the rhythm of wilderness expeditions intertwines around practices that are related to keeping warm, eating and sleeping: that is, practices related to being safe and alive (Rantala 2018). The cyclical rhythm of wilderness manifests strongly, and human beings have to obey and take advantage of this cyclical order to ensure their wellbeing. For instance, we have to check and secure the tent and equipment before tucking into the cosy warm sleeping bag in case of unexpected katabatic winds or cracking sea ice underneath. But why do we make our life so complicated far away from others?

Unlike deluxe holidays or relaxing traditional tourism, the value of visiting empty places and uncharted spots on the map is that they provide a space for challenging oneself and dealing with the frustrations of

discoveries. In other words, we put ourselves into a disadvantaged situation voluntarily to explore our unknown as part of the wilderness. Yet such a discovery is not only in our physical world, but also part of inner values and being within the human species. We never learn our ignorance by sitting comfortably at home. On the contrary, the wilderness offers a space to wake up a human's biological instincts in exploration and discovery. With the elements of intense environmental sensitivity and disadvantageous conditions during the expedition, we could disclose the weakest part of ourselves by corresponding to the cyclical rhythm of wilderness. When we discover our own limitations in the wilderness setting, such self-understanding processes facilitate answers to the questions 'Who am I? Why am I here?' and 'How can I process it?' In other words, Antarctica offers a place for us to process self-actualisation.

Conclusion

We as human beings are sentient animals, who value that which originates within ourselves. Being Antarcticness by integrating its natural rhythm of interior emptiness and landscape, revealed during expeditions, we value this southernmost 'space' and it becomes our 'place' as Antarctica with us. Once you set foot on this wilderness continent, this process will never end, even after you leave Antarctica. This is because our presence within Antarctica's interior also embodies the human values of this landscape. Such a dynamic relationship with our southernmost place is how I define Antarcticness.

Antarcticness is thus disclosed as embodying the affective relation between Antarctic wilderness and expedition visitors. Within the Southern Ocean, 'wilderness' acquires fresh meanings in addition to those of recreation opportunities, scientific and ecological values, prohibitions, desolation and others that have accumulated from people's experiences with wilderness in their home countries. Indeed, Antarctica can potentially play a crucial role in providing common ground for the convergence of wilderness perceptions (Tin et al. 2016), supporting Antarcticness for those who cannot travel to Antarctica because they glean perceptions from the expedition visitors. Caution is needed in assuming that this affective relation can be understood second-hand, given how much Antarcticness is about being in the wilderness and experiencing it directly. A further area of exploration is understanding more how expedition visitors can and cannot articulate their Antarctic experiences beyond the continent.

9.8 At the frontier of discovery in the Antarctic wilderness, we always reflect on the questions Who am I? Why am I here? and How can I process it? Photograph by Wilson (Wai-Yin) Cheung, 2015.

In the meantime, the focus remains on expeditions to the interior of Antarctica. I have employed my personal ethnographic examples to demonstrate how the Antarctic wilderness environment creates certain orderings and possibilities for disordering in relation to being environmentally sensitive during the expedition. This brings forth Antarcticness. Additionally, I discuss the wilderness rhythms of different times and spaces with their materialities, embodiments and representations that are carried in diverse cyclical and linear rhythms. This helps to characterise Antarcticness.

As Ingold (2011) has mentioned, when we spend time being in the environment, we are surrounded by landscape, not just on the ground but also as an integral part of it; we are wrapped in it and meld with it. We tune into it as it simultaneously tunes into us, shaping rhythms both regular and irregular. In the setting of wilderness in Antarctica, the practice of expedition is a process of Antarcticness; that is, a process of becoming in connection to particular materialities, to other people and to particular places affectively. As the element of wilderness consists of unpredictable uncertainties and sustainable risks, the rhythms of the different realities are made tangible both customarily and tacitly. These

environmental practices enrich the expedition tourist and are oriented towards human wellbeing by bringing forth the more-than-human agency within Antarcticness, making environmental sensitivity possible.

Life on the frozen, empty world would learn the wisdom of Antarcticness through Antarctic wilderness expeditions (Figure 9.8). However, this wilderness is a diminishing natural resource, in Antarctica as well as globally (Hughes et al. 2011). Its quantity and quality are at constant risk from the prioritisation of social and economic interests, non-acceptance of non-use as a viable means of action, and the systematic transformation of the natural to the artificial (Bastmeijer and Tin 2014). Will the increasing tourist population in Antarctica (Chapter 14) reduce the value of wilderness and of Antarcticness? How does the rhythm of wilderness change the tourist and his or her attitudes to our materialistic society? Can this wisdom of wilderness – can Antarcticness – be applied to the new era of human discovery on the moon and Mars? These questions help us to examine other possibilities for environmental sensitiveness in further contexts.

References

Bastmeijer, Kees, and Tina Tin. 2014. 'Antarctica: A wilderness continent for science: the "public's dream" as a mission impossible?' *Yearbook of Polar Law Online* 6(1): 559–97.

Cheung, Wilson, Thomas Bauer and Jinyang Deng. 2019. 'The growth of Chinese tourism to Antarctica: A profile of their connectedness to nature, motivations, and perceptions'. *Polar Journal* 9(1): 197–213.

DeLancey, Craig. 2012. 'An ecological concept of wilderness'. *Ethics and the Environment* 17(1): 25–44.

Edensor, Tim. 2016. *Geographies of Rhythm: Nature, place, mobilities and bodies*. Abingdon: Routledge.

Gibson, James J. 2014. *The Ecological Approach to Visual Perception: Classic edition*. London: Psychology Press.

Höckert, Emily. 2018. *Negotiating Hospitality: Ethics of tourism development in the Nicaraguan highlands*. Abingdon: Routledge.

Hughes, Kevin A., Peter Fretwell, Joanna Rae, Keith Holmes and Andrew Fleming. 2011. 'Untouched Antarctica: Mapping a finite and diminishing environmental resource'. *Antarctic Science* 23(6): 537–48.

Ingold, Tim. 1997. 'Life beyond the edge of nature? Or, the mirage of society'. In *The Mark of the Social*, edited by J.B. Greenwood, 231–52. Lanham, MD: Rowman and Littlefield.

Ingold, Tim. 2002. 'Between evolution and history: Biology, culture and the myth of human origins'. *Proceedings of the British Academy* 112: 43–66.

Ingold, Tim. 2011. *Being Alive: Essays on movement, knowledge and description*. London: Taylor & Francis.

Kinnunen, Veera. 2016. 'Jakaisimmeko elämämme jätteen kanssa? Eettisen materialismin hahmottelua' [Would we share our lives with waste? Sketching ethical materialism]. *Sosiologia* 3: 310–17.

Kinnunen, Veera. 2017. 'Tavarat tiellä. Sosiologinen tutkimus esinesuhteista muutossa' [Things in and on the way. A sociological study on the relationship between people and things]. *Acta Universitatis Lapponiensis* 362.

Lefebvre, Henri. 2004. *Rhythmanalysis: Space, time and everyday life*. London: A & C Black.
Nash, Roderick Frazier. 2001 [1967]. *Wilderness and the American Mind*. New Haven, CT: Yale University Press.
Olafsdottir, Gunnthora. 2013. '"… Sometimes you've just got to get away": On trekking holidays and their therapeutic effect'. *Tourist Studies* 13(2): 209–31.
Pollner, Melvin, and Robert M. Emerson. 2001. 'Ethnomethodology and ethnography'. In *Handbook of Ethnography*, edited by Paul Atkinson, Amanda Coffey, Sara Delamont, John Lofland and Lin Lofland. London: Sage.
Randall, David, Mark Rouncefield and Peter Tolmie. 2021. 'Ethnography, CSCW and ethnomethodology'. *Computer Supported Cooperative Work (CSCW)* 30: 189–214. https://doi.org/10.1007/s10606-020-09388-8.
Rantala, Outi. 2018. 'With the rhythm of nature: Reordering everyday life through holiday living'. In *Theories of Practice in Tourism*, edited by Laura James, Carina Ren and Henrik Halkier, 58–76. New York: Routledge.
Shah, Rohani Mohd. 2015. 'Public perceptions of Antarctic values: Shaping future environmental protection policy'. *Procedia: Social and Behavioral Sciences* 168(C): 211–18.
Tin, Tina, Rupert Summerson and He River Yang. 2016. 'Wilderness or pure land: Tourists' perceptions of Antarctica'. *Polar Journal* 6(2): 307–27.
Tuan, Yi Fu. 1979. 'Space and place: Humanistic perspective'. In *Philosophy in Geography*, edited by Stephen Gale and Gunnar Olsson. Dordrecht: Springer.
Vannini, Philip, and Jonathan Taggart. 2013. 'Doing islandness: A non-representational approach to an island's sense of place'. *Cultural Geographies* 20(2): 225–42.
Walsh, Neil, and Hazel Tucker. 2009. 'Tourism "things": The travelling performance of the backpack'. *Tourist Studies* 9(3): 223–39.

10

Togetherness for Antarcticness

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Homeward Bound is a ground-breaking, global leadership training programme for women in STEMM (science, technology, engineering, mathematics and medicine) with a close bond to Antarctica. Homeward Bound aims to heighten the influence and impact of women in making decisions that shape our planet by training a thousand women over ten years. As of December 2020, the Homeward Bound network comprised 410 women representing 45 nationalities. We are united in the knowledge that we are stronger together, we are able and willing to lead, and we are taking action with impact.

Each woman has her own story. At the time of writing, four cohorts of women in the Homeward Bound programme have travelled to Antarctica, and a fifth cohort are waiting to find out if this will be a reality for them. The programme includes a year of remote learning followed by a three-week Antarctic expedition. But what we discover and our relationship to Antarctica is entirely individual. In this chapter we could not hope to represent all experiences, but we aim to share the essence of our story through a blend of individual and shared memories, and a collective feeling of Antarcticness. We invite you to join us on our leadership journey and expedition to Antarctica.

Embarking

What would send you to Antarctica? Maybe you are captivated by stories of early twentieth-century explorers, of walls of ice that rise up from blue waters, and rugged chocolate-brown mountains capped with ice dunes. Perhaps it's the stories of the creatures that capture your imagination – the penguins that huddle on their rocky nests until it's time to feed, then glide gracefully through the water, leap into the air and dive down again as they fish; the whales and dolphins that soar through blue waters in a world that is relatively untouched by humanity. Or maybe it's something else entirely – the yearning to connect with a group of like-minded individuals from around the world, eager to make a difference in a world that suffers from too much need and too much greed. Maybe it's the stillness inside you that speaks softly, saying: 'This is your time.'

We are the women of Homeward Bound. We are mothers, daughters, partners, sisters and friends. We are scientists, technologists, engineers, mathematicians and medics. We come from around the world to learn from each other, to empower each other, to support each other. Together, we want to lead a new way on this planet. As we gather in Ushuaia, Argentina to board a ship for Antarctica, we invite you to join us on our journey.

A trip to somewhere so far from our experience, our homes and our families is not easy, no matter where we start our journey – even in the twenty-first century. There is a fluttering in our stomachs as we sit at our departure gate. There are long hours of waiting, then running, passport lines and another flight. There are delays and some missed connections (see Chapter 14). But there is a conviction. This is where we need to be. Right here. Right now.

We have gathered from many corners of the world, and we are connected by science, conservation, activism and much more. We have all been navigating our lives and careers in a world built for men – often alone, struggling to balance work and family and the challenges of life. We have spent the past year learning from and about each other. Our programme has helped us to understand how we interact with others and the barriers to making our work visible in the world. We have reflected on how we hope to have an impact on the planet, and most importantly, how we are stronger together in the face of global challenges.

Beneath the still-snow-capped Patagonian peaks that stand above Ushuaia, we begin to open our hearts and minds to new ideas and new ways of thinking. We are about to board a ship together for three weeks

10.1 Sitting with togetherness. Photograph by Oli Sansom, 2016.

in Antarctica. We are gathered in a conference room at a hotel, with large picture windows overlooking the grey waters of the Beagle Channel. It feels like a hive. We are buzzing with new energy and anticipation of the icy world that awaits us.

Mother Nature, Pachamama, Mutter Natur, Moder Jord, Moeder natuur, Móðir jörð, Dame Nature, Madre Naturaleza, Papatūānuku, Parameshwari, Priroda and 大自然 (*da ziran*) are just some of the words we have to describe nature and its power. Each of these names has its own unique history and meaning, and some are strongly political. We learn that language is powerful, for leading and driving change. We choose how we use our language. It also poses challenges on the ship, as we are operating in English. This is a second, third or even fourth language for many participants. Some words cannot be translated. This reminds us of the importance of our diversity. If only this could be reflected in global leadership.

As with any journey among new friends, ground rules and insights about our group will help us build community. We consider our personal boundaries, our responsibility to each other, and how we will support each other on the journey. We move around the room sharing names and stories, and ultimately find ourselves shifting tables and chairs aside to sit on the floor, closer together, in solidarity and excitement (Figure 10.1). We take time to consider our strategies for navigating life, our visibility

(to ourselves and others), and what it might mean to be leaders, and to lead as women.

The fact is, we are all leaders. We have a lot to learn. We want to lead, to inspire, to connect and to mentor. Faced with the immensity of Antarctica, we are trying to find a new way forward. We hope Antarctica will take us there.

As individuals, we are always finding our way through life, and sometimes the path becomes clear in our scariest moments. As a global community, we are traversing a scary moment in time – a moment characterised by declining natural resources and climate change and increasing polarisation. It is curious that 'polarisation', the sharply opposing views of extreme groups, is so far from the unity and clarity the poles can create through Antarcticness and Arcticness. We need to function as a global community to find a way forward, and each of us has a role to play. We want to take Antarctica with us.

The moment has arrived to embark on the journey. Are we ready? What baggage will we be willing to shed as we cross the ocean and enter a different world? What will we leave behind, so something new can blossom in its place? All these things go through our minds as we enter the belly of the ship and settle into the container of our voyage.

Crossing

We now leave Ushuaia behind us. The ship navigates along the Beagle Channel and out into the infamous Drake Passage. We venture south.

The Drake Passage is a point of convergence: a point of connections, crossovers and transitions. It is the body of water that reaches from Cape Horn in Chile, the southernmost tip of South America, to the South Shetland Islands at the northern point of the Antarctic Peninsula. It is the place where the Atlantic, Pacific and Southern Oceans meet. This place of in-betweens is the most treacherous part of our journey (Figure 10.2).

At this latitude, there is no land. Here, the currents that swirl around the Antarctic continent meet no barriers, meaning that this is considered one of the most challenging voyages a ship can make. What will we encounter? Some voyages are greeted by the relatively tame Drake Lake. Others must face the notorious Drake Shake, where waves can tower more than 10 metres high. Whatever hand we are dealt, the challenges of uncertainty and instability are ever present.

We are full of excitement and anticipation. Out here, there is no phone signal and no internet. We are learning to live at the pace Antarctica sets for

10.2 A journey between sea and sky. Photograph by Stephanie Langerock, 2019.

us. Unlike the South Pole explorers, we are not here with the idea to conquer this vast continent. We are here to learn whatever it may teach us.

We pause and remember to trust in the journey. To be patient if insights don't happen quickly. Be present. Be open. Notice our feelings and thoughts. Give ourselves time to not know and embrace this sometimes uncomfortable feeling. Give ourselves space to breathe and truly take things in.

Today is a day of floating and drifting. Rocking and swaying. The boat seems to move more than the waves. While some of us stumble around the ship finding our sea legs, drowsy from seasickness medication, others stay in their cabins, hardly able to move, riding the waves. We are a point in the ocean. Looking out at the blue expanse stretching before, behind and around us, we feel both small and emboldened. The sense of our own smallness is a humbling experience.

During our crossing, conversations with fellow expeditioners help some of us recognise assumptions about ourselves and how we hold ourselves back. This is the beauty of being in a diverse group where a genuinely safe space has been established. We all see the world differently, but, we realise, Antarctica strips away the layers of our outer shell so we understand ourselves as we really are.

As the norms of human society fade, we tune into our inner voice. It can feel selfish to focus on yourself, but this time is important. Being clear

on your own sense of self, what you believe in and what is important to you, helps you to focus your two most precious resources: time and energy. Understanding yourself is also a strong base from which to recognise and value the diversity in others. This is at the heart of progressive, compassionate leadership.

We are now in the moment after the beginning. There is no turning back. The moment when the journey becomes real. The moment after the anticipation, when the real challenges of the journey start to reveal themselves. Together we support each other through any discomfort, knowing that challenge can reap rewards. We muster the courage to step forward into a world unknown to many of us. To forge a different path. We venture into this unknown to create a better world, a better way of being and thinking, a better way of leading. Together.

Arriving

After two days and nights crossing the Drake Passage, we find ourselves on the upper deck of the MV *Ushuaia* for a breath of fresh air that bites our cheeks. The sky is milky blue and we let our gaze drift to the horizon, the edge between sky and Earth, the thin line between ocean and sky. At some point, while we were trying to sleep, we crossed the Southern Convergence Zone, another edge at the end of the world. This is the place where warm currents from the Southern Ocean encounter Antarctic waters. An oceanic weather front. A defining boundary between Antarctica and the rest of the world. The sharp shift in ocean temperatures changes the world – the air is dryer and colder, and the sky is endless on this clear day.

In a different life, we might have seen the Convergence in the bright light of day. We would have seen the change in the exploration and adventure. The steady hum of the ship's engine has become a comfort at this point.

We look out across the sea – and there it is! A break in the horizon. As the ship moves forward, it grows larger – our first iceberg! Soon there are gentoo penguins porpoising through the water, and it feels like another planet. Seeing our first penguin in Antarctic waters is a special moment on the journey. Everyone reacts differently. Daisy and Marina are standing at the bow of the ship. One is laughing and the other has tears glistening down her face. These two women in STEMM, so far from home, brought together by their separate experiences. Everyone always asks about the penguins, and now, here we are.

Every one of us arrives in Antarctica with a set of expectations. Some of us have come from icy winter climates, some of us from tropical cities. But we all have an idea of what we want to encounter. The thing is, now we are here, circling an iceberg the size of a tower block, the reality has chased away any expectations we had in mind. At the same time, other expectations fall away. Expectations of ourselves, our friends and family, our boss, our culture, our society. We wonder what Antarctica will ask of us.

Exploring

Antarctica has been part of my imaginings for many years. And now, finally, I am here and we are here, as Homeward Bound. It is both we and I. For me to be part of Antarctica, and Antarctica to be part of me.

I see Ana and Uxua walking around the ship, fast, breathing and smiling. The snow falls so their footprints are tracked as they walk to the bow. There are still humpback whales breaching alongside. I look up, and see Susan on the bridge, chatting to the captain about the weather, and perhaps the universe, as that is something she knows about, having studied it deeply for many years. Gravitational waves, space, sea, wind. It all feels linked. I attempt to meditate outside in the cold. I don't want to let a single moment of this journey pass by unnoticed. I can't think of anything except how cold my fingers are. I can hardly bear to go inside. The desire to feel the weather is intense. A few days ago, Mel told me that adventure is one of her values. I identified mine confidently as community and justice. But now I realise, 'yes!' adventure is in me too. I didn't see it before.

If the conditions are right, the crew will ferry us ashore in inflatable boats. As the boat slides up a gravelly bank, we learn to swing our legs over the edge and step into the water, then up to the shore. All of our landings require emerging from the water, as though we are sea creatures tentatively setting foot in a place that feels new and strange. On many of our landings, we are greeted by the cacophony of penguin chatter. They pay no attention to us – intent on going about their business of scuttling down to the water to fish and taking care of their chicks. We stay out of their way on designated paths.

On Danco Island, we hike up a hill past a nesting colony of gentoo penguins. At the top of the island, the penguin chatter fades, and in the absence of the steady hum of our ship, we immerse ourselves in Antarctic silence – for a moment. There is some shuffling as we shed heavy parkas

10.3 Antarctic silence, sunshine and beauty. Photograph by Betty Trummel, 2016.

in bright Antarctic summer sunshine and a temperature approaching 10°C. And then, in the moment when we hold our collective breath to soak in the silence and sunshine (Figure 10.3), there is a distant rumble. A low roar of ice crumbling and crashing. A few moments later, there is another. And then another. This is the sound of glaciers breaking – a normal occurrence in Antarctic summer, but an echo of climate change on the least inhabited continent on Earth.

Shore landings: time to investigate and learn, and take in pristine land and seascapes. Travelling in a little boat through such a surreal environment is indeed magical – every sight and sound magnified, the cold air feeling both biting and exhilarating.

We are surrounded by a panorama of steep cliffs gleaming in the light, or massive glaciers spilling right down to the sea. I hear the groaning and creaking of the glacial ice, an indication that at any moment crevasses will give way, and chunks of ice will topple into the sea. Mountain tops look like they are covered with folds of whipped cream or slathered with vanilla icing, thick and smooth.

I take time to meander along the shore and stop to sit on rocks or piles of snow. Gulls and terns glide overhead. 'Bergy bits' drift by. Penguins gallivant in and out of the water (Figure 10.4), their quirky

10.4 An Adélie penguin's journey at Paulet Island. Photograph by Anne Charmantier, 2019.

style and movement on land so different from their smooth gliding and turning about in the water. Seals also greet us, seemingly awkward on land; their adaptations for adept movement in the ocean are key to survival.

I bend down to investigate life in a tide pool, marvelling at the tiny fish and crustaceans frantically darting about in the harsh environment here. I contemplate the importance of every single member of the complex Southern Ocean food web.

We are in a tiny ship and I often feel alone in the vast Southern Ocean. This amazing continent and the islands in the Antarctic Peninsula are ever changing, depending on the day, the light and the landing spot. It is all unique and extraordinary. I'm mesmerised by what I've seen each day of this voyage.

But things do not always go to plan. As we head south, down into the Antarctic Circle, it becomes clear there is too much sea ice to navigate the Gullet in Laubeuf Fjord, to reach Rothera, the British Antarctic Survey's research station. Ice reaches from one side of the Gullet to the other, and there is no apparent break, even this late in the season (Figure 10.5). We are faced with a choice. We can go, but we will have to endure an alternative path, around the outside of Adelaide Island in rough seas. Or we can turn

10.5 The Gullet. Photograph by Hannah Laeverenz Schlogelhofer, 2018.

back. Maybe this is a step too far outside our ability to cope, an edge we are unable to cross. The group splits in two. There is uncertainty, and heated discussion. Severe seasickness is a very real fear and danger, but this is a once-in-a-lifetime chance to visit Rothera. Many of us long for the adventure, to take flight like albatrosses skimming through the sky, but others are grounded and fold their wings, believing the risk is too great. Overcoming fear takes real courage, but so does acceptance that sometimes we cannot have what we most desire. Finally, the decision is taken out of our hands and the captain announces we are going to Rothera. But it is a lesson. Sometimes we need to let go of what holds us back, as individuals and as a group (see Chapter 6). We reweave ourselves together and hold firmly.

Returning

One of the last stops of our ship full of women leaders, known affectionately by us as 'Ladyboat', is Deception Island. This is a perfect place for a freezing swim in the Antarctic waters – the polar plunge. Deception Island is an active volcano in the South Shetland Islands. The centre of the volcano collapsed 10,000 years ago and has been flooded by the sea. The collapsed caldera has given the island a horseshoe shape, allowing whaling ships, scientists and tourists to find shelter. But things are not so calm under the surface. More than 20 eruptions occurred in the

past two centuries, with the most recent one in 1971. We are warned that if an eruption starts, the seals and birds will be the first to leave, so we should keep an eye on the wildlife. Upon setting foot on Deception Island, we are struck by the beautiful black sand beach and the most unusual sight of a black glacier in the background, made of ash-layered ice.

Experiencing a polar plunge in such a lunar landscape is exhilarating, but is also a challenge for the body, since the water is around 1°C. Despite all the anticipation and planning for the plunge, it is an experience of high tension, with extreme physical and emotional stress, and overall quite a lot of screaming.

Back on the boat, we reflect on how our individual and collective reactions to this exciting event are relevant for our leadership journey. When facing stress, a good leader should be self-aware, but also be aware of the context, and of others. A polar plunge can be seen as any challenge we face in our lives, a challenge that requires courage, but also requires that we are attentive to others. Facing the challenge makes us proud as a group – we overcome the obstacle together.

And then we face the Drake Passage again. It is the necessary transition before we can return back to 'normal' life, to our families and our jobs. Over the edge again. Amidst our suffering from what we feel is a very rough crossing, i.e. 11 metre high waves and a ship tipping at 32°, our expedition leader Monika rates it at six out of ten. She does add a much more important exclamation: 'You are Antarcticans now!', and for us, this takes a deep meaning.

We feel this encounter with Antarctica has changed us in so many ways. It has changed our selves, brought us new knowledge and awareness, and enhanced our connection to our planet and our ambition to protect it. And perhaps it has changed others as well while we were away. An alteration in the family routine, a frustration from the parent left behind, a shift of who was in charge.

We share guidance on how to anticipate the change of coming back. Take small steps in the change, don't overwhelm yourself or others, go back to nature when you feel vulnerable, use love and humour (this book's cover photo). And finally, write down an 'elevator pitch' about Antarctica, because you will be asked how it was, and you will be at loss to summarise in a few sentences this glowing, infinite experience. We hope Antarcticness is something everyone can share.

This transition period back to South America allows us to look back at the impostor syndrome we all shared before becoming Antarcticans. So many of us were convinced that Homeward Bound would not select us, that Antarctica would remain a dream. Yet here we are, braving the waves

coming back from Antarctica. We are now ambassadors set to protect this remote, fragile and immense beauty. And we will stay stubbornly optimistic to protect it, because we are stronger together.

Land is now in sight and we are struck by the fact that icebergs are already so far away. Only yesterday, I could close my eyes and reopen them to the peaceful Antarctic beauty, yet now they are a memory or a photograph. When I close my eyes, I can see my home and my family.

Emerging

Going home to 'normal' life isn't always easy. Seeing our loved ones is wonderful, and so is finding the familiarity of our homes. Digesting everything we have experienced and learned can be hard. So is being confronted with sometimes hostile work environments. While we have all become ambassadors for Antarctica and we are determined to lead to protect it, we do it at our own pace and according to our path through life. Some jump right in to give presentations and keynotes from the day they return, while others need some time to cherish their experiences and wrap their heads around how to go about this. I am someone who needs to absorb the wonders, the beauty and the support of Antarctica and the sisterhood I felt on the ship first. Sometimes I was quite overwhelmed because I couldn't express the beauty and the magic of this experience while I really wanted to share it.

During a recent development conversation at work, I asked my head of department if they had noticed any differences since my return from Antarctica. The answer was 'Absolutely!' They said I had become a better version of myself and that I'm stepping up more regularly and more actively for the things I believe in. They could see I was really replying to Mother Nature's call for her daughters. I agree. I have become a better version of myself and I have become a more courageous leader. I am very much determined to keep giving Antarctica, Mother Nature and Mother Ocean the voice they deserve. A firm example of my determination is how I have been advocating for a green recovery since Covid-19 hit the world. I have invested a lot of time and energy to move this forward within our organisation and it has been completely worth it. While I was already leading and inspiring others before my participation in the Homeward Bound programme, I now own my leadership role.

It is very comforting to know that whenever we step up and we fall or fail, there is a group of women behind us to support us and to help us

back up. Stronger Together and Stubborn Optimism have become life mottos. We, as women, need to step up for our values and beliefs. The worldwide health and environmental crises we are currently facing require compassionate, authentic and strong leadership. Together we can and we will build a more sustainable and inclusive future. What better way is there than to do this together and through the bonds we forged with and within Antarctica?

Imagining

We – the fifth Homeward Bound cohort – had planned to travel to Antarctica in November 2020. Due to the Covid-19 pandemic, our voyage has been postponed indefinitely and Antarctica remains in the realm of our collective imagination.

Antarctica has a unique power to ignite our imagination. Thinking of Antarctica allows us to believe in a different world, in the road less travelled. The idea of heading south with a group of like-minded, diverse, truly global women in STEMM has given birth to a strong sense of togetherness in our group.

Even without having been there, Antarctica represents a special place for us. An Antarctic expedition would not just be the adventure of a lifetime, but a unique opportunity for an inward journey. Antarctica inspires us to imagine new ways of collectively leading towards a sustainable future, sparks new ideas to tackle today's environmental challenges, and creates a sought-after sense of belonging in a disparate world.

Antarctica is a symbol of scientific research, but a place where not so long ago women were not even allowed to go. Every woman who goes there is balancing the books. Adventuring there together would create a bond for life, stretching the idea of a professional network of women in science towards a heartfelt convergence of minds.

It is one of the last uninhabited places on Earth and is particularly vulnerable to human activities and climate change. As we imagine, we are acutely aware of Antarctica's need for urgent protection. Antarctica, with its vast wilderness, gives us the perspective needed to confront the immense challenges ahead of us.

Antarctic wildlife is elegant, humble, strong and relentless – and so are we. The currents of the Southern Ocean are magnificent, yet fierce and unforgiving. Dreaming of Antarctic waters reminds us how small we are, but how powerful our impact can be and how humans contribute to

10.6 The art of ice. Photograph by Anne Charmantier, 2019.

its degradation and now to resurrection. As a team of women in STEMM, we are united in our obligation to protect it, along with our entire planet.

Antarctica nourishes the child-like wonder that captivates our imagination. It promises adventure and discovery in exchange for our curiosity, determination and willingness to accept that we are not in control. It draws us in with a mysterious magic that reminds us: we are part of something larger. It represents peace and collaboration, people from around the world working together, putting science and purpose above geopolitical boundaries. Antarctica represents the expanse of human ingenuity and our incredible opportunity to change the world for better or worse – depending on our choices.

Antarctica is like its icebergs (Figure 10.6), revealing only a portion of its majesty above the water. Our Homeward Bound journey is similar to the iceberg, in that we uncover ourselves and each other in this amazing depth and ability. We see in Antarctica the permission and the insistence to be our raw, free, unconstrained and strong selves. By embracing Antarcticness, we expect to embrace the harmony and balance within us and we bring it into the world. Antarctica gives us the inspiration to imagine the bond holding us, and the strength to make the world a better place, together.

Haiku Interlude

Ilan Kelman

Imagination

Fear ice dark white cold raw death

Be Antarcticness

11

The Antarctic Flags project: a flagship outreach campaign for international cooperation

Sammie Buzzard and Tun Jan Young

Unattributed quotations throughout are based on personal interviews between the authors and those connected to the project. We thank them for their time in contributing to this work.

Antarctica does not have a flag. It is not a country, it has no indigenous population, and there is no government. Despite many countries laying claim to (often overlapping) parts of this frozen region, the continent was ultimately designated as a scientific preserve through the Antarctic Treaty. Military activity is explicitly banned by the Treaty, as are any activities that 'shall constitute a basis for asserting, supporting or denying a claim to territorial sovereignty in Antarctica or create any rights of sovereignty in Antarctica' (Article IV, Clause 2). The resulting tenet of scientific cooperation and collaboration underpins all modern activity on the continent and, ultimately, embodies the ideals of Antarctica and notions of Antarcticness.

So why, every year, are hundreds of flags designed for Antarctica and sent to the continent from all over the world, if the continent is only to be used for peaceful activities?

Originally conceived by the Foundation for the Good Governance of International Spaces, or 'Our Spaces',[1] the Antarctic Flags project aims to connect schoolchildren to Antarctica through taking their flag designs to be flown on the frozen continent. The project was designed to be a school-level activity that could be carried out in celebration of Antarctica Day, which was established after the Antarctic Treaty Summit in 2009 to carry on the legacy of the Antarctic Treaty.[2] The project, devised by Julie

11.1 Members of the Mass2Ant research team, including co-author T.J. Young (last on right), showcase flags sent from Hunwick, Cedars and St Nicholas Primary Schools (UK) at their ice coring site on the Roi Baudouin Ice Shelf. Photograph by Nadine Mattielli, 2017.

11.2 Flags from 30 countries are displayed by members of the Bulgarian and Spanish Antarctic expeditions at the Spanish Juan Carlos I Antarctic research station. Photograph by Nedelcho Hazurbasanov, 2015.

11.3 Flags are displayed on the Ronne Ice Shelf from students from Escuela 163 'Japon' (Bolivia), Hollybank Primary school (UK) and Woodford Primary School (UK). Photograph by Rachel Tilling and Isabel Nias, 2018.

Hambrook Berkman, and expanded by the Association of Polar Early Career Scientists (APECS), the International Polar Foundation (IPF) and Polar Educators International (PEI), is now coordinated by early career scientists from the UK Polar Network (UKPN) and has involved participants from every non-Antarctic continent. Teachers are sent lesson suggestions, so that their students gain a true understanding of Antarctica's unique position among the Earth's continents before they create their designs. Flags from each school are then sent on to those travelling to Antarctica for scientific purposes to display (Figures 11.1–11.3).

Here, we reflect on the impact of bringing Antarctica and Antarcticness into the classroom, discuss the evolution of the project with previous participants, and deliberate on perceptions of Antarctica, a continent which the majority of people will never visit, but still have a deep interest in.

The history of the Antarctic Flags project

On 1 December 1959, the enactment of the Antarctic Treaty established a scientific preserve free from military activity that championed the values of science, collaboration and trust, which can be argued idealistically to be the essential pillars of Antarcticness. Every year on 1 December, Antarctica Day celebrates these moral pillars through activities and opportunities that demonstrate how individuals, groups and countries can work together through science as a global language of cooperation that spans borders and boundaries and that connects people to this frozen continent.

Part of these celebrations involves a worldwide outreach project that encourages schoolchildren to learn about Antarctica and imagine what a flag for the continent would look like. The hugely successful Antarctica Day Flags project – approaching its tenth anniversary in 2021, at the time of writing – pairs schools with scientists and support personnel travelling to Antarctica, who carry copies of flags designed by students to fly on the continent, returning photos and certificates to the schools upon the conclusion of their expedition.

To fully understand the origins of this project, we retrospectively recall the underpinnings of the 2009 Antarctic Treaty Summit, conceived by Paul Arthur Berkman, then of the University of Cambridge, to celebrate 50 years of the 1959 Antarctic Treaty. Berkman had overwintered in Antarctica at the age of 22, and while there, he recognised the role of science in maintaining world peace. At that time, there was an implicit understanding among scientists that science and policy operate independently of each other, and that science should remain 'objective' in its approach and implementation. This independence presented a logistical challenge for effective science policy in the form of a fundamental lack of resources, networks and expertise to identify and engage with relevant policy-makers, as well as monitoring and sustaining their efforts towards impact.

As a result, there existed an underlying fear that this objectivity that underpins scientific findings may potentially be compromised when it enters the policy sphere (Montuschi 2017). From his year-long deployment on the southern continent, Berkman recognised not only the need for a combined science and policy interface, but also the importance of Antarctica as a platform for the synthesis of science, policy and diplomacy (Berkman 2019). His book *Science into Policy* recounts these experiences within the unique policy framework of the

Antarctic Treaty as an example of effective science diplomacy (Berkman 2002).

In 2007–8, as part of a Fulbright Distinguished Scholarship at the University of Cambridge, Berkman and David Walton from the British Antarctic Survey began planning an Antarctic Treaty Summit to be hosted in Washington, DC in celebration of the fiftieth anniversary of the Treaty. Berkman was insistent that the summit should occur on 1 December, the day the Treaty was signed, and that this day should continue to be celebrated in subsequent years. This annual celebration became recognised as Antarctica Day. Antarctica Day was inspired by the actions of President Dwight D. Eisenhower, who, in the 1950s, was the catalyst for global strategies to achieve 'a day of freedom and of peace for all mankind' by creating an international space 'forever to be used exclusively for peaceful purposes . . . with the interests of science and the progress of all mankind' (Berkman 2011). The establishment of Antarctica Day aimed to continue the legacy of the Antarctic Treaty and to celebrate other international spaces such as the high seas, outer space and the deep seas.

Despite the fact that it conflicted with World AIDS Day, and that Chile already had a national Antarctica Day (with a very different message from Berkman's aims, as it commemorates Chile's territorial claim in Antarctica), it was felt that the symbolism of this date was significant enough to warrant overlap. Chilean participants decided to adopt this date as Global Antarctica Day, in addition to their own national celebration.

Despite the enthusiasm of Berkman and his wife Julie Hambrook Berkman in celebrating the Treaty, awareness of the Treaty was not at the time a primary objective for the Secretariat, which oversees the Antarctic Treaty System. Participation in Treaty meetings is closed, involving only five delegates from each country. So what were the next steps to build on the summit and Antarctica Day? Berkman, Hambrook Berkman and Walton felt that, because Antarctica quintessentially represented the ideals of an international space, it was imperative that they devise a long-term strategy that continues to highlight its importance within the global future. Our Spaces, the Foundation for the Good Governance of International Spaces, a UK-based non-governmental organisation, was created in 2009 as a result of this momentum. Although its conception is a direct legacy of the summit, its remit has grown beyond just that of the polar regions. According to its website:

> Nearly 70% of the Earth's surface lies outside national boundaries and thus outside national laws and governance.

This surface of water and ice, stretching from the poles to the equator and upwards from the seabed to outer space, encompasses what are called "International Spaces" and their sustainability is crucial to all life on Earth.

Although these regions and their resources lie beyond national frontiers they connect into a seamless whole with national jurisdictions so that the global future can only be properly served by consensus management of these extra-territorial spaces.[3]

Although many treaties, such as the Antarctic Treaty, cover the majority of these spaces, Hambrook Berkman describes these spaces as being like Swiss cheese, in that although there are many holes, they are not connected, as they lie beyond international jurisdiction. In this light, Our Spaces aims to advance education, raise awareness and promote research regarding governance and management of these global commons across both disciplines and nationalities.

The idea to celebrate Antarctica with flags came from Julia Dooley, a teacher of gifted and talented elementary school students in Delaware. Dooley had spent two months in Antarctica as an ANDRILL (the Antarctic Geological Drilling Project) ARISE (ANDRILL Research Immersion for Science Educators) Educator, as part of a team of educators deployed alongside science teams (Pound et al. 2019). Dooley had asked her students to design flags for Antarctica and asked Hambrook Berkman to judge the flags. A real flag was made of the winning design and sent to Antarctica, as well as being hung on the school flagpole.

Reporting back on the project at the next Our Spaces board meeting, Hambrook Berkman later described how it was clear to everyone that this 'Flags' idea 'had legs'. It was also clear that this was not a project that one person could manage, and to scale up the idea to multiple schools would require some assistance.

At the same time that Our Spaces was being established, the fourth International Polar Year (actually two calendar years, running from March 2007 to March 2009) was taking place. As part of this, the Association of Polar Early Career Scientists (APECS) was established. APECS is an international organisation for early career scientists and educators across all disciplines with an interest in the cryosphere. In addition to supporting researchers in their professional aspirations, the organisation aims to promote education and outreach as an integral component of polar research, and to stimulate the next generations of polar researchers (APECS 2019; Baeseman and Pope 2011).

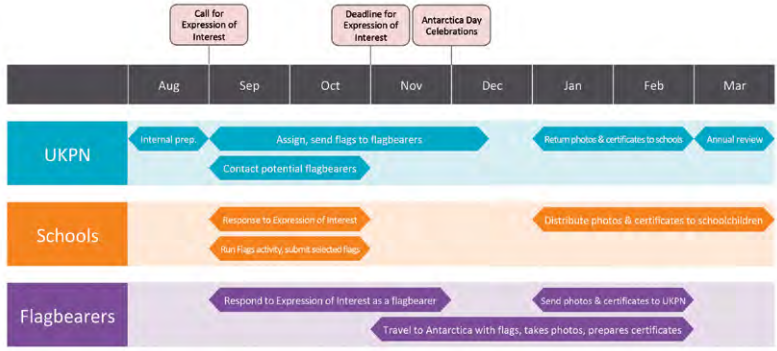
Hambrook Berkman's flags project fell within this education and outreach remit, and it was APECS member Heidi Roop, now an assistant

professor at the University of Minnesota, who suggested sending the flags digitally. With the support of APECS, the project grew exponentially. Roop recognised that the need to send flags virtually helped to expand the diversity of participants (although she acknowledges that internet access is still a limiting factor in taking part), but was also necessary due to the large time commitment involved. When 600 flags came in from one teacher, Hambrook Berkman and her team realised that they were going to have to set some ground rules. Now, schools are limited on the number of flags that they can send, ranging from one flag per school to three flags per class, depending on the resources available for the given year. In 2015, Tun Jan (T.J.) Young, on behalf of the UKPN (the UK branch of APECS) joined the initiative, helping to automate the process through spreadsheets in order to reduce some of Hambrook Berkman's work. These have continued to develop into online forms allowing direct submission of all the information by the teachers. With the increasing support of other APECS national committees from the following year onwards, the project continues to grow both in scope and reach. The project is now a 'one-year job' for early career researchers and educators coming through UKPN, who currently handle the bulk of the project administration.

Although Hambrook Berkman believes that every young scientist ought to be able to handle some outreach, she has personally felt the advantages of being able to deliver exciting research on behalf of her more introverted colleagues. Although the UKPN is now running the project, Hambrook Berkman has had the 'fantastic' experience of hanging flags on the *National Geographic Explorer* ship in Antarctica and to personally engage students with Antarctica in classrooms around the world.

Flags in a changing world

Although the workflow of the Antarctic Flags project has continuously evolved during its decade-long history, its core components as well as its fundamental objectives remain unchanged. Hypothetical flags of Antarctica designed by schoolchildren travel down to Antarctica in the hands of researchers and expedition personnel, and evidence of their journey is presented to participating schools upon the flagbearer's return. At all points during this workflow, project coordinators from the UKPN maintain regular contact between schoolteachers and flag-bearers (Figure 11.4).



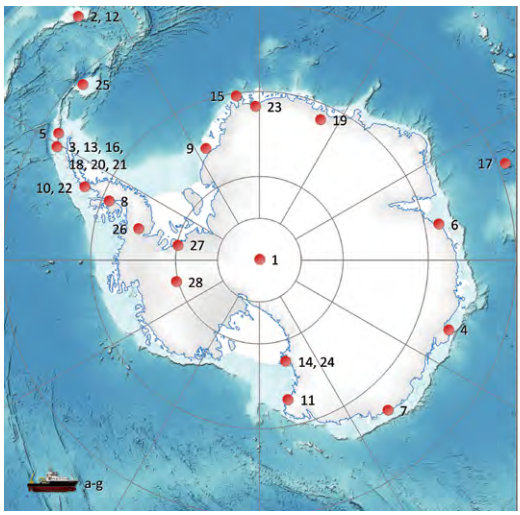
11.4 Annual workflow of the Antarctica Flags project. Image by T.J. Young, 2021.

Table 11.1 Participation statistics in the Antarctic Flags project since 2015 (from UKPN's records)

	2015	2016	2017	2018	2019	2020
Schools	38	50	107	49	70	106
Countries	11	11	13	6	7	13
Flags	284	232	675	254	323	122
Flag-bearers	18	18	45	19	24	14

While Our Spaces and the UKPN provide suggestions of how to incorporate the project into school classrooms, its implementation is completely and purposefully left open-ended. This is partially to accommodate the (sometimes rather stringent) conditions that are needed to meet necessary government-mandated knowledge requirements, depending on the age and location of the students. For example, in Malaysia, the introduction of the flags activity into classrooms required advance approval from their Ministry of Education. Although the planning was considerably more complicated in comparison to other countries, this requirement had its own unique benefits with respect to efficiency and reach. The Sultan Mizan Antarctic Research Foundation was proud to inform that they disseminated the invitation for the public and schoolchildren to participate in Antarctica Flag Day 2013 with a flag competition at science fairs and a wall mural at one school. On the other hand, many schools in Brazil allow teachers free rein to introduce new material in their individual curricula, which provided opportunities for creativity. With the strong leadership of Erli Costas, then the President of

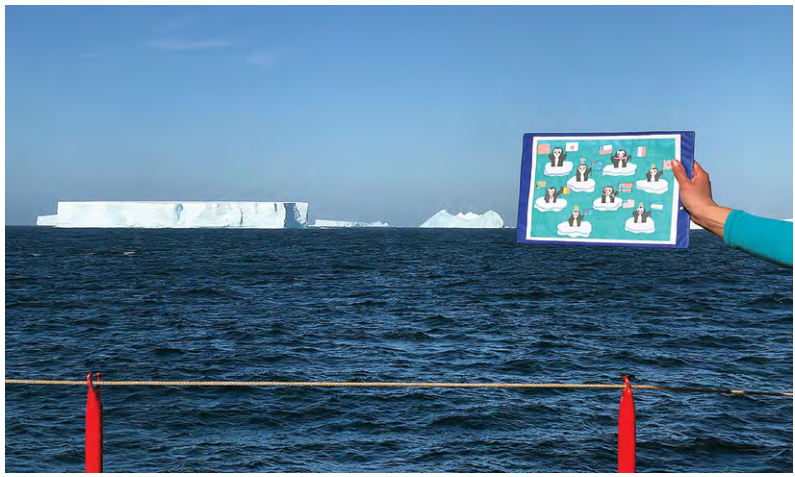
11.5 Flags have been sent to Antarctica from all countries highlighted in red. Image by Sammie Buzzard, 2021.



	Stations / Camps / Vessels	Country
1.	Amundsen-Scott	United States
2.	Bird Island	United Kingdom
3.	Campamento Byers	Spain
4.	Casey	Australia
5.	Comandante Ferraz	Brazil
6.	Davis	Australia
7.	Dumont d'Urville	France
8.	Fossil Bluff	United Kingdom
9.	Halley	United Kingdom
10.	Horseshoe Island	Turkey
11.	Jang Bogo	South Korea
12.	King Edward Point	United Kingdom
13.	St. Kliment Ohridski	Bulgaria
14.	McMurdo	United States
15.	Neumayer	Germany
16.	Palmer	United States
17.	Port-aux-Français	France
18.	Port Lockroy	* United Kingdom (UKAHT)
19.	Princess Elisabeth	Belgium
20.	Rey Juan Carlos	Spain
21.	Risopatrón	Chile
22.	Rothera	United Kingdom
23.	SANAE IV	South Africa
24.	Scott	New Zealand
25.	Signy	United Kingdom
26.	Sky Blu	United Kingdom
27.	Union Glacier Camp	* Antarctic Logistics & Expeditions
28.	WAIS Divide	United States
a.	Akademik Treshnikov	Russia
b.	Almirante Maximiano	Brazil
c.	Araon	South Korea
d.	Explorer	* Nat'l Geographic
e.	James Clark Ross	United Kingdom
f.	Lawrence M. Gould	United States
g.	Nathaniel D. Palmer	United States

11.6 Final flag destinations on and surrounding the Antarctic continent. Locations do not include temporary field camps. Cruises are collectively represented and not spatially projected. A * means that the base or camp is operated by non-governmental organisations or private companies. Image by T.J. Young, 2021.

APECS Brazil (the Brazilian national branch of APECS), the Antarctic Flags activity was innovatively incorporated in classrooms through digital books as well as in international workshops. The result was a substantial network of schools, teachers and researchers who participated in the project from the classroom to its journey to and from Antarctica.



11.7 During 2020–1 when Antarctic travel was severely limited due to the Covid-19 pandemic, those who were still travelling stepped up to take as many flags as possible. Here, a flag carried by Povl Abrahamsen (British Antarctic Survey) from Ramsey Academy (UK) is displayed next to the remnants of the huge A-68 iceberg which was originally larger than the state of Delaware. The iceberg made media headlines in 2017 when it broke away from Antarctica's Larsen C Ice Shelf. Photograph by Alice Marzocchi and Yvonne Firing, 2021.

Within the classroom, the flexibility of the flags activity enables the project to be incorporated into a number of subjects. Although it is most commonly carried out within a geography or science class, submissions have also come from more unexpected sources, such as from a computer science project. Similarly, the level of engagement between the UKPN, participating schools and potential flag-bearers varies. While the majority of schools are self-sufficient in their implementation of the flags activity with minimal guidance from the project coordinators, flag-bearers as well as members of the UKPN have personally visited participating schools and led the flags activity along with other enrichment activities, such as science experiments and show-and-tells. These visits have even taken the form of video calls from the flag-bearers while they are physically on the Antarctic continent.

The cumulative reach of the project is global, with participation from every continent, matching the aims of the project. Antarcticness can and should involve everyone, regardless of their country of residence, since Antarctica is a space for everyone even if we cannot all physically be

there. Table 11.1 shows the overall participation in the project since 2015, with Figures 11.5 and 11.6 showing respectively the countries that have participated, and the variety of destinations of the flags around Antarctica, although the project could still be more global.

With the Covid-19 pandemic hitting in 2020 and much Antarctic research cancelled or postponed for 2020–1, the implementation of the Antarctic Flags project seemed in jeopardy for the first time in its history. The determination of the team who had signed up to take over the project ensured that flags could still travel, albeit at a reduced capacity. Jennifer Arthur, a PhD student at the University of Durham, UK, explains that due to there being considerably fewer scientists heading to Antarctica for the 2020–1 summer, the team made extra effort to start recruiting flag-bearers early. They put out calls on social media and targeted email lists such as within the British Antarctic Survey. Thanks to her efforts, and those of fellow team member geography teacher Fiona Old, flag-bearers were recruited from three different countries. These included individuals with as diverse roles as marine and zoological field assistants, an oceanographer, a ship's chief officer, a medical officer, a mechanical engineer and station leaders. The team also decided to limit entries to one per school for that year, given the shortage of people heading to Antarctica. This enabled the project to continue successfully despite the global pandemic (Figure 11.7).

Perspectives of participants

Given its creative underpinnings, the Antarctic Flags project is flexible, scalable and spans a wide range of ages. While the content depicted in their flags may vary across ages, they all centre around aspects of cooperation and harmony. Figure 11.8 shows students participating in a flag creation activity in Oman. Although it was originally envisioned as a humble classroom activity, the concept of Antarctic flag design can be easily adapted, and scaled up or down, to complement a variety of outreach activities. This was perhaps best demonstrated by the Bulgarian Antarctic Expedition, which embedded the activity throughout their calendar, not only with in-person school visits by participating scientists, but also through remote video conferences, travelling photography exhibitions, science festivals and museum open days.

Given the large age range of students participating in the project, from as young as three to as old as eighteen, the motivations for schools signing up can differ. The benefits for younger students in particular were

11.8 Students at Jaifar Ibn Al Julanda School (Oman) prepare their flag designs. Photograph by Julie Hambrook Berkman, 2019.

noticed by Liz Pasteur, who worked for the IPF during the early days of the project. In addition to operating the Belgian Princess Elisabeth Station in East Antarctica, the IPF implemented the flags activity alongside their own Class Zero Emission climate change project, and so became an obvious partner in the Flags project.[4]

Through incorporating the Antarctic Flags project into in-person outreach events, Pasteur found that the practical aspects of the project were more compatible with younger students, not only for curriculum-based reasons similar to those that Hambrook Berkman had discovered, but also because of the universal appeal of colouring in! While the hands-on experiments of Class Zero Emission were already inspiring to those inherently interested in science, the ability to design and colour personally designed flags appealed to a different audience that otherwise would not have been as receptive to scientific experiments. In Pasteur's experience, the Antarctic Flags project often worked best with primary schools as the teachers have comparatively more freedom and are not as restricted to specific aspects of the curriculum as their secondary school counterparts.

There are nonetheless many benefits for older students taking part. Kate Stockings is a secondary school teacher in London, and was attracted to the project due to it allowing students to see the 'bigger picture', enabling them to see intrinsic value in their creations beyond just an output of routine school work. She feels that the uniqueness of the flags activity is that there is a definite end product. Students 'hate doing

something to think it is just going to end up in the bin', but with the knowledge that their flags could be seen flying in Antarctica, they become excited that their work will be part of a bigger purpose. The project has also motivated Stockings to get more involved in polar science communication. After participating in the project as a teacher, she joined the UKPN committee as Head of Education and Outreach.

The simplicity of the project is the reason Hambrook Berkman feels it has been so successful across age groups. She says the connection to it is instant: 'When you tell people Antarctica doesn't have a flag, they get it.' Art can be an international language (see also Chapters 6, 12, 13 and 17). It does not necessarily matter where the flags came from when they are seen, as art connects everyone. Furthermore, the messages of how important peace is and how important science is in making good decisions translate easily across age groups and nationalities, representing key and universal aspects of Antarcticness.

The project has benefits beyond the link to Antarctica it provides for the students. For the UKPN members helping to coordinate the project, the project management experience and networks formed are a key benefit gained from taking part, as those leading the project are often PhD students, at the beginning of their scientific careers.

Regardless of approach or mindset, the joy of scientific outreach and working with children is clear to many of the project coordinators. Jenny Turton, a former coordinator of the project, explains that children are 'always so enthusiastic and amazed by everything, which always reminds me why I do my research'. For her, the project was light relief during some of the more difficult times in the research process. She describes a time when she was feeling particularly stressed and found '40 beautiful, hand-painted and crafted, colourful maps' in her postbox, speaking of the joy of spreading them out over her office floor. Of course, the humour in the drawings cannot be forgotten. As Emma Pearce, another former flags coordinator, puts it, 'Who knew a penguin could be drawn in so many different ways!'

The importance of flags for Antarctica

From the perilous expeditions of Roald Amundsen and Robert Falcon Scott to the, at times, almost daily flights that supply the bases of 42 different countries on the continent, Antarctica has always been tinted with a colonial lens (Dodds 2006). For some countries, the applicability of the colonial concept used to be palpable, such as the United Kingdom

(Chapter 5), which perceived its Antarctic activities between the two world wars as a colonial project (Dodds et al. 2017). The promulgation of the 1959 Antarctic Treaty, a rare long-standing beacon of international cooperation, in essence put the process of territorial claims on hold by bringing countries together after the Second World War. Even so, many countries still operate on a more nuanced approach through measures such as periodically reiterating their territorial claims, assigning place names or investing in scientific stations and related infrastructure in tactical locations. The outcomes of the Treaty provided a firm foundation for ongoing international cooperation to successfully manage nearly 10 per cent of the Earth's land mass.

The Antarctic Flags project aims to promote the legacy of international cooperation enshrined in the Antarctic Treaty by reshaping these colonialist perspectives associated with the southern continent into one instead associated with internationalisation and scientific cooperation. The elegant simplicity of the Treaty's 14 articles provides inspiring examples for youth of humankind working together (see Chapter 16). This international collaboration is crucial to the many successes within polar research, most notably that of multinational scientific projects and operations.

Despite the actions resulting from the Treaty, Antarctica lacks a symbol to represent its ideals of science for peace. It is this fundamental issue that the project seeks to address. Given that Antarctica has often been depicted in society as a place of mystique that provides a tabula rasa for imaginative and utopian projection (Leane 2015), the Antarctic Flags project presents a unique opportunity to tap into the creative mind and explore the possibilities presented by the Antarctic Treaty's visions. This creative aspect of the activity not only serves as a novel learning method, but also promotes the association of concepts that may at first seem tenuous and far-fetched, such as ideals of Antarcticness. Through engagement with the latest polar science, while also fostering the ideals of international collaboration and governance of common spaces, both of which are manifestations of Antarcticness, children are exposed to important ideas that are often not directly taught in schools. As a result, these ideals are often depicted by students as central themes in many flag designs.

In addition, the project capitalises on the public's fascination with Antarctica as an inaccessible and uncrossable frontier, reshaping their connection with the southern continent to one involving international cooperation and stewardship (see Chapter 3). Although the majority of the project's participants are unlikely ever to visit the continent

themselves, the project enables students to connect with the southern continent and understand that they have an important role to play as concerned global citizens.

Together, these inherent themes and connections formed the crux of recollections from past project participants and coordinators alike:

> Making connections with Antarctica is so important, so that people can appreciate its complexity, fragility and importance within the global climate system and the ongoing impacts of climate change on the continent. It's important for people to understand that what happens in Antarctica affects the rest of planet Earth, including its potentially huge sea-level rise contribution. (Jennifer Arthur, PhD student, University of Durham, project coordinator of the 2020 cycle)

> Antarctica is such a fundamental part of the Earth's system. From ice, to atmosphere, to ocean, to living creatures; the Antarctic is connected and impacted by them all. Lots of people can't point out the Antarctic on a map, given that it is usually cut off at the bottom, and doesn't feature heavily in school studies. But it is a place of international cooperation, research, science and peace. So educating people about any aspect of the Antarctic is important. And maybe we can inspire some people to want to go there, and to build a career in science so that they can visit and protect it. (Jenny Turton, Research Associate, Friedrich-Alexander University, project coordinator of the 2016 cycle)

> People have a far greater appreciation for the vulnerability of the Arctic/Antarctic if they can feel connected to it. It's the same argument people use for having animals in zoos, if you go to a zoo and see an elephant and fall in love, you're much more likely to go home and then look up ways to save the elephants in the wild. Antarctica is far harder to make accessible to people in 'real life'; you can show pictures, and watch *Frozen Planet* [the 2011 BBC documentary], but actually seeing something you've created and been a part of makes the experience a lot more personal and connected. (Emma Pearce, PhD student, University of Leeds, project coordinator of the 2018 cycle)

> Antarctica, just like the high seas and deep seabed, play a significant role in our climate system, carbon sequestration (oceans)/fresh water storage (Antarctica) despite generally being places that are not conducive to permanent human habitation. As for many people out of sight is very much out of mind, outreach bringing those 'inhospitable' (for humans only) places closer to them might remind them of the importance to treat them with respect and look after them. (Daniela Liggett, Senior Lecturer, University of Canterbury, regular flag-bearer since 2011)

> The polar regions are a litmus test for the Earth's climate. Antarctica is the 'cuisine' of the climate, what happens there affects the whole Earth…and climate change is felt most clearly. Everything is connected. Our world is an interdependent ecosystem and we are part of it. We teach children to think how their actions affect nature even in Antarctica, and how to protect it more. The Flags project is connected with this knowledge. (Iglika Trifonova, journalist, photographer and President of APECS Bulgaria, regular flags activity coordinator since 2012)

Beyond the flags

The Antarctic Flags project is one of a multitude of efforts worldwide to connect the public to the polar regions (see also Chapter 3), such as Antarctica Day, which has continued to grow. Now a decade old, Antarctica Day is currently coordinated by APECS and continues to be an annual highlight within Antarctic education and outreach communities. The flags project, which historically set its submission deadline to symbolically fall on 1 December, is a major component. APECS documents all the global activities taking place each year, and Hambrook Berkman has described her surprise at seeing events as diverse and far-ranging as a concert in Australia and film festival in Arkhangelsk, Russia.

Our Spaces themselves have contributed more than just the flags project. The book *Celebrating Antarctica: A treaty protecting a continent* (Hambrook Berkman and Pope 2015) was written by Hambrook Berkman, along with Allen Pope, former president of the UKPN and now a director of Our Spaces. Published in 2015, the book explains the Treaty to children, was illustrated by schoolchildren from around the world, and has been

translated into the four languages of the original Antarctic Treaty (English, French, Russian and Spanish) in addition to 19 other languages. Crucially, the book includes many of the earliest submissions for the Antarctic Flags project as a tangible conceptualisation of the Antarctic Treaty's ideals. In turn, given its wide range of languages, the book is an integral component for many international schoolteachers who hope to incorporate the flags project into their classrooms.

The idea for the book originated from a trip to Russia, where Berkman was travelling to lecture. While there, Hambrook Berkman visited a school and discovered a fundamental lack of resources about Antarctica. After suggesting that teachers could create their own materials to fill this gap, one teacher produced a grade four book about the Antarctic Treaty. This matched Hambrook Berkman's personal passion of helping elementary school teachers to teach science subjects while helping overcome stereotypes of them being 'dry and boring'.

One of Our Spaces' key messages focuses on people working together and using science as a basis to make decisions peacefully. Hambrook Berkman noticed from the flags they were receiving that teachers were teaching what they knew already, such as climate change and marine life. Therefore, having a book about the Treaty would help with their message.

Another application to the flags project came from flag-bearer Daniela Liggett. Liggett, along with her students, enacted a mini-Antarctic Treaty Summit on the ice in the Ross Sea region of Antarctica. Students and field staff put up their own countries' flags around their campsite and, during evening briefing, talked about their own perspectives of what role the Antarctic Treaty System played in global politics and in the governance and management of human activities in the Antarctic. They also reflected on the different positions that their respective countries have in relation to the Antarctic Treaty System and what they saw as the Treaty's future. A variety of efforts to continue to raise awareness of Antarctica and the future of this frozen continent are essential.

Future of the project

With UKPN now coordinating much of the Antarctic Flags project, the programme may become susceptible to being overly UK-centric. Often, other nations are added to the project as a result of someone having connections to a British school abroad. As shown in Table 11.1, the numbers of countries that participate each year is relatively low in

comparison to the total number of schools that have participated in the programme overall (Figure 11.5). Gerlis Fugmann, the former executive director of APECS, who helped advertise the programme to APECS members in its early days, is optimistic that this does not have to be the case. Fugmann is impressed that the programme has developed into something more international and grown in participation over the years, but also feels that there is potential for it to become even more international. Fugmann feels that the visibility of the project is one of the reasons it has been so successful. The visual nature of the outputs gives the students real feedback on where their work is going and gets them excited about polar research, with the displays at stations being impressive.

It would certainly be possible to expand participation and involve research bases more equally by having higher-level coordination – for example, by involving the Scientific Committee on Antarctic Research (SCAR), a thematic organisation of the International Science Council charged with initiating, developing and coordinating high-quality international scientific research in the Antarctic region. A danger of involving higher-level organisations would be that project management benefits gained by the early career researchers who currently coordinate the project may be lost altogether. International scientific cooperation, especially around 'our spaces' such as Antarctica, will only increase in importance in the future under changing environmental and societal conditions (Berkman 2009).

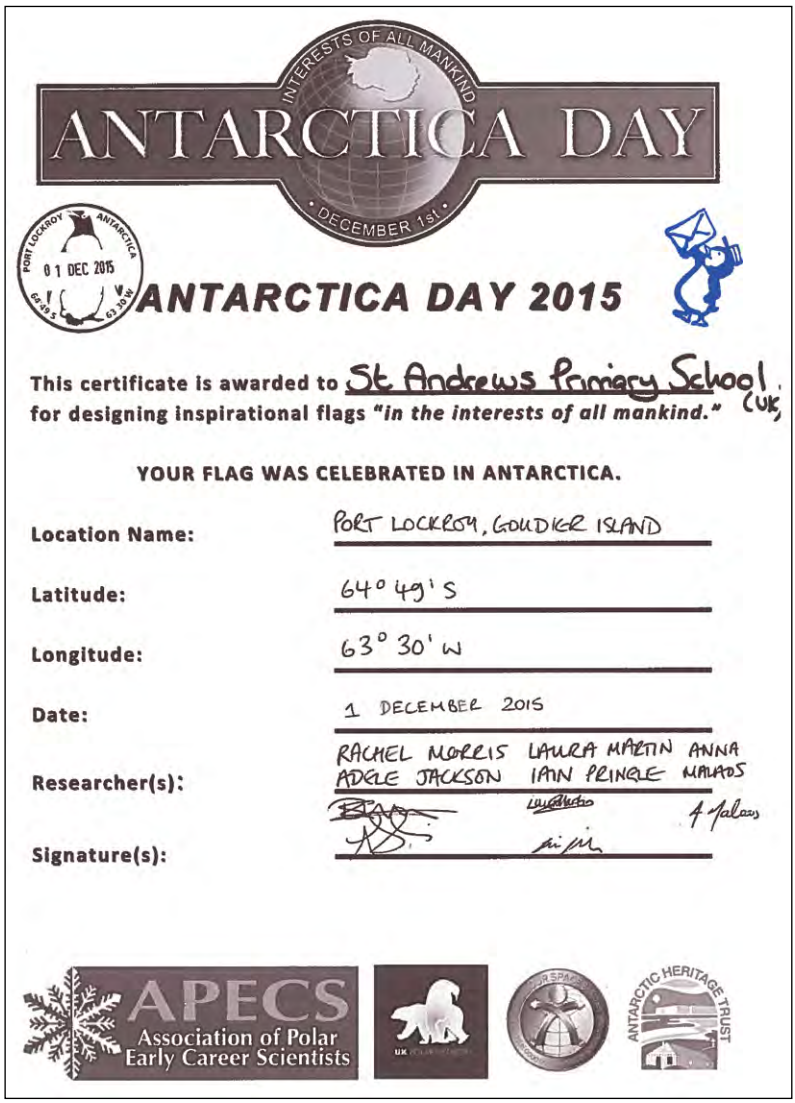
Those who currently classify themselves as 'early career' will be at the forefront of this cooperation. In fact, several former participants of the project were involved in efforts to increase scientific collaboration between the UK and Russia, breaking down walls at a time when the two country's respective governments were building them, through a series of workshops held in Moscow and Cambridge in 2018 (Buzzard 2018). Although the focus of this workshop was the Arctic, and notions of Arcticness can be very different from Antarcticness due to the former having permanent human inhabitants, many researchers work across both poles, and international collaboration is essential for successful research at either pole.

Additional work is needed to make the project truly global, especially with regards to encouraging participation in parts of Asia and Africa. A significant proportion of participating schools, especially beyond the UK, are private, and effort is needed to reach a broader socioeconomic demographic. Heidi Roop highlights the need for the project to have a way to monitor its outcomes. Beyond the numbers of flags and numbers

11.9 Marianne Karplus and Galen Kaip (University of Texas, El Paso, USA) display flags from Red Rose Primary School (UK) in front of one of the US Antarctic Program's Twin Otters at the Lower Thwaites Glacier Camp, one of several stations supporting the International Thwaites Glacier Collaboration. Photograph by Marianne Karplus and Galen Kaip, 2018.

of students (Table 11.1), there is currently no real way beyond anecdotal evidence to know what the students gain from taking part. Although the project's flexibility allows it to reach students of a range of ages and nationalities, the lack of clear learning objectives could be an issue. Is making people aware of Antarctica enough of a learning objective? Furthermore, does providing a photo of their flag designs and a certificate (Figures 11.9–11.11) ensure any long-term connection to Antarctica for students?

Roop acknowledges that, without partnerships with social scientists, it is difficult to know the project's true outcomes. She would have liked to have had a chance to clearly articulate goals for the project, but she did not have the time for helping with this task alongside helping with the flags. Feelings of burnout are common among those who run the project, and although the accounts given here are generally positive about taking part, often this participation is at a very personal level and is done during the organisers' own time. It is hard, as it is within research and teaching more generally, to derive value from these experiences and to use them



11.10 An example of a certificate from the 2015–16 campaign, signed by deployed members of the UK Antarctic Heritage Trust at Port Lockroy, Antarctic Peninsula, and returned to St Andrews Primary School (UK). Image by the UK Antarctic Heritage Trust, 2015.

11.11 Student flags produced by sixth-grade students of Centennial Academy, Atlanta, Georgia (USA). Photograph by Sammie Buzzard, 2020.

to further one's career due to a lack of systems placing value on them, especially within hiring and promotion decisions. In evaluating polar outreach and communication activities, Salmon and Roop (2019, 297) make three recommendations that could benefit the flags project:

- Improved articulation of goals and objectives
- Acknowledgement of different drivers, voices, and power structures
- Increased practical training, resources, and reporting structures.

A further potential issue is that the uptake of the project is often from the 'super' teachers, tending to mean those who are often already doing more than others. Hambrook Berkman fears that they may get bored and may want variety after participating in the project for a few years. She feels there is definitely more room for creativity in connecting people with the frozen continent.

Hambrook Berkman is also ambitious that new audiences can be persuaded to take part in polar outreach. She highlights the increasing number of retirees and elderly people participating in Antarctic-bound tourist cruises. To her, it seems only natural that they would want to multiply the effect of having gone to Antarctica by recounting their

experiences in school visits. Hambrook Berkman laments that more has not been made of this. She does not know of anyone who goes to Antarctica and comes back thinking 'well, that was just another trip'.

Hambrook Berkman's long-term goal is that a sufficient number of the next generation understand the scientific importance of Antarctica within the collaborative context of the Antarctic Treaty. The hopeful gift from children to the world is the book they have crafted with their flags (Hambrook Berkman and Pope 2015). In turn, the future of Antarctica rests on these future leaders being able to balance national interests within an international commons. In the event that any country decides to renege on the Treaty – for example, to try to explore for minerals, metals or fossil fuels – Antarctica will then have a civil society to rely on, advocating for its ideals of Antarcticness. Essentially, in Hambrook Berkman's words, 'We're all on this planet together.'

Acknowledgements

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Notes

1 https://ourspaces.org.uk (accessed 19 August 2021).
2 http://www.atsummit50.aq (accessed 19 August 2021).
3 https://ourspaces.org.uk/about-us (accessed 19 August 2021).
4 http://www.polarfoundation.org/projects/detail/class_zero_emission (accessed 19 August 2021).

References

Association of Polar Early Career Scientists (APECS). 2019. 'APECS Annual Report 2016–2017'. https://www.doi.org/10.5281/zenodo.2536695.

Baeseman, Jenny, and Allen Pope. 2011. 'APECS: Nurturing a new generation of polar researchers'. *Oceanography* 24(3): 219. https://www.doi.org/10.5670/oceanog.2011.73.

Berkman, Paul Arthur. 2002. *Science into Policy: Global lessons from Antarctica*. London: Academic Press.

Berkman, Paul Arthur. 2009. 'International spaces promote peace'. *Nature* 462: 412–13.

Berkman, Paul Arthur. 2011. 'President Eisenhower, the Antarctic Treaty and origin of international spaces'. In *Science Diplomacy: Antarctica, science and the governance of international spaces*, edited by Paul Arthur Berkman, Michael A. Lang, D.W.H. Walton and Oran R. Young, 17–28. Washington, DC: Smithsonian Institution Scholarly Press.

Berkman, Paul Arthur. 2019. 'Evolution of science diplomacy and its local–global applications'. *European Foreign Affairs Review* 24: 63–79.

Buzzard, Sammie, Joseph Cook and Alexey Maslakov. 2018. 'Arctic collaboration transcends political tensions'. *Nature* 558(7708): 30.

Dodds, Klaus. 2006. 'Post-colonial Antarctica: An emerging engagement'. *Polar Record* 42(1): 59–70.

Dodds, Klaus, Alan D. Hemmings and Peder Roberts (eds). 2017. *Handbook on the Politics of Antarctica*. Cheltenham: Edward Elgar.

Hambrook Berkman, Julie, and Allen Pope. 2015. *Celebrating Antarctica: A treaty protecting a continent*. London: Our Spaces.

Leane, Elizabeth. 2015. *Antarctica in Fiction: Imaginative narratives of the far south*. Cambridge: Cambridge University Press.

Montuschi, Eleonora. 2017. 'Using science, making policy: what should we worry about?' *European Journal for Philosophy of Science* 7: 57–78.

Pound, Kate, Louise Huffman, Joanna Hubbard, Matteo Cattadori, LuAnn Dahlman, Julia Dooley, Robin Frisch-Gleason, Rainer Lehmann and Betty Trummel. 2019. 'ANDRILL ARISE: A model for team-based field research immersion for educators'. *Polar Record* 55(4): 251–73.

Salmon, Rhian A., and Heidi A. Roop. 2019. 'Bridging the gap between science communication practice and theory: Reflecting on a decade of practitioner experience to develop a new framework for public engagement design'. *Polar Record* 55(4): 1–14.

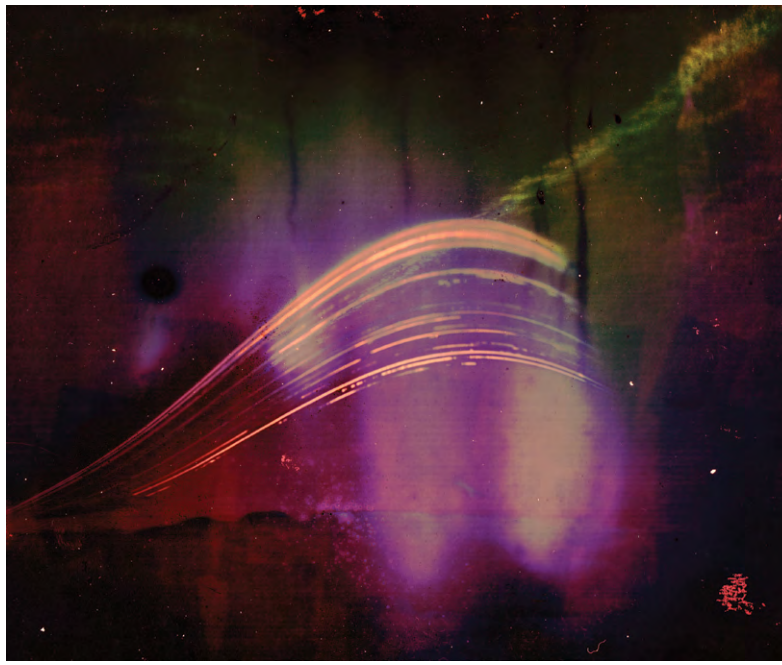
12

The art of interconnection: meaning, symbolism and Antarcticness in Antarctic solargraphy

Adele Jackson

Antarctic Sun Lines is a series of Antarctic solargraphs that visually locate the continent in relation to planetary dynamics and the natural forces that sustain life on Earth. Solargraphy is a photographic process using a pinhole camera and an extremely long exposure time to record an image of the sun. Although I began creating solargraphs in Antarctica during the summer season 2015–16, it was an international collaboration of Antarctic organisations, researchers and base personnel from 2017 to 2019 that enabled the realisation of the *Antarctic Sun Lines* pan-Antarctic project. This chapter opens with a description of the origins of solargraphy and my introduction to the art form, before using notions of Antarcticness to discuss the concepts behind the project and to contextualise the work in relation to Antarctic cultural and environmental narratives.

Spanish artist Diego López Calvín and Polish artists Slawomir Decyk and Pawel Kula developed solargraphy, or *solarigrafia*, in 1999 (Fosbury and Trygg 2010). Their work built on historic precedents in photographic image making, combining camera obscura theory and the use of light-sensitive material to record an image. A camera obscura (Latin for 'dark room') is literally a darkened chamber with a tiny hole in one wall. As light passes into the chamber through the hole, which acts as a lens, a reversed and inverted reflection of the world outside is cast onto the wall opposite (Marien 2006, 2). A pinhole camera is a camera obscura. The discovery of the light-sensitive properties of silver and the idea of utilising these properties to create images drawn with light were documented long before the first permanent photograph was produced (Batchen 1999;



12.1 The first Antarctic solargraph recorded on Goudier Island, Port Lockroy, Antarctica. Solargraph by Adele Jackson, 2015–16.

Marien 2006). Importantly, the development of photography cannot be attributed to one individual (Batchen 1999).

Throughout the late eighteenth and early nineteenth centuries, techniques were developed by a number of chemists, scientists, artists and inventors, some of whom worked in collaboration. Two notable figures whose work relates directly to the solargraphic method are Thomas Wedgwood and William Henry Fox Talbot. Wedgwood succeeded in using silver nitrate to create light-sensitive paper, but he was unable to stabilise, or 'fix', his photographic images, which would darken over a period of time (Batchen 1999). The creation of the 'paper-based negative-positive system' to reproduce multiple photographic prints is attributed to Talbot (Batchen 1999, 34), who worked with the scientist John Herschel to develop a method to permanently fix photographic images. Solargraphy's contemporary technological twist is the use of a digital scanner and digital imaging software to transform the paper negative into a positive image. No chemicals are used in the image reproduction process.

To create a solargraph negative, a pinhole camera loaded with light-sensitive paper is fixed securely in a position facing solar noon with its pinhole aperture left open for several weeks or months. Geographically fixed in position, the camera moves with the planet. Each time the sun aligns with the camera's pinhole, the light-sensitive coating on the paper inside the camera reacts and a line is drawn as the Earth rotates on its axis. Stationary features in the foreground appear in the final image but, due to the long exposure time, moving elements such as people or vehicles are not recorded. Because the Earth orbits the sun on a tilted axis, the sun appears higher in the sky each day as the year progresses towards midsummer, then lower in the sky as the season progresses towards midwinter. This seasonal planetary dynamic creates the arcs of light in solargraph images. Cloudy days with sunny intervals result in a broken line, and a missing line is the consequence of an overcast day.

Reminiscent of the account published in 1839 detailing Joseph Nicéphore Niépce's and Louis Jacques Mandé Daguerre's daguerreotype photographic process, which heralded the rapid and international expansion of photography (Marien 2006), López Calvín, Decyk and Kula made their *solarigrafia* image-making method publicly available. In their internet-based project *Solaris* (2000–2), they invited artists across the world to create and upload solargraphs.[1] This accessible and collaborative approach enabled solargraphy to proliferate in use and popularity. Details on how to construct a pinhole camera and make solargraphs are readily available online.[2] In contrast, and contradicting the three artists' original ethos, some solargraph makers have sought to commercialise the process.[3]

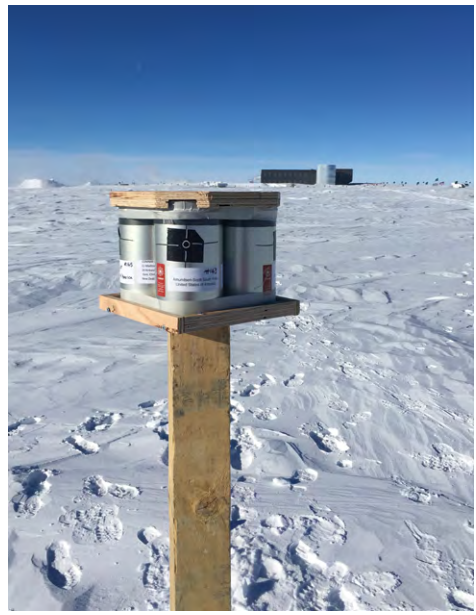
I was introduced to the art form through working with UK-based artist Bob Clayden, who began experimenting with the technique in 2011 (fstop 2013). Whilst working as an arts development officer for local government, I devised and managed *Plant-Life-Cycle*, an artist residency and public art programme. This project, which creatively explored cycles in nature, was a component of a cultural festival celebrating the Tour de France Grand Départ in Yorkshire in 2014 (Slater et al. 2014). Clayden was one of the commissioned artists. He produced a series of solargraphs in Dewsbury Country Park, a location significant for being the largest new woodland in the north of England.[4] Just a few months earlier, I had started working in Antarctica as an expedition photographer through the now discontinued *Polar Arts Program*.[5] Conversations with Clayden sparked the idea of creating Antarctic solargraphs.

With Clayden's support, during the austral summer season 2015–16, while I was working for the UK Antarctic Heritage Trust at the Port

12.2 The package of pinhole cameras and installation instructions supplied to each Antarctic research station. Photograph by Adele Jackson, 2018.

Lockroy historic site in the Antarctic Peninsula, I created my first Antarctic solargraphs. Figure 12.1 shows an image from this series. From 2017 to 2019, with the participation of more than 40 organisations and more than 70 individuals, the solargraph project became an international collaboration representing 31 states. The support of the Council of Managers of National Antarctic Programs (COMNAP), the New Zealand and the UK Antarctic heritage trusts, and scientists from the University of Canterbury was instrumental in enabling solargraph cameras to be installed at research facilities, heritage sites and deep field locations across Antarctica. Additionally, cameras were set up in the five Antarctic gateway cities through the willing participation of researchers, research institutes and logistics agencies.

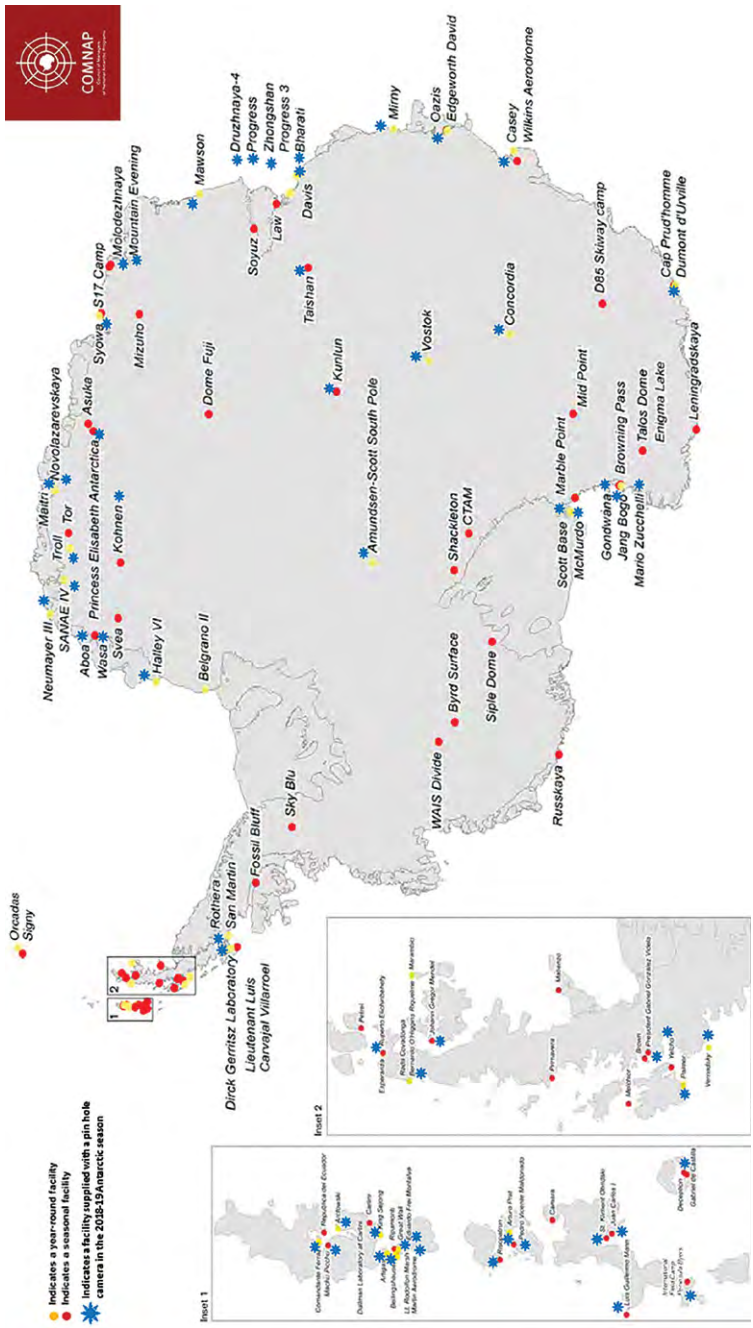
During the 2018–19 season, more than 100 solargraph cameras were distributed, along with my directions for setting up and taking down the cameras. Figures 12.2 and 12.3 show the package each research facility received and one of the Antarctic installation sites. I provided each facility with two cameras with one exception: Four cameras were sent to the Amundsen-Scott South Pole Station to enable a 360° recording of the



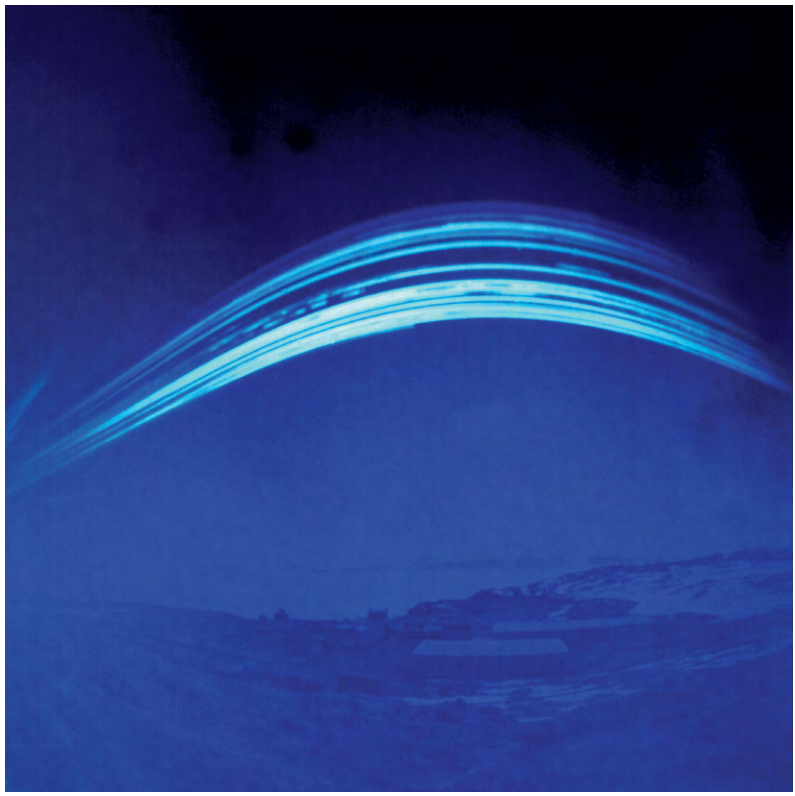
12.3 The solargraph pinhole camera installation at the Amundsen-Scott South Pole Station. Photograph by Tim Ager, 2018.

Sun (Figures 12.3 and 12.12). The map in Figure 12.4 shows the research facility locations where the cameras were installed. All the cameras were returned to Ōtautahi/Christchurch, Aotearoa New Zealand, where I processed the negatives into final images. Figures 12.5–12.12 show a selection from the collection.

The willingness of Antarctic organisations and those working in Antarctica to support the work of others reflects a cooperative attitude that is often evident within the Antarctic community. International cooperation is a founding principle enshrined in the articles of the Antarctic Treaty. The achievements of the International Geophysical Year (IGY) 1957–8 and the cooperation upon which the IGY's success depended were, to a significant extent, the basis for the negotiation of the Treaty (Elzinga 1993). An ethos of cooperation and collaboration continues to be central and essential to the strategic and operational activity of many Antarctic organisations. Antarctica's treaty-based governance arrangements and the continued international commitment to the Antarctic Treaty System are widely lauded qualities that differentiate the continent from all others. International cooperation is a



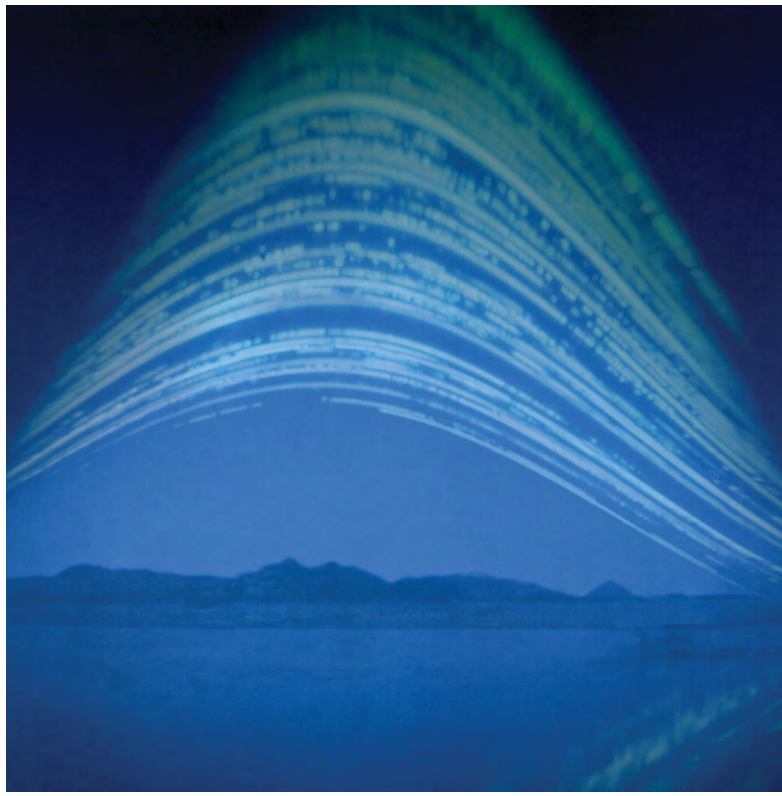
12.4 COMNAP Antarctic facilities map showing the pinhole camera installation locations. Map reproduced with permission of COMNAP, 2021.



12.5 Mario Zucchelli Research Station, Northern Foothills, Victoria Land, Antarctica. Solargraph by Adele Jackson, 2017–18.

facet of Antarcticness, and it was fundamental to the realisation of *Antarctic Sun Lines*.

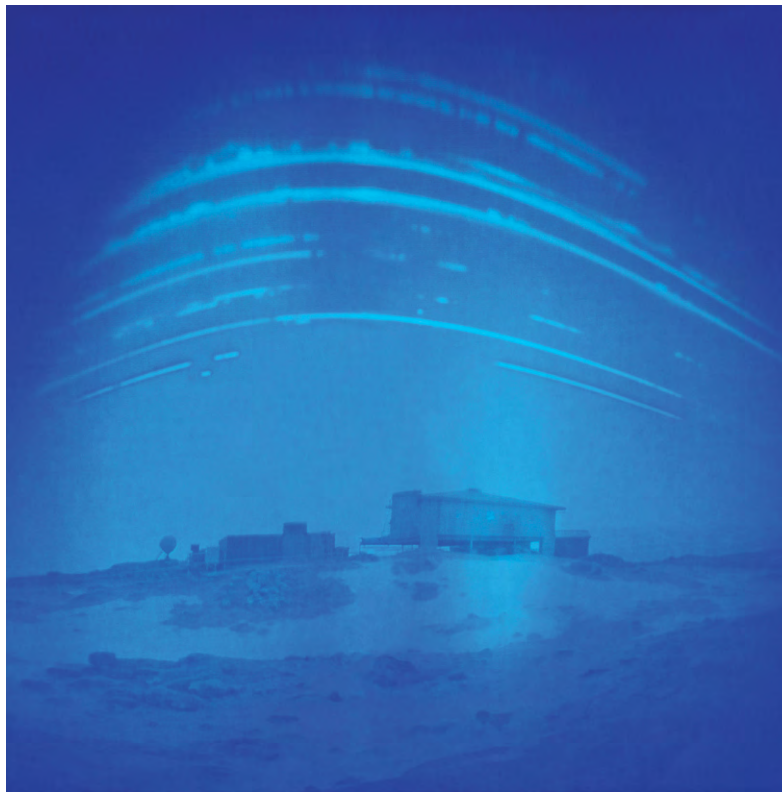
My initial motivation to create Antarctic solargraphs was simply to record a summer season in a single image. However, as I continued to create solargraphs during subsequent deployments to Antarctica, the concept behind the work deepened. These images are more than aesthetic souvenirs of time spent in the far south. Daguerre famously stated that his photographic process is 'not merely an instrument which serves to draw nature; on the contrary it is a chemical and physical process which gives her the power to reproduce herself' (quoted in Sussman 2014, 1). Similarly, the solargraphic method gives the Earth and the sun the power to draw a representation of their relationship. Curiously, in much published material, solargraphy is described as recording the 'track', 'trail' or 'path' of the sun across the sky (Fosbury and Trygg 2010; López Calvín



12.6 One of five international Antarctic gateway cities. Ushuaia, Tierra del Fuego, Argentina. Solargraph by Adele Jackson, 2017–18.

n.d.; Trygg 2006, 2017), but this is misleading. The sun is stationary. The orbiting Earth is the moving element in solargraph making. This dimension of planetary dynamics – the Earth's tilted orbit around the sun – is central to the symbolism within *Antarctic Sun Lines*.

The seasonal variation of light and heat, and stimulation of ocean and wind currents resulting from the tilted orbit, are fundamental factors in creating the conditions for life on Earth. Antarctica is central to these rhythmic dynamics. The distinction between winter and summer is at its most extreme in the high latitudes. The long period of astronomical twilight and darkness in the winter that alternates with the extended period of direct sunlight in the summer generates an annual freeze/thaw cycle. Metaphorically speaking, the cycle of seasonal change in the freezing and thawing of Antarctic ice generates the 'pulse' of Earth's circulatory system of ocean currents. As artist Chris Drury poetically



12.7 Palmer Station, Anvers Island, Antarctica. Solargraph by Adele Jackson, 2018–19.

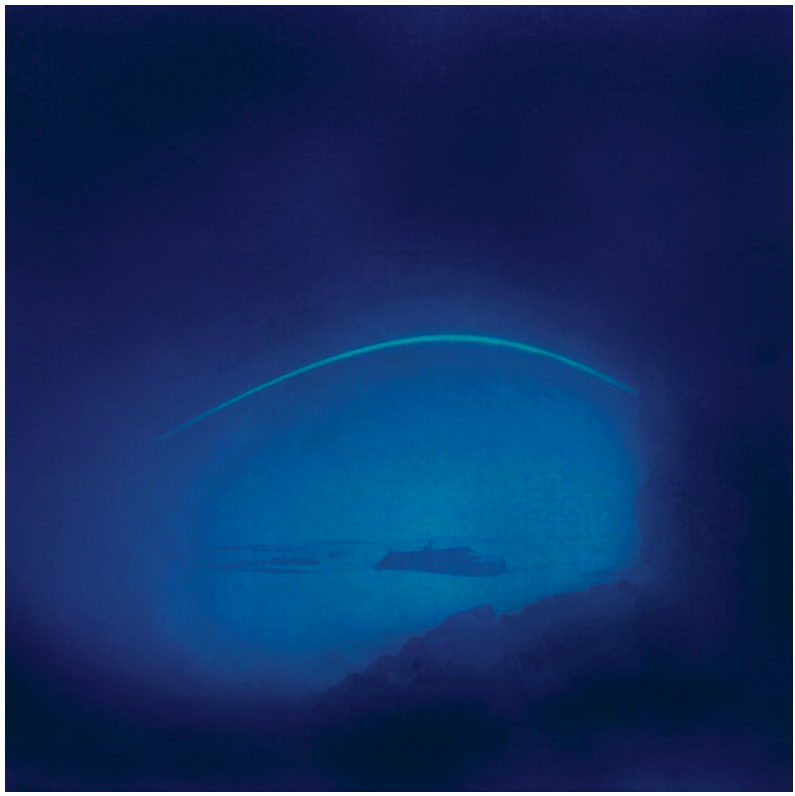
observed, Antarctica is 'the heartbeat of the Earth' (Drury 2008, 6). The movement generated when cold, warm, salty and fresh waters meet stimulates the ocean's circulatory flow. These currents are a life force in the marine system (Hays 2017).

In a climate warmed through the anthropogenic production of carbon dioxide, methane and other greenhouse gases, the maintenance of an atmosphere and ocean system conducive to life in its present forms is under threat. Accelerated melting of Antarctica's freshwater glaciers and ice shelves will increase global sea levels, and a slowing of ocean currents is predicted (Lago and England 2019). Furthermore, krill, a keystone species of the marine food web, depends on the presence of Antarctic sea ice (Nicol et al. 2008). Likened to a grazing meadow, the underside of the sea ice is the habitat for the plant life on which krill feed (Stretch et al. 1988). A thinning of sea ice and ocean acidification will

12.8 Anemometer tower at Base A, Historic Site and Monument (HSM) No. 61, Goudier Island, Port Lockroy, Antarctic. Solargraph by Adele Jackson, 2018–19.

likely have catastrophic impacts (IPCC 2014). In this scenario, the loss of liveable habitat and the loss of food sources threaten extinction of many species. Considering that marine plant life generates at least 50 per cent of oxygen in the atmosphere (National Oceanic and Atmospheric Administration 2021), the demise of a liveable marine habitat has implications for terrestrial life. The future trajectory for life on Earth depends on life in the ocean. The indivisible inter-relationships between planetary dynamics, solar radiation, Antarctic ice and life on Earth are the inspiration behind *Antarctic Sun Lines*. The global environmental significance of the Antarctic location is central to the artwork's Antarcticness.

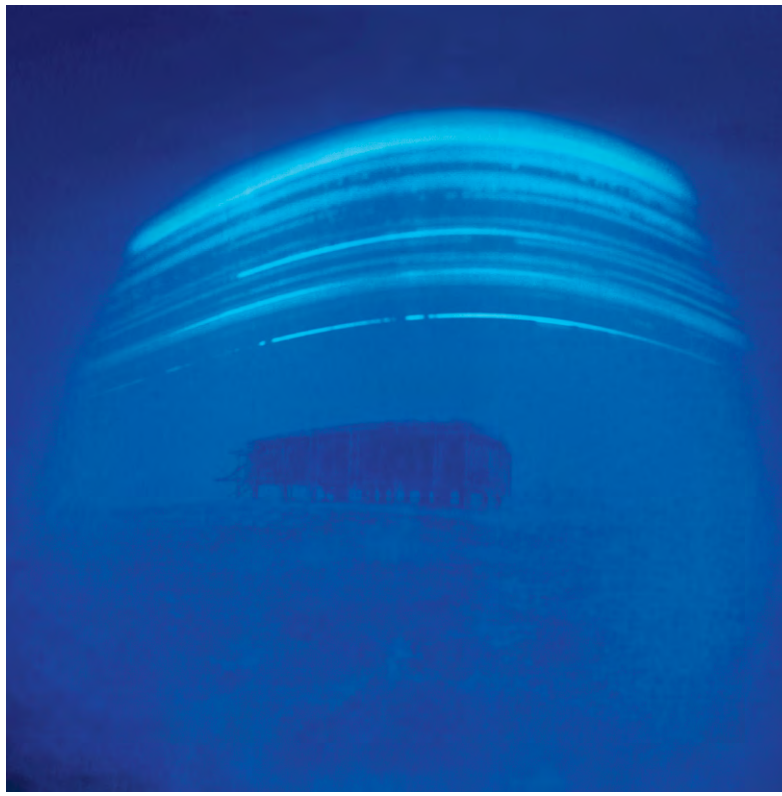
Equally, the work is concerned with human understandings of the Earth's systems and human impacts upon these. Antarctic-based scientific



12.9 Scott's Hut, HSM No. 16, Cape Evans, Ross Island, Antarctica. Solargraph by Adele Jackson, 2017–18.

research has increased human knowledge of planetary processes (Chapter 16), climate histories and changes in Earth's systems, which in turn enables the modelling of future scenarios. As Leane and McGee (2020, 1) observe, 'Antarctica is now increasingly understood as an environment irrevocably altered by remote human action and one that will irrevocably change the course of human lives all over the globe.'

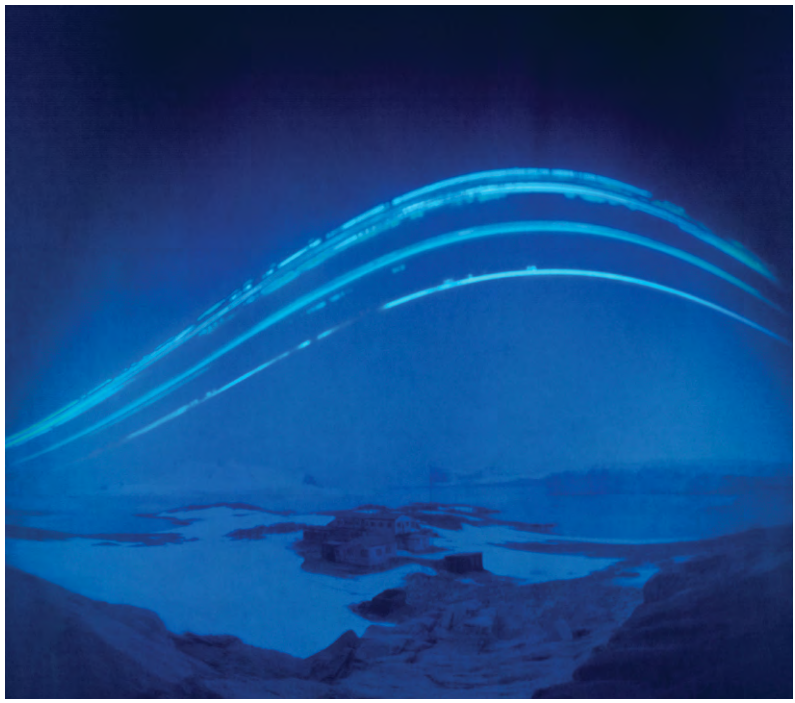
The representation of human infrastructure in *Antarctic Sun Lines*, through the foregrounding of historic and contemporary research bases (Chapter 5), scientific instruments and gateway city landmarks (Chapter 3), is a reference to the research activity that has both advanced knowledge of the natural world and simultaneously revealed anthropogenic causes of the environmental changes that are impacting life on Earth.



12.10 Arrival Heights Laboratory, Scott Base, Ross Island, Antarctica. Solargraph by Adele Jackson, 2018–19.

The use of colour in the *Antarctic Sun Lines* solargraphs is another aspect of their Antarcticness. Colour balance and the visual qualities of contrast, brightness and saturation in solargraph images are determined by the artist using a digital editing process. The paper image inside the pinhole camera, which serves as a photographic negative, is scanned to create a digital file, which is then inverted to create a positive image using image editing software. After inversion, solargraphs are often dark green in colour and require adjustments to reveal the foreground details. Manipulation of colour to create a final image is a matter of artistic choice.

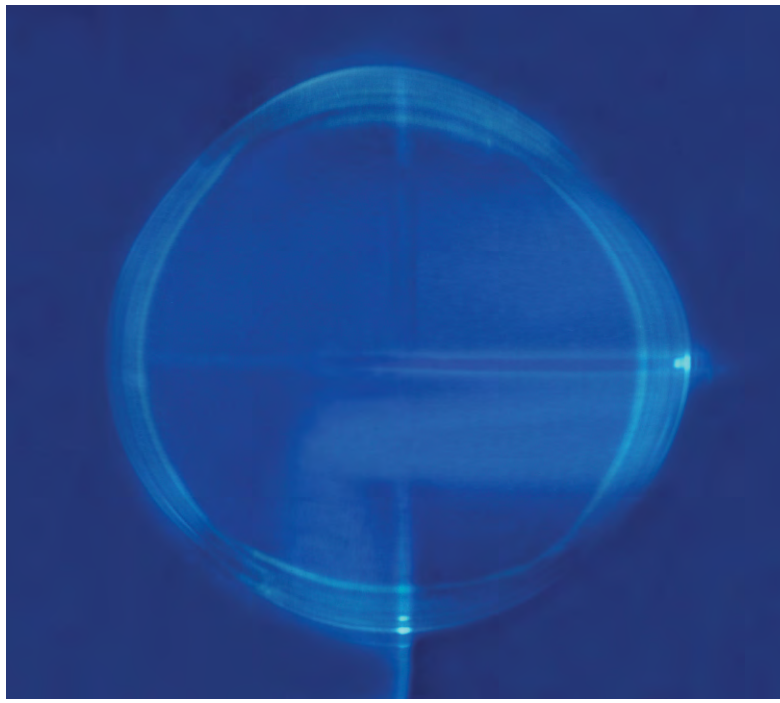
My use of a blue palette for *Antarctic Sun Lines* is deliberate and symbolic. On the surface, the continent appears white; it is frequently referred to as 'the white continent' (van der Watt and Swart 2016). However, it is the space between ice crystals that gives the illusion of whiteness. When compressed, the ice shows its true colour. Look deep



12.11 Base E, HSM No. 64, Stonington Island, Marguerite Bay, Antarctica. Solargraph by Adele Jackson, 2017–18.

into a crevasse and you will see reflected back an astonishing blue light. Antarctic ice is blue. Blue also has other symbolic associations (see Chapter 17). The oceans, which cover 71 per cent of the Earth's surface, also reflect blue light. This blue appearance has inspired the nickname 'the blue planet' (Chaturvedi 2020, xi). Viewed from space, the Earth has been likened to a 'blue marble' (Poole 2008, 82). Also from space, Earth's protective layer, its atmosphere, shows itself to be a fragile 'thin blue line' (NASA 2009). The blue that saturates the *Antarctic Sun Lines* solargraphs represents the Earth's cryosphere, hydrosphere and atmosphere.

The first public presentation of *Antarctic Sun Lines* took place at Christchurch Art Gallery/Te Puna o Waiwhetū as part of the city's 2019–20 *Antarctic Season Opening* series of events. The centrepiece was a solargraph presented on a solar-powered lightbox structure (Figure 12.13). Using the sun's energy to illuminate the image that the sun had drawn was central to the artistic concept. In further acknowledgement of the role of Antarctic science in developing knowledge of Earth's systems,



12.12 Amundsen-Scott South Pole Station, South Pole, Antarctica. Solargraph by Adele Jackson, 2018–19.

and also as an expression of the work's Antarcticness, the structural design of the presented work adopted the visual aesthetic, materials and technology used to generate power in deep-field Antarctic science events. The solar photovoltaic panel and battery system I used in the exhibition had been deployed in Antarctic cryospheric research (Figure 12.14).

The Antarcticness of *Antarctic Sun Lines* lies not only in its subject matter and its aesthetic construction, but also in the work's contribution to Antarctica's cultural heritage. Visual art played a role in human understandings and engagements with Antarctica long before the existence of the continent was proven (Andrews 2007; Fox 2005b). Speculative maps and images aided the conjuring of the idea of an Antarctic continent. The presence of artists in Antarctica since the first documented crossing of the Antarctic Circle in 1773 indicates the value placed upon the creation of images. Imperialist ambitions of securing claims to land and resources were the motivation of early Antarctic expeditions (cf. Chapters 5, 7 and 10). The orders issued to ship's master

12.13 Presentation of *Antarctic Sun Lines* at Christchurch Art Gallery | Te Puna o Waiwhetū, 2–6 October 2019. Photograph by Adele Jackson, 2019.

Edward Bransfield, who sighted the continental mainland of Antarctica in 1820 (Campbell 2000), epitomise the concerns of the time:

> You will explore every harbour you may discover, making charts and noting the soundings and whether secure for ships to ride in . . . You will ascertain the truth as to the abundance of sperm whale [and] the natural resources for supporting a colony . . . You will note minutely the appearance of the land . . . You will collect specimens of each plant [making] drawings of each as well as of every animal, bird, fish, insect and reptile . . . You will keep a meteorological journal . . . ascertain correctly the latitudes and longitudes of the headlands . . . [and] take possession of [the land] in the name [and] on behalf of His Majesty. (quoted in Ida and Shirreff 1913, 367)

12.14 The solar power system used in the exhibition of *Antarctic Sun Lines* is shown here being used in Antarctic cryospheric fieldwork on the McMurdo Ice Shelf. Photograph by Wolfgang Rack, 2014.

Reflecting the various cultural and political imperatives and ideas of each generation, image-making has made and continues to make considerable contributions to knowledge, understandings and interpretations of Antarctica and Antarcticness. Photography has particular significance in Antarctic cultural history, scientific research and communication of ideas. The advent of photography in the nineteenth century introduced new opportunities for representing the continent and human activity there. The *Challenger* Expedition of 1872–6 was the first to include a camera in its essential equipment (Andrews 2007; Codling 1997). Unattributed photographs of icebergs and landscape features populate the expedition reports.

The prominence of photography as the primary method of imaging Antarctica grew throughout the twentieth century, with professional photographers often key members of expedition teams. Frank Hurley (Chapter 7) and Herbert Ponting are two of the most widely acclaimed photographers of the early expeditions into Antarctica's interior (Hurley and Rex 2001; Ponting et al. 1979). Ponting accompanied Captain Scott's *Terra Nova* Expedition of 1910–13; Hurley travelled with both Sir Douglas Mawson's 1911–13 Australasian Antarctic Expedition and Sir Ernest Shackleton's 1914–17 Imperial Trans-Antarctic Expedition. Their work contributed significantly to expedition reports and public engagement.

Photography and film were frequently used to draw audiences for post-expedition fundraising lecture tours (Andrews 2007). Advances in

technology saw photographic techniques increasingly applied to scientific and geographic research. Early versions of trimetrogon and photogrammetry photographic surveying enabled aerial charting of parts of the continent (Fox 2005b), which were later superseded by remote sensing and satellite imaging. Art, imagery and developments in image-making technologies have transformed Antarctica from an imagined space into a knowable place (Fox 2005a, 2005b).

Most people will never have the chance to visit and see Antarctica; their visual access to the continent comes in the form of imagery and art. Glasberg (2012, xix) argues that this makes Antarctica 'the most mediated place on Earth'. With this in mind, it is essential to recognise that representations of Antarctica are constructs composed by the artist, the image maker or the photographer. Glasberg (2012) discusses the history of Antarctic landscape photography and its role in the construction of understandings of place. She highlights that the choices an Antarctic photographer makes about composition, perspective, what is included and what is excluded are conscious and they communicate ideas that reflect cultural and political perspectives. Using Ponting's work as an example, Glasberg argues that Antarctica's interior was framed as a blank, untouched terrain that invited exploration, delineation and ownership. Ponting's landscapes are 'claims on the territory created by the camera's eye', echoing the imperialist drives of the expedition (Glasberg 2012, 93).

Antarctic landscape photography has also served commercial and environmental agendas. Environmental conservation imperatives have motivated many landscape photographers to represent Antarctica as the last unspoiled wilderness in need of protection. Eliot Porter, who served on the board of the Sierra Club, was one of the first colour photographers to aestheticise the Antarctic landscape (Fox 2005b; Glasberg 2012; Porter 1978). An unfortunate irony is that stimulating public interest also stimulates tourism (Chapter 14). Emissions from long-haul flights (Chapter 2), and localised environmental impacts through trampling and seabed anchor scour, are just a few of the negative anthropogenic impacts of travelling to Antarctica (Brooks et al. 2018).

In contrast to aestheticising the landscape, contemporary critically enquiring photographic artists have captured the often overlooked, or ignored, features of the Antarctic environment. In 2008, New Zealand artist Anne Noble threw light on aspects of Antarctic culture hiding in plain sight. Noble's *Piss Poles* series depicts outdoor urination sites and her *Bitch in Slippers* collection documents the misogynistic cultural practice of vehicle naming (see also Chapter 5), a practice inspired by US

military aircraft nose art (Velasco 2004). Her work presents viewers with confronting images that challenge the notion of an unspoiled, pristine place (Noble 2014). Turning the gaze upon human activity and cultural practices, Noble reveals rarely seen dimensions of Antarctic life. Immaculate icy landscapes may dominate visual representations of the continent, and on the surface these images may appear to represent an essence of Antarcticness, but this idea is easily upended. Antarctica has a messy human cultural and environmental dimension. Despite the proliferation of images to the contrary, untainted purity is not a true quality of Antarcticness.

Polar solar phenomena have long been areas of fascination for photographers and artists. *Antarctic Sun Lines* resonates with the field of Antarctic light and solar-focused creative enquiry. Edward A. Wilson, physician, naturalist and artist with both of Scott's south polar expeditions, is widely admired for the colour accuracy of his watercolour portrayals of Antarctic light and parhelia (Walton and Pearson 2006; Wilson and Wilson 2011). Decades later, using a home-made fish-eye lens, Swiss photojournalist Emil Schulthess, who travelled south with the US Operation Deep Freeze delegation in 1959, was the first to record experimental photographs of the sun at the South Pole, which at the height of summer appears above the horizon for 24 hours (Schulthess 1960). Fox describes Schulthess's work as providing 'one of the most influential visions of the continent for other artists' (Fox 2005b, 203).

American artist Erika Blumenfeld, who has also constructed her own equipment to photograph light, explored her fascination with Antarctic light during her collaboration with the *ICEPAC* project, supported by the South African national Antarctic programme during the International Polar Year 2007–8 (Hug 2009). In her *Ice Horizons* series, she documented the changing colours of the sky and the ice. Exposing the myth that Antarctica is a white continent (Blumenfeld 2009) her photographs reveal the ice to be awash with colour.[6]

Exploring beyond the spectrum of light visible, American artist Diane Tuft, who travelled with the National Science Foundation's Antarctic Artists and Writers Program, photographed the effect of ultraviolet and infrared light on the Antarctic landscape (Tuft 2014). Tuft offers viewers a glimpse into an otherwise unseen Antarctic world. Photography also offers a way to view the spectacle of auroras caused by solar flares that are only faintly discernible to the naked eye. Since 2017, the astronomer and director of the Otago Museum Dr Ian P. Griffin, himself an accomplished photographer of solar phenomena, has organised seasonal commercial flights over the Southern Ocean and

sub-Antarctica for passengers to witness and photograph the aurora australis (Sabin 2021).

Besides the fact that it is created in Antarctica, the notion that the entire body of Antarctic photography has a specific Antarctic quality, or a distinct Antarcticness, is not easily distilled into a single idea. The motivation and the political and cultural imperatives behind the creation of photographic images, and the critical reading of those images, have changed over time. A drive to understand place, both geographically and culturally, is a broad unifying theme, but one that is not unique to Antarctica. Furthermore, recent Antarctic photography, including *Antarctic Sun Lines*, casts the gaze both at and beyond Antarctica. Antarctica is the entry point for contemplating a larger planetary perspective.

Since the turn of the twenty-first century, an increasing number of artists and photographers working in the Antarctic cultural space have responded to their concerns about anthropogenic global environmental change. Over several Antarctic summers, Argentinian artist Andrea Juan and Native American Shinnecock artist Camille Seaman have each used photography to communicate their concerns and prompt public engagement and discussion. Through her abstract photographs of floating and layered diaphanous fabrics, Juan visualised the invisible changes in atmospheric chemistry that are causing the warming of the planet (Juan 2008). Seaman's iceberg portraits serve to personalise a sense of loss and grief associated with climate change and melting ice. In describing her worldview, Seaman speaks of all living and non-living dimensions of the natural world as an interconnected and inter-related family (Seaman 2014). She talks of the breath and sweat of our ancestors frozen within Antarctic ice (Seaman 2014). Her photographs of icebergs in the books *Last Iceberg* and *Melting Away* are, in essence, portraits of dying relatives (Seaman 2008, 2014). The work of Juan and Seaman exemplifies a planetary awareness and environmental concern that has grown in prominence in Antarctic visual art over the last 20 years. *Antarctic Sun Lines* sits within this genre.

In an era of environmental uncertainties, in which Antarctica has a disproportionate influence on the fate of many ecosystems, life forms and human communities, appreciation of planetary dynamics and human agency within the interconnected whole Earth system needs to be in the forefront of our political, economic, environmental and cultural discourse. These ideas underpin much contemporary Antarctic art, and an essence of Antarcticness can be distilled from the context of current environmental imperatives. Planetary interconnection and interdependence is at the

heart of contemporary Antarcticness. This manifests itself in the continent's relationship with the sun; in the role of Antarctic ice in maintaining ocean and life systems; and in the centrality of Antarctica in Earth systems research and the modelling of environmental futures. Drawing connections – literally and figuratively – is where *Antarctic Sun Lines* and Antarcticness converge.

Notes

1 See http://rezerwatidei.pl/reaction-to-light/the-solaris-project (accessed 18 August 2021).
2 For example: https://www.youtube.com/watch?v=P_gpbDQHe2Q (accessed 18 August 2021).
3 For example: https://solarcan.co.uk (accessed 18 August 2021).
4 See https://sites.google.com/site/livingeyester/home/sun-cycle-1 (accessed 18 August 2021).
5 See https://www.transartists.org/air/theme-polar-arts-program (accessed 18 August 2021).
6 See https://erikablumenfeld.com/works/the-polar-project (accessed 18 August 2021).

References

Andrews, Lynne. 2007. *Antarctic Eye: The visual journey*. Mornington, Tasmania: Studio One.

Batchen, Geoffrey. 1999. *Burning with Desire: The conception of photography*. Cambridge, MA: MIT Press.

Blumenfeld, Erika. 2009. 'What is white'. In *Arte da Antártida: Art from Antarctica*, edited by Alfons Hug, 183–4. Rio de Janeiro: Aeroplano.

Brooks, Shaun T., Julia Jabour and Dana M. Bergstrom. 2018. 'What is "footprint" in Antarctica: Proposing a set of definitions', *Antarctic Science* 30(4): 227–35. https://doi.org/10.1017/S0954102018000172.

Campbell, R.J. 2000. *The Discovery of the South Shetland Islands 1819–1820: The journal of midshipman C.W. Poynter*. London: Hakluyt Society.

Chaturvedi, Sanjay. 2020. 'Foreword'. In *Anthropocene Antarctica: Perspectives from the humanities, law and social science,* edited by Elizabeth Leane and Jeffrey McGee, xi–xiv. Abingdon: Routledge.

Codling, Rosamunde. 1997. 'HMS *Challenger* in the Antarctic: Pictures and photographs from 1874'. *Landscape Research* 22(2): 191–208.

Drury, Chris. 2008. *Antarctica: A heartbeat of the Earth*. London: Beaux Arts.

Elzinga, Aant. 1993. 'Antarctica: The construction of a continent by and for science'. In *Denationalizing Science: Sociology of the sciences. A yearbook*, edited by Elizabeth Crawford, Terry Shinn and Sverker Sörlin, vol. 16, 73–106. Dordrecht: Kluwer.

fstop. 2013. 'Bob Clayden: We Gathered our Photographs and Left @ The Art House'. Accessed 18 August 2021. https://www.fstopmagazine.com/blog/2013/09/bob-clayden-we-gathered-our-photographs-and-left-the-art-house.

Fosbury, Robert and Tarja Trygg. 2010. 'Solargraphs of ESO'. *The Messenger* 141: 43–5.

Fox, William L. 2005a. 'Terra Antarctica: A history of cognition and landscape'. *Archives of Natural History* 32(2): 192–206.

Fox, William L. 2005b. *Terra Antarctica: Looking into the emptiest continent*. San Antonio, TX: Trinity University Press.

Glasberg, Elena. 2012. *Antarctica as Cultural Critique: The gendered politics of scientific exploration and climate change*. New York: Palgrave Macmillan.

Hays, Graeme C. 2017. 'Ocean currents and marine life'. *Current Biology* 27(11): R470–R473.

Hug, Alfons. 2009. *Arte da Antártida: Art from Antarctica*. Rio de Janeiro: Aeroplano.

Hurley, Frank and Tamiko Rex. 2001. *South with Endurance: Shackleton's Antarctic expedition 1914–1917. The photographs of Frank Hurley*. New York: Simon & Schuster.
Ida, Lee, and W.H. Shirreff. 1913. 'The voyages of Captain William Smith and others to the South Shetlands'. *Geographical Journal* 42(4): 36–70. https://doi.org/10.2307/1779065.
IPCC. 2014. *Climate Change 2014: Impacts, adaptation, and vulnerability*. Geneva: IPCC.
Juan, Andrea. 2008. 'Gender on ice gallery: Andrea Juan artist statement'. In *Scholar & Feminist Online: Gender on Ice*, edited by Lisa E. Bloom, Elena Glasberg and Laura Kay, 7(1). Accessed 18 August 2021. http://sfonline.barnard.edu/ice/index.htm.
Lago, Véronique and Matthew H. England. 2019. 'Projected slowdown of Antarctic Bottom Water formation in response to amplified meltwater contributions'. *Journal of Climate* 32(19): 6319–35. https://doi.org/10.1175/JCLI-D-18-0622.1.
Leane, Elizabeth, and Jeffrey McGee (eds). 2020. *Anthropocene Antarctica: Perspectives from the humanities, law and social science*. Abingdon: Routledge.
López Calvín, Diego. No date. 'Introducción a la solarigrafía/About solarigraphy'. Accessed 18 August 2021. http://www.solarigrafia.com/solarigrafia_solarigraphy/Introduccion_Solarigrafia.html.
Marien, Mary W. 2006. *Photography: A cultural history*, 2nd edition. London: Laurence King.
NASA. 2009. 'Thin Blue Line'. Accessed 18 August 2021. https://www.nasa.gov/multimedia/imagegallery/image_feature_1529.html
National Oceanic and Atmospheric Administration. 2021. 'How much oxygen comes from the ocean?' Accessed 18 August 2021. https://oceanservice.noaa.gov/facts/ocean-oxygen.html.
Nicol, Stephen, Anthony Worby and Rebecca Leaper. 2008. 'Changes in the Antarctic sea ice ecosystem: Potential effects on krill and baleen whales'. *Marine and Freshwater Research* 59(5): 361–82. https://doi.org/10.1071/MF07161
Noble, Anne. 2014. *The Last Road*. Auckland: Clouds.
Ponting, Herbert G., Frank Hurley and Jennie Boddington. 1979. *1910–1916 Antarctic Photographs: Herbert Ponting and Frank Hurley. Scott, Mawson and Shackleton expeditions*. Melbourne: Macmillan.
Poole, Robert. 2008. *Earthrise: How man first saw the Earth*. New Haven, CT: Yale University Press.
Porter, Eliot. 1978. *Antarctica*. Auckland: Hutchinson.
Sabin, Brook. 2021. 'Flight to the lights: Onboard Air New Zealand's new aurora hunter'. Accessed 18 August 2021. https://www.stuff.co.nz/travel/kiwi-traveller/300258188/flight-to-the-lights-onboard-air-new-zealands-new-aurora-hunter.
Schulthess, Emil. 1960. *Antarctica*. New York: Simon and Schuster.
Seaman, Camille. 2008. *The Last Iceberg*. Portland, OR: Photolucida.
Seaman, Camille. 2014. *Melting Away: A ten-year journey through our endangered polar regions*. New York: Princeton Architectural Press.
Slater, Paul, Bob Clayden, Adam Strickson and Adele Jackson. 2014. *'Plant-Life-Cycle*: 3 artist residencies at Dewsbury Country Park'. Accessed 18 August 2021. https://plant-life-cycle.tumblr.com.
Stretch, James J., Peggy P. Hamner, William M. Hamner, William C. Michel, Jared Cook and Cornelius W. Sullivan. 1988. 'Foraging behavior of Antarctic krill *Euphausia superba* on sea ice microalgae'. *Marine Ecology Progress Series* 44(2): 131–9.
Sussman, Elisabeth. 2014. 'Foreword'. In *Gondwana: Images of an ancient land*, edited by Diane Tuft, 1–10. New York: Assouline.
Trygg, Tarja. 2006. 'What is solargraphy?' Accessed 18 August 2021. http://www.solargraphy.com/index.php?option=com_content&task=view&id=4&Itemid=5.
Trygg, Tarja. 2017. 'Solargraphy – The art of catching the sun's path through a pinhole camera'. Accessed 18 August 2021. https://www.alternativephotography.com/solargraphy-catching-the-suns-path-pinhole-camera.
Tuft, Diane. 2014. *Gondwana: Images of an ancient land*. New York: Assouline.
van der Watt, Lize-Marié, and Sandra Swart. 2016. 'The whiteness of Antarctica: Race and South Africa's Antarctic history'. In *Antarctica and the Humanities*, edited by Peder Roberts, Lize-Marié van der Watt and Adrian Howkins, 125–56. London: Palgrave Macmillan.
Velasco, Gary. 2004. *Fighting Colors: The creation of military aircraft nose art*. Nashville, TN: Turner.
Walton, David. W.H., and Bruce Pearson. 2006. *White Horizons: British art from Antarctica 1775–2006*. Ipswich: Flying Colours.
Wilson, David M., and Christopher J. Wilson. 2011. *Edward Wilson's Antarctic Notebooks*. Cheltenham: Reardon.

13

Discover, arrive, explore, return

Elizabeth Bradfield

Preparation

Long before it was seen, Antarctica was imagined. Imagined as Eden, as populated by strange winged creatures (which it is, albeit differently than was once envisioned), as portal to the Earth's otherly centre.

As I write, we mark the two-hundredth anniversary of the first confirmed sighting of the Antarctic continent by people sailing with the British ship's master Edward Bransfield, the Russian Fabian von Bellingshausen and/or the American Nathaniel Palmer, depending on who you believe and what you count as official 'seeing'. What strange irony that there will be silence and 'unseeing' this austral summer of 2021 as the novel coronavirus upends travel plans for researchers, tourists, ship crews and facilities workers alike.

I think Antarctica has a sense of humour. I think it laughs, ready to delight in this respite from our presence, the burden of our fascination. I know the skuas are laughing.

We've written so many of our fantastical, commercial, colonial, utopian, dystopian, alien dreams and nightmares onto Antarctica's vastness and isolation from the peopled world. And, held apart by the whirling dervish of the Southern Ocean, it has been big enough and wild enough to absorb them. Apart-ness has been a strength, even as technology's time-folding of communication and travel have changed our experience of its distances (see Chapter 14). We know the world has touched Antarctica's ozone and algae, its weathers and silences. Yet, somehow, the ice holds its own.

Many who have been fortunate enough to visit more than once – for work or pleasure – find their return holds both joy and grief (see Chapter 10). Joy at reuniting with a beloved place and the opportunity to know it more deeply, with a more nuanced sense of normalcy and strangeness. Grief in bearing witness to human impact. In the future, is the right course more 'seeing' or fewer visitors? A fellow naturalist observes, 'The evidence for climate change is right here, but no one will believe it unless they can see it. There are so few people that can get here to see it.'[1] However, we must weigh the consequences of our witnessing with the need to spark active care. How can we be good stewards for this land that is held, unlike any other on our planet, collectively in our custody beyond the demands of nationhood?

This year, we suspend our visitation and our tromping, our peering and ice-breaking. Hopefully this stillness invites consideration as to how we might return with gratitude and care for this land, this ice and all it is home to – penguins, springtails, sheathbills, seals, icefish and more.

What follows is a wonderment, an investigation, a querying of what discovery can mean in its widest, most generous, and humble sense. Words from various visitors – contemporary and historic, tourists and scientists, artists and naturalists – thread through. I am grateful to them for their waypoints in this mapping.

North Truro, Massachusetts, USA, October 2020

i. Discover
– from Old French: to unroof, unveil, betray

What don't you know? What questions
pull you onward like a scent toward
source: last hour's skunk, fresh bread, wild
roses in sun, bluefish roiling under glinted water?

There was the dream, the page-drifted dreaming,
the recognition of your desire, and then

an impending guilt that I wouldn't make the most of it, or appreciate it enough[2]

a glorious breakage
as light shone onto ice
through fog or sleet, through
anticipation's veil
we reckoned ourselves antipodes… squalls attended.[3]

No one finds this place alone. All of us,
every one, has found this shore hard-
won, our arriving buoyed by so many
hands, back home or here, back then or now. But

you do not have to be good.[4]

No one, no matter merit or effort,
is fully prepared for what they will find

rough, passionate, revengeful, but likewise brave, sincere, and true[5]

within themselves.

ii. Arrive
–to reach the end of a journey by sea. From Latin ad ripam*, to the shore.*

Are we there yet? Are we here?
To arrive is not singular but unbounded, ongoing
like the ocean that cinches this place apart.

The cold sucked away my confidence.[6]

Ashore, at last, you see also what can't
be seen, not in the span of time you have,
however long that is. Not in seasons
of arrivals. What you find is your own

brevity, your frustrating,
compressed, intense brevity.

The blessed sun now and then broke through the clouds.[7]

Consider: an Antarctic sponge alive today was born
when woolly mammoths roamed. None of us
are suited to such scale. There was no *us* here
before the decade that birthed braille, friction
matches, the difference engine, Portland cement.

The idea of a place without people is so important.[8]

Here, now, you find imagination's edge.

The screaming of the penguins created a most unpleasant feeling.[9]

Wherever you began

coming from the Philippines everything was unusual[10]

you've arrived to only one of your beginnings.

iii. Explore
– *to cry out; from Latin* ex- *'out'* + plorare *'utter a cry'*

No matter the others and their records.
Whatever first is yours, is yours.

My first discovery in Antarctica was that benthic foraminiferans can move.[11]

You must cast off attachment to certainty.
Sureness comes from the ground that grew you.
This land refuses fixity, is fluid, is ice.

I did not believe the thing credible, I put no faith in these indications.[12]

I know it takes time to leave a life. To shed
what armours you've built for the built world,
what knowledges have been your guides.

It took me so long to get it in my head that we were below treeline and the snow pack had to do with latitude not elevation.[13]

Buried in the word *explore* is sorrow. *Plorare*,
a polar keening for lost unknowns
and also the discovery of new spans
between query and comprehension.

The compasses became very uncertain in their indications.[14]

It doesn't matter that others have had these revelations.

My pride had been washed away.[15]

Go ahead. Let wind and wave scour
you. Let light squint, spume cleanse, let
albatross winging the wake show
that to follow is rich forage, too.

Gather what mnemonics you must

– the cameras of course had to come out –[16]

to shore against your future absence.

Let be be the finale of seem.[17]

Now gentoo, now crabeater. Now sea ice
under Erebus, steaming. Now moss lichen algae
fossil. Now lake buried, river buried, water
flowing slow under thousands of meters of snow –

good-bye to most of the day-dreams![18]

Now hut. Now chain rusted and bound
to rock. And, too, oil drum, whale bone,
pocket-slurry of glove, lip balm, lint.

iv. Return
– first: to come back; then: 1590s, to give in repayment

Simplest of all words yet most bewildered
as you retrace leagues and respool threads
laid in leaving.

my whole body and being yearned to stay in Antarctica
and my mind and heart were so full I didn't know what to do
or even think anymore[19]

Don't mourn. Plot. What's next is to find

How good the memories of those days are.[20]

what you have seen and will do after time
has done its cloudy, sun-pierced work.

Sources

Quotations from explorers are taken from original writings republished in *Antarctica: Firsthand Accounts of Exploration and Endurance*, edited by Charles Neider (New York: Cooper Square Press, 2000). Mary Oliver's poem 'Wild geese' was first collected in her book *Dream Work* (Boston: Atlantic Monthly Press, 1986). Wallace Stevens's poem 'The emperor of ice-cream' was first collected in his debut collection, *Harmonium* (New York: Knopf, 1923). All quotations dated 2020 are from personal correspondence with Antarctic naturalists/guides, grant recipients and tourists. Of course, those categories often overlap.

Notes

1 Linda Burback, 2020.
2 Luke Kenny, 2020.
3 Capt. James Cook, 1773.
4 Mary Oliver, 'Wild geese',1986.
5 George Forster, 1773.
6 Charles Hood, 2020.
7 Thaddeus Bellingshausen, 1880.
8 Lisa Sette, 2020.
9 James Weddell, 1822.
10 Dom Del Rosario, 2020.
11 Michaela Mayer, 2020.
12 Charles Wilkes, 1838.
13 Camille Dungy, 2020.
14 James Clark Ross, 1841.
15 Jason Kelley, 2020.
16 Roald Amundsen, 1910.
17 Wallace Stevens, 'The emperor of ice-cream', 1922.
18 Sir Robert Falcon Scott, 1910.
19 Kara Weller, 2020.
20 Apsley Cherry-Garrard, 1911.

14

Experiencing Antarcticness: slow tourists, fast penguins and timeless landscapes

Daniela Cajiao and Yu-Fai Leung

What is Antarcticness? In some senses, this question can be answered easily by describing the continent's extremes, being the coolest, the driest and the windiest place on Earth, its sheer size and space, its expansive ice cover, its amazingly adaptive biota and more (Liggett et al. 2015). This makes sense, because Antarctica has no indigenous peoples or permanent culture to speak of. In comparison, for the companion volume to this one, *Arcticness* (Kelman 2017), its contributing authors interweaved rich cultural history into the description of Arcticness. These socio-cultural attributes are absent in Antarctica.

Yet the characterisation of Antarcticness would be incomplete with only a biophysical description, however comprehensive or sophisticated it is. There is a glorious history of human exploration of this majestic last frontier. The early explorers were the first to encounter and suffer from the formidable elements of Antarctica. There is a sobering history of human exploitation of Antarctic resources. There are also wonderful stories of scientific expeditions that show how science can take hold and progress at the mercy of Antarcticness. Dedicated scientists collect precious data that helps unveil many mysteries of Antarctica, improving our understanding of the natural history of the continent and its global relevance, both in terms of how it regulates global ecosystems and how it is affected by global processes such as climate change. Finally, there are intriguing political manoeuvres and policy discourse in the Antarctic Treaty System. How the human engagement with Antarctica is governed and what lies ahead in the future fascinate scholars in social sciences and other disciplines.

This chapter is about a specific human dimension of Antarcticness: how is it experienced emotionally and cognitively. How do humans perceive, immerse ourselves in and reflect on the unique character of Antarctica? Answers to these questions depend on our identity when engaging with Antarctica – whether you are a scientist, logistical staff, tour guide or tourist. In this chapter, we explore this experiential dimension through the lens of tourists and researchers, given our research focus and identity. We take an integrated perspective, which includes how we have experienced Antarcticness as researchers, what we have observed from other colleagues and tourists during our journeys, and what we have learned from the published literature on Antarctic tourism. As Antarctic tourism is growing and diversifying in the age of technology and social media, it is imperative to reflect on the unique experience with Antarctica treasured by tourists and how this 'transformative' experience is relevant to future generations.

This chapter begins with a brief overview of the Antarctic tourism industry, followed by a description of the challenging nature of Antarctic tour journeys. The latter may serve as an effective way to slow down tourists' pace and open up their senses, preparing mindful visitors to experience elements of Antarcticness and elevate their awareness of ecological footprints. Through the discussion, we merge scientific findings on Antarctic tourist experiences with our own Antarctic journeys, in which the slower pace and closer encounters led us to transformative experiences through interactions with wildlife and landscapes. We conclude this chapter by describing the potential threats to the Antarcticness experience and what actions may be needed to protect such an experience.

Antarctic tourism in brief

Before we discuss further the experience of Antarcticness, we provide a brief overview of Antarctic tourism for context. Travelling as tourists is a primary pathway for ordinary citizens who seek to experience Antarctica in a safe environment supported by modern vessel technology and well-trained tour operators and guides. Commercial tourism in Antarctica began in the late 1950s with a few overflights and cruises, and it grew significantly in the 1990s and early 2000s (Bauer and Dowling 2009). In 1956, the first documented tourist flight to Antarctica was operated by LAN-Chile from Tierra del Fuego and overflew the South Shetlands and the Antarctic Peninsula. Ten years later, Lars-Eric Lindblad began offering

regular trips to the Antarctic. Since then, expedition cruises to the Antarctic Peninsula, the traditional cruise modality, have been an annual feature offered by other tour operators (Liggett et al. 2011). Commercial tourist flights to Antarctica involving landings were slow to develop, but increased gradually during the 1980s and 1990s. Since 2003, commercial flights have expanded more rapidly into different modalities and activities (Stonehouse and Snyder 2010).

In the 2019–20 season, the International Association of Antarctica Tour Operators (IAATO) reported a total of 74,851 tourists visiting the continent, representing a 32 per cent increase compared with the 2018–19 season (IAATO 2020; Carey 2020). Meanwhile, tourism diversification has resulted in new operations, variations in modalities (e.g. seaborne and air-based trips), different lengths of the journey, and an expanding portfolio of tourist activities from 7 to 49 (IAATO 2019). Flights are now connecting tourists with cruise ships at King George Island, diversifying not only the mode of transport, but also the length, depth and intensity of itineraries and activities in Antarctica.

Most of the tourism activities involving landings take place in the Western Antarctic Peninsula region, resulting in a high concentration of visitors on specific sites (Bender et al. 2016; Lynch et al. 2010). Ninety-eight per cent of all tourism on the continent takes place in a small zone only about 500 kilometres in length (Carey 2020). Bender et al. (2016) concluded that if the total area used by tourists at the 24 most popular landing sites in 2012–13 is aggregated, 77 per cent of all landings occurred on no more than 2 km^2 of land, typically where high-value natural elements are present. There are uncertainties, as booming tourist numbers could push the voluntary self-regulatory system to a breaking point with potentially more non-IAATO tour operators (McClanahan 2020).

The Antarctic Treaty and its related agreements, collectively known as the Antarctic Treaty System (ATS), regulate the uses and management of Antarctic resources and services, including tourism. Resolutions and visitor site guidelines are examples of management instruments adopted by the Treaty Parties to establish procedures and regulations regarding general and site-specific tourism affairs. The first recommendations for visitor activities date back to 1966, when Treaty Parties specified the conditions under which tourist groups could be granted permission to visit research stations. In the ensuing years, the number of visitors continued to increase, and tourism became a recurring topic among the Treaty Parties, prompting the development of more recommendations and guidance for Antarctic visitors (ATS 2021).

By the end of the 1980s, the tourism industry began to organise itself collectively, proposing its own guidelines. IAATO was founded in 1991 to represent the majority of operations developed in the Antarctic and is currently the organisation bridging communication among operators and the Treaty Parties. After the Treaty Parties encouraged IAATO to produce site-specific guidelines for high-use visited sites in 1996, the first series of visitor site guidelines was introduced in 2002. Since then, new guidelines have been developed and some current ones modified, with a total of 42 guidelines as of 2019. These voluntary guidelines constitute the primary mechanism to provide specific advice for tourism activities developed at highly visited sites. Visitor site guidelines establish minimum viewing distances for wildlife observation. Specifically, the guidelines recommend: (1) a viewing distance of 5 metres from wildlife when people are ashore, (2) increased distance if any change in behaviour is observed, (3) maintaining quiet and (4) moving at low speed (IAATO 2019).

Approaching the world of Antarcticness: the challenging journey

It is no secret that the journey to and from Antarctica can be rough. An important part of the challenge stems from the unpredictability of the journey due to highly dynamic weather conditions, even in the austral summer. The unpredictability commonly causes delays, adjusted itineraries and changed landing activities, although many of these adjustments are done seamlessly by tour or expedition vessel operators 'behind the scenes'. Another challenge is physical: rough seas through the Drake Passage can put a lot of demand of the human body, a test of endurance (see Chapter 10).

There are plenty of descriptions of the toughness and danger of the voyages by early Antarctic explorers. The extraordinary sagas of endurance made legends of Shackleton, Amundsen and Scott, as portrayed vividly in books and movies. Grim drawings of ill-fated vessels engulfed by the Antarctic darkness, perpetuate the impression that during an Antarctic journey, humans can be subject to unforgiving Antarctic elemental forces at any point (Collier and Collier 1999). Perhaps these accounts of challenges and adaptations of the early explorers set a cautionary tone for expeditioners and tourists nowadays to respect and prepare for what they may encounter as they embark on their Antarctic journey (see Chapters 6, 10 and 13).

14.1 The authors on board the Spanish research vessel *Hésperides* from King George Island to Greenwich Island in December 2019. The weather and sea conditions were pleasant on that day, but such conditions are also subject to change. Photograph by Yu-Fai Leung, 2019.

Accounts of scientific expeditions have described a fair share of challenges. Chapters 4 and 16 in this volume, as well as Walker (2013), include many stories of how researchers in the field had to prepare for and negotiate with the dynamic weather and sudden storm events. We personally have experienced frequent flight or vessel schedule changes ranging from a few hours to a few days (Figure 14.1). Among the nine Antarctic journeys taken by the first author, only two kept to the original itineraries. As for the second author, his first Antarctic journey was met with delays in both directions. These changes were due not only to the dynamic weather, but also to complex logistical challenges, including a Chilean plane crash that postponed the inbound flight by the Brazilian Air Force for six days.

As Antarctic tourism has become more popular in the past three decades, mass and social media have picked up the trend and offered colourful accounts of Antarctic voyages from tourists' perspectives (for example, see CNN 2021). The treacherous Drake Passage is certainly something many Antarctic YouTube videos and social media posts want to highlight (see IAATO 2021). Popular guidebooks, such as the *Lonely*

Planet guide, set the expectation up front by stating that 'everyone – scientist, support worker, government official and tourist – who comes to this isolated continent must "earn" it, whether by sea voyage or flight. Ice and weather, not clocks and calendars, determine the itinerary and the timetable of all travel here' (Averbuck and Brown 2017, 4). Tourists themselves reflect on these challenges in photos, blogs and social media (Roura 2012; Wang 2016). Despite the anticipated challenges, most tourists are excited about the scenery, ice, wildlife, and the sights and sounds that constitute the Antarctic experience in which they are going to immerse themselves (Maher et al. 2006).

The challenges of the earlier explorers can now be relived, to a certain extent, by the paying public, even though, in reality, their journey is well planned with safety as the top priority. In fact, because of the uncertainties, tour operators do not promise a fixed itinerary, and they typically make landing and activity decisions the night before, based on the latest weather and environmental conditions. Through good communication and expectation management, most Antarctic tourists understand this unpredictable nature of their journey. They are willing to pay for their tour without being promised what they will see or do on a day-to-day basis. They learn to tolerate the discomfort of the rough sea and to be patient to wait for their desired activities.

Slow tourists, mindful tourists

'Travel too fast and you miss all you travel for' (Germann 2017, 15).
Many Antarctic tourists come from fast-paced cities and are accustomed to traditional tour itineraries with an elaborated programme of activities on a fixed timetable. The Antarctic voyage draws a sharp contrast when the tourists are willing to be patient and accepting of unplanned experiences. These travel conditions might sound suboptimal, but they may provide an important opportunity for tourists to slow down, to reflect on various trip and educational materials provided by the tour operator in advance (Mortimer and Prior 2009), and to align their body, mind and senses with the elements of Antarcticness upon arrival (see Chapter 9). In other words, the challenging voyage may facilitate what the literature refers to as a slow tourism experience – which itself might characterise Antarcticness, especially a tourist's Antarcticness. This change in pace and expectation is also common for scientists who want to do a lot during their expedition, but find themselves in the midst of logistical uncertainties (see Chapters 4 and 16).

The concept of slow tourism first emerged in the early twenty-first century with an influence from the slow food movement and the Cittaslow movement which was founded to improve the quality of urban life by slowing down (Clancy 2017). According to Gardner (2009), slow tourism represents the frame of mind of the traveller who wants to spend time discovering a landscape and awaking sensations. For slow tourism, transport is not just the means of arriving at a destination, but also constitutes an opportunity for experience and interaction with the local hosts as well as the natural environment (Calzati and Salvo 2017). Slow tourists can be increasingly influenced by their heightened sense of responsibility towards the environment and the search for meaningful experiences.

Antarctic tourism can be a slow tourism experience. Picard and Zuev (2014) suggest that the journey to and through the Antarctic is marked by three phases: travel to, and through, and back home (see also Chapter 13). They argue that these phases constitute a process of transition in which tourists can be subject to a transformative experience. One of the most remarkable changes is the sensation of separation when one abandons civilisation to immerse oneself in the natural world, filled with elements of Antarcticness – the vastness, tranquillity and timelessness – resulting in the feeling of isolation and awe (Powell et al. 2012). Such overwhelming experience gained from a slower pace may help tourists form a spiritual connection with nature (see Chapters 8, 9 and 14), facilitating their awareness, appreciation and understanding of the fragility and vulnerability of this unique place. Conceivably, regardless of their country of origin, age or level of education, tourists may become more mindful about their responsibility towards Antarctica's future and trigger a self-assessment of the footprint that human activities, including tourism, could cause to the environment.

To increase mindfulness and pro-environmental behaviour of Antarctic tourists, perhaps creating Antarcticness, the role of passionate guides as storytellers who advocate for the conservation of the continent is crucial. Moscardo (2008, 2017) has emphasised that the use of stories to organise and present information is more likely to support tourists' learning and changes in attitudes. Morgan (2010) suggests that travel represents a potential vehicle for transformative education and learning. Indeed, undertaking a journey that involves a profound space for reflections and mindfulness, like the Antarctic one, may provoke sufficient disruption of one's worldview. If everyone is transformed by travel to some degree, as Morgan (2010) suggests, then Antarctic tourists arguably have some of the best chances to transform themselves and become

14.2 Site management actions taken by tour operators to minimise disturbance to wildlife and improve safety for visitors at Port Charcot. The black path was set up temporarily for tourists to walk on the ice safely. Flags were used to mark the path for tourists to follow in order to delimit the trampled areas. The tourists on this visit were compliant with all site guidelines. Photograph by Daniela Cajiao, 2020.

mindful citizens through their interactions with the elements of Antarcticness.

Do slow and mindful tourists really make 'better' tourists? Research in other settings has shown that mindful tourists prefer information and educational services, which would contribute to their learning outcomes and environmental awareness (Frauman and Norman 2004). Such a linkage is yet to be established in the Antarctic context. From what we have observed in multiple years, Antarctic tourists did show high compliance with IAATO's visitor site guidelines as seen in Figure 14.2, although non-compliant behaviour of tourists might still occur (Roura 2012).

We are conducting an ongoing study analysing Antarctic tourists' motivations, experiences and pro-environmental outcomes. We identified at least four different motivation-based typologies of Antarctic tourists. Even though each typology presents different nuances, the Antarctic experience is producing changes and transforming people to some degree and in different aspects. We also found that the journey provoked a deep

sense of immersion, transformation, connection and advocacy for nature, as revealed by quotations from tourists:

> I will be forever changed. For the better.

> Made me realise that the toughest location of the Earth is also very fragile. Also realise how small and insignificant we are as a human being.
>
> Filled me with awe and respect for nature. Made me even more conscious of climate change. Made me want to advocate for Antarctica.
>
> It certainly has made me more passionate about protecting our environment. I hope that Antarctica can be protected from change. We must be vigilant in understanding how fragile our environment is to help to protect it.

Our transformative experiences

'If you have been to Antarctica once, you are hooked for life.'

While most of our Antarctic journeys took place on scientific expedition vessels, our experiences bear some similarities with the slow, mindful and transformative experiences described above. Since 2011, the first author has made nine trips (including eight research expeditions) to the Antarctic Peninsula region as part of the Ecuadorian and Spanish Antarctic research teams. The second author joined the Ecuadorian expedition for the first time in the 2019–20 summer season. We both experienced logistical challenges of getting to Antarctica and back, slowing us down on many occasions, but also affording us unexpected opportunities to experience the elements of Antarcticness. Ultimately, our field research activities brought us even closer to Antarctic landscapes and wildlife, especially penguins.

Our expeditions were based on Greenwich Island, where Ecuador's Maldonado Scientific Station is located, while our research took us to Barrientos (Aitcho) Island, where penguin experiments and tourist observations were conducted. Our fieldwork schedule was dictated by the sea and wind conditions, particularly whether inter-island commute by zodiac boats was safe, even though on a good day this commute takes only about 15 minutes. On the days when we had to stay put at the scientific station, we took short excursions around Greenwich to explore the landscape, glaciers, rocks, mosses, lichens and wildlife, such as elephant seals, penguins and other birds.

On our respective first Antarctic journeys, we were greeted by different but unforgettable scenes. The first author was thoroughly impressed by the enormous size of the ice and white space in front of her eyes upon arrival. These sublime images were engrained on her mind quickly as her first experience of Antarcticness. The second author's first sight of Antarctica was ice-covered landscapes on King George Island from the air. It was an emotional feeling after awaiting in Punta Arenas for six days, but this first airborne impression was soon augmented by the delightful greetings from all three brush-tailed (*Pygoscelis*) penguin species – gentoo (*P. papua*), chinstrap (*P. antarctica*) and Adélie (*P. adeliae*) – at the Uruguayan Artigas research base where the Ecuadorian team was waiting for a vessel transfer.

On subsequent visits, we were greeted by the same landscape and white space that did not seem to change a bit over time. This sense of timelessness and stillness is profound; it is like coming home when visiting Antarctica each time.

While the mountains, rocks and seas seem like unchanged constants, we have experienced many dynamic elements of Antarctica, including inclement weather, as well as some of the most amazing sights and sounds of tumbling ice from the edges of glacier to the sea. We have observed many changes during different visits. Some, such as steady decreases in ice cover, were clearly visible, but other observations were due to our mindful inspections of the biota in relation to fieldwork and consequent increase in knowledge of the ecosystems. For example, we observed the incremental recovery of previously trampled tourist trails on Barrientos Island as revealed by the colour changes in moss composition each year. While slow and meticulous fieldwork helped us detect ecological features that could have been missed, the close-up inspections also increased the resolution at which we were able to discern the diversity of mosses and lichens, which would be considered as uniform patches if observed from a distance.

During different visits, we encountered countless penguins and many other wildlife species. The hustle and bustle of fast-moving penguins rushing to the sea or back to their nests to feed their chicks is the most lively element of Antarcticness. Our penguin encounters included some direct confrontations, when curious penguins tried to take possession of our tape measures or disturbed our camera tripods. As for other species, one notable change we observed was the decreasing number of southern elephant seals (*Mirounga leonina*) hanging out on Barrientos Island, from as many as 69 in the early 2010s to only a few on the 2019–20 visit. This could be a change in their distribution patterns, a part of population dynamics or a result of other factors at play.

14.3 The authors conducting a field experiment and observing the behaviour of chinstrap penguins on Barrientos Island. Photograph by Yu-Fai Leung, 2020.

We also observed tourists during different visits. We were always warmly greeted by tour guides. From our observations, tour guides were all diligent in preparing the visitor site to ensure that tourists, once they arrived ashore, were confined to temporarily marked routes. Most tourists appeared to maintain the minimum viewing distance from penguins and other wildlife, even though such distance could be hard to maintain with dynamic movements between tourists and penguins.

Part of our research is examining Antarctic tourists' experiential and learning outcomes. Another part of our research is about behavioural responses of gentoo (*P. papua*) and chinstrap (*P. antarcticus*) penguins to simulated tourist activities during their land excursions (Figure 14.3). In our 53 field experiments spanning two and a half weeks, we came into close contact with penguin colonies. On the first field day to Barrientos, our biggest impression was the busy penguins on the South Beach as much as the intense 'penguin perfume' – the smell from penguin poop all over the island. While moving around the study colonies and performing the experiments, we had time to observe many aspects of penguins' life on the island. We were intrigued by their breeding and feeding behaviour, amused by their fast walks and funny gestures, and lamented the inevitable loss of cute penguin chicks to skuas (*Stercorarius antarcticus*) and other predators in front of our eyes. The more we have observed and

learned about penguins, the more we have become impressed with, and inspired by, their toughness, persistence and sense of purpose and direction.

Through our encounters with the White Continent, its wild and untamed space, its majestic landscape and seascape, and its truly amazing wildlife, we came to the conclusion that this place is worthy of devotion of our ideas, time and energy to make a contribution to its sustainable future. We understand the challenges ahead in terms of logistics, funding and capacity, but we proceed as purposefully and persistently as the fast-moving penguins.

Future outlooks

Like the timeless Antarctic landscape – overlaid with all the changes, so that this duality contributes to Antarcticness – and the constantly huddled wildlife, the perception of Antarcticness may seem to be omnipresent whenever humans have a chance to approach the continent, from the earliest explorers to the future generations. The reality is that many aspects of Antarctica are changing: its ice shelves, glaciers, sea ice, land cover, wildlife and more. These changes are driven by multiple factors, which by and large are associated with the warming global climate.

The physical changes occurring in Antarctica, especially in the Antarctic Peninsula, coincide with changes in the way tourists approach and experience Antarctica and, hence, Antarcticness. The diversification of tourism modalities generates short-term and all-flying options in which tourists no longer expect the inconveniences of time and discomfort through the Drake Passage. This seems to be good news for people who now have faster and less demanding options for an Antarctica journey. Tourists are also offered more activities on board their vessel and while ashore, giving new ways of experiencing Antarctica. As these trends continue, we wonder if these new ways of tourism may present potential threats to the traditional Antarctic experience through slow and mindful encounters with the elements of Antarcticness?

If the sense of Antarcticness represents the essence of a true wilderness experience that can be transformative (Chapter 9), then it is imperative to be proactive in thinking how the opportunities for such an experience should be maintained. Research is needed to explore the meaning of an Antarcticness experience and how its quality is defined among tourists using different modalities, with different motivations and from different markets. Results would inform the tourism sector on their

education and information strategies before, during and after the Antarctic journey. From a strategic perspective, we hope that the sense of Antarcticness will be maintained and reinforced through a more proactive and comprehensive management of tourism. To achieve this goal, everyone involved in Antarctica will need to play an essential role in designing and establishing appropriate frameworks of cooperation that would enable effective and efficient management of Antarctic's nature and its treasured experience.

References

ATS [Antarctic Treaty Secretariat]. 2021. 'Tourism and non-governmental activities'. Accessed 25 August 2021. https://www.ats.aq/e/tourism.html.

Averbuck, Alexis, and Cathy Brown. 2017. *Lonely Planet: Antarctica*, sixth edition. Oakland, CA: Lonely Planet.

Bauer, Thomas, and Ross Dowling. 2009. 'Ecotourism policies and issues in Antarctica'. In *Ecotourism Policy and Planning*, edited by David A. Fennell and Ross K. Dowling, 309–29. Wallingford: CABI.

Bender, Nicole A., Kim Crosbie and Heather J. Lynch. 2016. 'Patterns of tourism in the Antarctic Peninsula region: A 20-year analysis'. *Antarctic Science* 28: 194–203.

Calzati, Viviana, and Paola de Salvo. 2017. 'Slow tourism: A theoretical framework'. In *Slow Tourism, Food and Cities: Pace and the search for the 'good life'*, edited by Michael Clancy, 32–49. London: Routledge.

Carey, Peter W. 2020. 'A growing tourism industry in the Antarctic: Challenges and opportunities'. In *The White Continent and South America: Climate change, global policy, and the future of scientific cooperation in Antarctica*, edited by Anders Beal, 91–108. Washington, DC: Wilson Center.

Clancy, Michael, ed. 2017. *Slow Tourism, Food and Cities: Pace and the search for the 'good life'*. London: Routledge.

CNN. 2021. 'Protecting the Antarctic'. Accessed 3 September 2021. https://www.cnn.com/interactive/2018/06/world/antarctica/.

Collier, Graham, and Patricia G. Collier. 1999. *Antarctic Odyssey: In the footsteps of the south polar explorers*. New York: Carroll & Graf.

Frauman, Eric, and William C. Norman. 2004. 'Mindfulness as a tool for managing visitors to tourism destinations'. *Journal of Travel Research* 42: 381–9.

Gardner, Nicky. 2009. 'A manifesto for slow travel'. *Hidden Europe* 25: 10–14.

Germann, Jennie. 2017. 'Travel too fast and you miss all you travel for: Slower mobilities and the politics of pace'. In *Slow Tourism, Food and Cities: Pace and the search for the 'good life'*, edited by Michael Clancy, 32–49. London: Routledge.

IAATO [International Association of Antarctica Tour Operators]. 2019. 'Antarctic tourism statistics 2018–2019'. Accessed 25 August 2021. https://iaato.org/tourism-statistics-327mnsyd.

IAATO. 2020. 'Data & statistics'. Accessed 25 August 2021. https://iaato.org/tourism-statistics.

IAATO. 2021. 'Antarctica is the most hostile place on Earth'. Twitter post, 14 January 2021. Accessed 20 April 2021. https://twitter.com/iaato_org/status/1349841224077860866.

Kelman, Ilan, ed. 2017. *Arcticness: Power and voice from the north*. London: UCL Press.

Liggett, Daniela, Alison McIntosh, Anna Thompson, Neil Gilbert and Bryan Storey. 2011. 'From frozen continent to tourism hotspot? Five decades of Antarctic tourism development and management, and a glimpse into the future'. *Tourism Management* 32: 357–66.

Liggett, Daniela, Bryan Storey, Yvonne Cook and Veronika Medunam, eds. 2015. *Exploring the Last Continent: An introduction to Antarctica*. New York: Springer.

Lynch, Heather J., Kim Crosbie, William F. Fagan and Ron Naveen. 2010. 'Spatial patterns of tour ship traffic in the Antarctic Peninsula region'. *Antarctic Science* 22(2): 123–30.

Maher, Patrick T., Alison J. McIntosh and Gary D. Steel. 2006. 'Examining dimensions of anticipation: Inputs prior to visiting the Ross Sea Region, Antarctica'. *Tourism in Marine Environments* 2: 51–63.
McClanahan, Paige. 2020. 'Tourism in Antarctica: Edging toward the (risky) mainstream'. *New York Times*, 26 February 2020.
Morgan, Alun David. 2010. 'Journeys into transformation: Travel to an "other" place as a vehicle for transformative learning'. *Journal of Transformative Education* 8: 246–68.
Mortimer, Greg, and Elaine Prior. 2009. 'Antarctic tourism: An operator's perspective'. In *Health of Antarctic Wildlife: A challenge for science and policy*, edited by Knowles R. Kerry and Martin J. Riddle, 231–40. Heidelberg: Springer.
Moscardo, Gianna. 2008. 'Understanding tourist experience through mindfulness theory'. In *Handbook of Tourist Behaviour*, edited by Metin Kozak and Alain DeCrop, 99–115. London: Routledge.
Moscardo, Gianna. 2017. 'Exploring mindfulness and stories in tourist experiences'. *International Journal of Culture, Tourism and Hospitality Research* 11: 111–24.
Picard, David, and Dennis Zuev. 2014. 'The tourist plot: Antarctica and the modernity of nature'. *Annals of Tourism Research* 45: 102–15.
Powell, Robert B., Matthew T.J. Brownlee, Stephen R. Kellert and Sam H. Ham. 2012. 'From awe to satisfaction: Immediate affective responses to the Antarctic tourism experience'. *Polar Record* 48(2): 145–56.
Roura, Ricardo M. 2012. 'Being there: Examining the behaviour of Antarctic tourists through their blogs'. *Polar Research* 31: article 10905.
Stonehouse, Bernard, and John Snyder. 2010. *Polar Tourism: An environmental perspective*. Bristol: Channel Views.
Walker, Gabrielle. 2013. *Antarctica: An intimate portrait of the world's most mysterious continent*. London: Bloomsbury.
Wang, Ke. 2016. 'Research on travel image in Antarctica: Based on an exploration in the Mafengwo blogs'. *Tourism Overview* 3: 159–63.

15

The world's greatest laboratory? Antarcticness as the relationship between Antarctica and science

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In 2020, the UK and several other countries celebrated the two-hundredth anniversary of the assumed 'Discovery of Antarctica', marking a relationship with the Antarctic continent which had spanned two known centuries (House of Lords Library 2020). Over the course of Antarctic history, science has played a series of important roles. Glasberg (2012, xix) noted the ways in which Antarctica had been subject to the efforts of 'a succession of expert actors, from national heroes and military men of the twentieth century, to the adventurers, scientists and support workers, tourists and state-supported artists of the present day'. This chapter explores some of the various relationships which have existed between science and the southernmost continent, considering how science contributes to Antarcticness, from the science carried out by the early explorers of Antarctica to the role that science plays in the governance, conservation and future of the Antarctic continent.

The Heroic Era: exploration and science in Antarctica

The Heroic Era of Antarctic exploration is considered to have begun in 1895, at the International Geographical Congress in London, where attendees were encouraged to unveil the mysteries of the Southern Continent (Clancy et al. 2014). The Heroic Era was a time during which copious expeditions were funded for Antarctic exploration and scientific

endeavour, and is considered to have lasted until 1916 or thereabouts (Liggett et al. 2015).

For British explorers and scientists, Antarctica, the South Pole in particular, had taken on 'aspects of a holy grail' (Larson 2011, 2). The UK's Royal Geographical Society and Royal Society, in response to the call for more Antarctic expeditions at the International Geographical Congress, funded a series of British expeditions (Clancy et al. 2014). Science was said to be an integral component of these expeditions, conflating science and Antarcticness, as British geographers and explorers 'saw themselves as scientists and their expeditions as grand enterprises of science' (Larson 2011, 2). There was an emphasis on not simply exploring for exploring's sake, but on conducting research along the way (Larson 2011).

This era was also characterised by an interest in colonising the Antarctic continent (compare to Chapter 7), and using expeditions to justify claims to Antarctic territory (Chapter 5). Argentina was the first state to pursue (and achieve) an ostensibly permanent presence, but the UK was the first to officially submit a claim to Antarctic Territory in 1908 (Liggett et al. 2015). This was followed by further claims to Antarctic territory. New Zealand began administering the Ross Sea region in 1923, France claimed Adélie Land in 1924, a large sector was claimed by Australia, Norway claimed its own Antarctic territory (with undefined northern and southern limits) in 1939, in 1940 Argentina claimed the Antarctic Peninsula region claimed by Britain, and Chile also laid claim to the same area in 1943 (Liggett et al. 2015). In many ways, scientific endeavour was used to justify an effective presence on the continent, and during British expeditions, emphasis was placed not only on the value of the scientific knowledge gained, but also on the flag-planting ceremonies and the claiming of territory in the name of the British Empire (Larson 2011). The mixture of ideals shows the ever-shifting nature of assumed Antarcticness, linking science and colonialism.

The well-known explorers from the Heroic Era had differing opinions on the value of science to an Antarctic expedition. The first two explorers to reach the South Pole are often used to describe these approaches to science and exploration in the Antarctic, producing contrasting views of the Antarctic–science relationship which might represent Antarcticness. Roald Amundsen, the Norwegian explorer who reached the South Pole first, having assured the backers who provided him with his ship that he would be studying Arctic drift, set off for the Antarctic instead, determined to be the first to reach the South Pole (Larson 2011). Despite his achievements, his reception at the Royal Geographical Society and across Britain during

his lecture tour describing his exploits was decidedly frosty, and Amundsen was slighted at every turn by British audiences, who supposedly took issue with his lack of scientific devotion (Larson 2011). Robert Falcon Scott, the British officer who had also set out for the South Pole, is often said to have been a dedicated scientist, and this supposed difference between him and Amundsen was illustrated by those reporting on the race between the two to reach the South Pole, noting that 'it is to be remembered that, unlike the Amundsen, the Scott expedition had much scientific work to perform' (Larson 2011, 21).

When it became clear that the Norwegian expedition team had been the first to reach the South Pole, the scientific value of the Scott expedition was much emphasised, with the official comments from the Royal Geographical Society, which funded Scott's work, stating that the object of the expedition 'was valuable research in every branch of science' (Larson 2011, 23). Scott's small party perished on the return journey from the South Pole, with one contribution to their difficulties often suggested as being their decision to carry on collecting geological specimens on their trip back to their ship (Larson 2011). The tragic loss of the expedition led to the increase in scientific significance ascribed to it – using the science to represent Antarcticness – with many noting that it was considered to have contributed greatly to scientific knowledge, and referring to the expedition as 'more modern and substantive than Amundsen's' (Larson 2011, 287).

During the Heroic Era, science was used to validate and quantify the efforts to explore the continent, the relationship of which could be taken to represent Antarcticness, and to disparage expeditions that were not scientific enough. Science was not only a way of validating expeditions to the Antarctic, but also employed to justify colonial presence on the continent, which was later used to support official claims to Antarctic territory.

'The world's greatest laboratory': twentieth-century science in Antarctica

The period that followed the Heroic Era saw scientific activity replacing explorers' expeditions, further solidifying the science–Antarctic relationship as Antarcticness. The First World War diverted attention and funds from the Antarctic, and it was not until the interwar years that interest in Antarctica was matched by funds for scientific research activities.

In the interwar years, there was a shift away from expeditions with a primary focus on exploration, and the introduction of new technologies such as aircraft to the continent (Gould 1971, from where this chapter's title comes). One of the most prolific visitors to the Antarctic continent during this period was the American naval officer Richard E. Byrd, who spent the best part of two decades collecting scientific data on the continent, and establishing an American presence in the Antarctic (Badminton 2017). Byrd's career in Antarctica can be split into three distinct phases. In the first phase, in the late 1920s, he established a base on the Ross Ice Shelf, which he named 'Little America', and from which he launched a flight over the South Pole (Glasberg 2012). For his second expedition, he overwintered on the continent alone, having established a second, larger version of Little America for his colleagues (Badminton 2017). In his later expeditions during the Second World War, Byrd's work was logistically supported by the US Navy, heralding the advent of bigger scientific projects, requiring vast amounts of logistical support on the continent (Glasberg 2012).

The territorial implications of the scientific work taking place on the continent after the Heroic Era were far more overt. The colonial undertones of creating a permanent Antarctic structure named 'Little America' were not lost on Byrd (Badminton 2017). He also linked his scientific endeavours to the possibility of governing or laying claim to Antarctica, and urged staff at the State Department to make a claim to Antarctic territory under the Hughes Doctrine, using his activities as examples of effective occupation (Kikkert 2015). Alongside this more overt link between science and political agendas at this time, Glasberg (2012, 6–7) argues that in the post-war period, 'dewy-eyed imperialism gave way to globalised twentieth-century transnational capitalism in Antarctica' and that Byrd's activities were integral to this shift.

Lloyd Berkner, a scientist who had worked on Byrd's first expedition to Antarctica, was integral to changing the relationship between science and the continent in the post-war period. Following his work in Antarctica, he went on to work for the Department of Terrestrial Magnetism of the Carnegie Institute of Washington, and in April 1950, at a dinner party with several other upper atmosphere physicists, he suggested that it was time to organise another International Polar Year (IPY), given that there was a period of maximum solar activity expected during 1957 and 1958 (Glasberg 2012). The conversation that followed would lead to the creation of the International Geophysical Year (IGY), with many of the dinner guests finding themselves on the organising committee (Needell 2010).

Whereas the two previous IPYs had involved programmes of research which primarily focused on the Arctic, the IGY programme of research covered the globe and was the first IPY to involve substantial research in both polar regions (Needell 2010). To coordinate the scientific research taking place during the IGY, the International Council of Scientific Unions (ICSU) created the Scientific Committee on Antarctic Research (SCAR), a body which brought together scientists from 12 different countries and organised the research taking place on and around the Southern Continent; the open sharing of results from the research; and the dissemination of the research in the years that followed (Launius 2010). SCAR has been lauded for managing to create an effective and open atmosphere of collaboration – possibly a characteristic of Antarcticness through science – between the US and USSR IGY programmes in Antarctica, at a time of great political tension between the two superpowers (Walton and Clarkson 2011). The IGY was referred to as 'the greatest peacetime activity in man's history' by the executive director of the US National Committee of the IGY (Walton and Clarkson 2011, 2–3).

The IGY created political goodwill which supported the negotiation and ratification of the 1959 Antarctic Treaty, aiming to preserve the use of Antarctica for peace and science (Gould 1971), so the IGY is often lauded as a triumph of science over politics. The more critical historiographies of the IGY and the events leading up to it tell a different story. One example focuses on the joint Norwegian-British-Swedish Expedition to Antarctica during the IGY, which at the time was an expedition very much in defiance of the new dominance of superpowers in Antarctica and therefore inherently political in nature: Over time 'it has been reinterpreted as an apolitical and cooperative venture, which has fitted neatly into narratives of progress, from belligerent nationalism to the Antarctic Treaty' (Roberts 2013, 66). Glasberg (2012, xx) also aptly sums up the attitudes of many of the countries taking part in the IGY Antarctic research programme, noting that the shift from exploration to science in the post-war years allowed for the 'cleansing of heroes of empire' to make way for science, which justifies human presence on Antarctica, and therefore occupation by another name.

Since the IGY and the Antarctic Treaty, science has replaced exploration as the main activity in Antarctica. The current permanent structures on Antarctica are scientific stations, and Antarctica is often referred to as the 'world's greatest laboratory' (Gould 1971) or a 'continent for peace and science' (Walton and Clarkson 2011, 1). Thus, when discussing and describing the meaning and relevance of Antarcticness,

science, diplomacy and their interactions become prominent, raising the question about whether Antarcticness led to science–diplomacy interactions, the other way around, or both. The success of scientists in collaborating during the IGY, and in creating the political goodwill which allowed for a diplomatic solution to the issue of Antarctic territorial disputes, has given rise to the idea that Antarctica is a place where science meets diplomacy, and where science diplomacy succeeds.

Science and diplomacy in the Antarctic

Science and diplomacy undoubtedly came together in Antarctica with SCAR coordinating the collaborative research programme, working as a vehicle for science diplomacy. One of the prominent examples of science for diplomacy during this period was the sharing of historical meteorological data between the US and the USSR, which allowed the re-establishment of relationships between Soviet scientists and their international colleagues 'for Soviet scientists from a wide range of disciplines in the Earth sciences, including oceanography' (Lajus 2013, 187). The spirit of openness and collaboration created by SCAR, and attributed to the activities of the IGY, led to the political will for extending the IGY for another year, which morphed into the conference held in Washington, DC bringing 12 countries together to negotiate a longer agreement for Antarctica (Dodds and Collis 2008). During the Cold War tensions of the era, in Antarctica, science became a tool for creating peaceful agreements between countries (possibly suggesting that science diplomacy came to represent Antarcticness), allowing for a lull in Cold War tensions and the continent's demilitarisation (Dodds 2010).

The relationship between science and diplomacy has created a narrative of Antarctic exceptionalism, which also inputs into Antarcticness and which needs to be critiqued and studied further to understand the political agendas at play in the Antarctic Treaty System (ATS; see Dodds 2010; Howkins 2017; Roberts 2021). Glasberg (2012, 66) is critical of the results of science diplomacy on the Antarctic, noting that:

> the idea of Antarctica as a continent for science has no serious political counter movement. Yet, scientific exceptionalism – the idea that scientific work is exempt from the political contexts within which it operates – like other forms of exceptionalism, in no way obviates the central problematic of national presence in Antarctica.

Science and diplomacy met in Antarctica during the IGY, and have had an enduring relationship since then. Following the negotiation and ratification of the Antarctic Treaty in 1959 and 1961 respectively, science has been the primary activity that underpins the continent's governance (Dodds 2010).

Governing Antarctica through science

One prominent mention of a possible international system of governance for the Antarctic was in 1956, when the representative for India raised the question of Antarctica's governance at the UN General Assembly (Howkins 2008), suggesting UN stewardship of the Southern Continent, which could be considered 'the common heritage of mankind' (Howkins 2008, 44) and thus indicating an assumed governance baseline for Antarcticness through science. The Antarctic Treaty, signed in 1959 and ratified in 1961 by the 12 countries involved in the IGY, formalised the relationship between Antarctic governance and science. It can be said that 'international science under the ATS re-enchanted Antarctica as a space for a wary global peace-through-science' (Glasberg 2012, 66).

There are many criticisms of the ATS. Howkins (2017, 4) states that, despite the existence of the ATS, 'Antarctica remains an imperial environment and science continues to be used to legitimate political power'. Glasberg (2012, 6) agrees with Howkins, and expands on his argument, suggesting that:

> The ATS functions as a way of suspending national claims while deferring the very logic of territory as national entities while simultaneously bolstering those national agencies that seek to govern and control the possible material wealth of the Continent. In this sense, the ATS holds Antarctica in suspension for a future nationalism.

The ATS has succeeded in many ways. The primacy of science in Antarctica was integral to the demilitarisation of the Antarctic continent, as set out by Article IV of the Antarctic Treaty, which prevented it from overtly becoming another front for the Cold War. However, even these successes can be criticised. Glasberg (2012, 70) points out that the involvement of various military forces in the logistical operations on the continent, means that 'it can never be completely separated from its military modes and contexts' (also Chapter 2 in this book).

Science and Antarctic conservation

Science and the work of scientists in Antarctica has been integral to the creation of conservation measures on the Antarctic continent, with conservation often being highlighted as a key component of Antarcticness (see Chapters 9 and 15). Since the signing and ratification of the Antarctic Treaty, scientists have been able to shape the ATS's approach to conservation.

The earliest example took place in the late 1950s and early 1960s. As the Antarctic Treaty was being negotiated, biologists working under SCAR were discussing the importance of preserving animal and plant life in Antarctica (Antonello 2019), leading to Carrick (1960) detailing the need for protecting Antarctic wildlife. The issue of conserving Antarctic wildlife was discussed by other passionate ornithologists, including Brian Roberts, the head of the UK delegation for the Antarctic Treaty negotiations (Antonello 2019). Despite the fact that the ATS was relatively new and fragile, Roberts made responding to the issue of Antarctic conservation a priority, and pushed for discussions of the issue in the ATS, which eventually led to the Agreed Measures on the Conservation of Antarctic Flora and Fauna (AMCAFF; Antonello 2019).

In the late 1960s, scientists working in Antarctica highlighted the seal populations and the need to protect them. Commercial sealing has a long history in Antarctica and its surrounding islands. From as early as the 1770s, elephant seals in the Antarctic were hunted for their pelts and by 1956, they had been hunted to extinction in several locations (Antonello 2019). Fur seals in the Antarctic had also been devastated by hunting before scientists could undertake meaningful studies into the species (Antonello 2019).

In response to the pressing need for seal conservation in Antarctica, the Convention for the Conservation of Antarctic Seals (CCAS) was negotiated. Discussions at the Antarctic Treaty Consultative Meetings began in 1966, and it took six years for the Convention (British Antarctic Survey 1972) to be drawn up and signed. During this time, public opinion on seal hunting began to shift as awareness of the realities of hunting and commercial seal products grew, and anti-sealing protests gained momentum (Barry 2005). Antonello (2019) suggests that the reason why CCAS took so much longer for Antarctic Treaty Consultative Parties to negotiate, in comparison to AMCAFF, was primarily because seals had been previously exploited for commercial gain and were therefore a more politically sensitive resource to regulate. In many

ways, Antonello (2019) argues, tensions arose over seals because the discussions about sealing became a proxy for Treaty parties setting forth ideas about what they wanted Antarctica to look like. Similarly, although there was a great deal of consensus among scientists, who favoured protections for the seal populations, it became clear during the negotiation period that scientific consensus would not necessarily lead to political consensus in Antarctica.

As more was understood about life in the Antarctic Ocean, it became clear that the waters were rich in fish and krill, and the need for fishing regulations and the conservation of these species became apparent (Wendebourg 2020). The role of SCAR and SCAR-affiliated scientists was integral to bringing the issue of overfishing during the 1960s and 1970s to the ATS, providing advice suggesting a form of regulation of these activities (Wendebourg 2020). The 1977 SCAR 'Biological Investigation of Marine Antarctic Systems and Stock (BIOMASS)' project measured the populations of Antarctic fish and krill over eight years, and noted the possible effects of overfishing and over-exploitation on the Antarctic marine ecosystem (CCAMLR 2020).

Discussions at the ATS around how best to sustainably make use of the populations of fish, krill and other living resources in Antarctic waters over several years led to the negotiation of the 1980 Convention on the Conservation of Antarctic Marine Living Resources. Since its creation in 1980, the Convention has morphed into its own arena for political decision making in Antarctica. CCAMLR has its own Commission, which meets annually, and has 26 members and 10 acceding states (CCAMLR 2020). These members are involved in creating and enforcing regulations on the use of 'Antarctic populations of finfish, molluscs, crustacean and sea birds found south of the Antarctic Convergence' (CCAMLR 2020), an area which encompasses the jurisdiction of the ATS, and more (Wendebourg 2020). When taken into consideration alongside the International Convention for the Regulation of Whaling and CCAS, CCAMLR provides extensive protection for and conservation of the living resources on the Antarctic continent and in the surrounding waters (CCAMLR 2020).

Antonello (2019), in his book's title, referred to these early conservation efforts in Antarctica as 'the greening of Antarctica', a descriptor for the change in the way the Antarctic environment was seen and described between 1959 and 1980, when it morphed from a contested wilderness to an environment which was considered to be fragile and in need of protection. Antonello (2019) argues that these early conservation efforts from the ATS are important for reasons

beyond the immediate effect of environmental protection in Antarctica. First, the creation of new Agreed Measures and Conventions in the early years of the ATS allowed for the Antarctic Treaty Consultative Parties to add to and, in some ways, reinterpret the Antarctic Treaty shortly after its ratification, allowing for it to become an evolving and changing system of governance (Antonello 2019). Second, these conservation efforts allow for the exertion of what Howkins (2017, 8) refers to as 'environmental authority' through the ATS. Howkins (2017, 4) defines environmental authority as:

> the assertion that the production of useful scientific knowledge about an environment helps to legitimate political control over that environment. The concept of environmental authority therefore combines the idea of doing better science, which does not necessarily involve political control, with some sort of political claim to a territory, which does not necessarily involve scientific research.

In the case of these successful early conservation efforts, Antonello (2019) and Howkins (2017) apply a more critical eye, pointing out how scientific knowledge about Antarctica and the push for conservation were often co-opted by political actors for their own reasons.

The science published in 1985 on the ozone hole over Antarctica (Farman et al. 1985) was another important milestone in the conservation efforts for the Antarctic, given that it raised public awareness of the issue and the so-called fragile nature of the Antarctic environment, another element often ascribed to Antarcticness. Scientists in Antarctica were tasked with finding out which pollutants had contributed to the thinning of the ozone layer over Antarctica. The discovery of and subsequent investigation into the phenomenon ultimately led to the signing of the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer. The Montreal Protocol (1987) required the signatories to drastically cut down on the use of ozone-depleting substances such as chlorofluorocarbons and hydrochlorofluorocarbons, so that the ozone layer would repair, and to report on progress to the United Nations Environmental Programme.

In the 1980s, the Consultative Parties to the Antarctic Treaty also negotiated the Convention for the Regulation of Antarctic Mineral Resource Activities (CRAMRA), which was signed on 1 June 1988. The Convention allowed for exploratory mining activities on the Antarctic Continent, whilst creating a regulatory framework under which such activities could be carried out (Zang 1991). CRAMRA was a convention

which drew criticisms from a number of environmental groups, including Greenpeace (McDonald 2018). These groups aired concerns about the lack of explicit environmental protection and argued against allowing any form of exploration for mineral resources, with Greenpeace staging a series of protests against the Convention, which included creating a 'World Park' base on the Antarctic continent (McDonald 2018) and protesting while dressed as penguins outside venues where negotiations for the Convention took place (Shortis 2019).

The Convention ultimately failed in 1989 when Australian Prime Minister Bob Hawke refused to ratify the Convention due to his concerns for the Antarctic environment (Harris and Meadows 1992). In addition to environmental worries, there were concerns about protecting Australia's territorial claims and possible sovereignty over Australian Antarctic Territory (Hayward et al. 2006). The French Prime Minister followed suit (Brady 2013), and given that the ATS requires consensus for decisions and instruments to come into force, the French and Australian governments, by not ratifying the convention, halted CRAMRA in its tracks (Brady 2013; Harris and Meadows 1992). The failure of the Convention led to the beginnings of the negotiations which would result in the 1991 Madrid Protocol, another conservation milestone for the protection of the Antarctic environment (Hayward et al. 2006).

The 1991 Protocol on Environmental Protection to the Antarctic Treaty, also known as the Madrid Protocol, was negotiated in the wake of the failure of CRAMRA. The Protocol involves a 50-year moratorium (perhaps representative of the science-based conservation dimension of Antarcticness) on mining for mineral resources in Antarctica, which came into force when the Protocol was fully ratified by all Antarctic Treaty Consultative Parties in 1998. The Protocol requires signatories to abide by a series of rules and regulations laid out in the text of the Protocol and additions to the text through Annexes. The Protocol led to the creation of the Committee for Environmental Protection (CEP), which since its first meeting in 1998 has considered the science and research taking place in the Antarctic, and provided advice based on research on how best to go about minimising the effects of human presence in Antarctica, and conserving parts of the continent which need protecting. Under the CEP, Antarctic Specially Protected Areas (ASPAs) and Antarctic Specially Managed Areas (ASMAs) have come into force. The ASPAs are designated 'to protect outstanding environmental, scientific, historic, aesthetic or wilderness values, any combination of those values, or ongoing or planned scientific research'[1] and ASMAs are designated for areas where

scientific research is ongoing or planned for the future, requiring consideration for efforts to protect the Antarctic environment. Until the end of the Madrid Protocol's moratorium on exploration for mineral resources in 2048, the protection of the Antarctic environment is assured to some degree.

Science, mineral resources and 'the question of Antarctica'

Science has been at the heart of one of the biggest controversies regarding the Antarctic continent, reinforcing notions of Antarcticness based on the continent's relationship with science. As SCAR scientists in the 1980s speculated on the possibility of mineral deposits in Antarctica, or the likelihood that oil reserves might exist under the Antarctic seabed, the question of mineral resources and exploitation was raised several times.

The 'question of Antarctica' was prominently raised at the United Nations General Assembly in 1956, when the head of the Indian delegation proposed a form of UN trusteeship for Antarctica, as opposed to the existing competing claims to Antarctic territory. Although the reason given for wanting to table a discussion on Antarctica was that India feared nuclear testing or Cold War conflict in Antarctica (Howkins 2008), many of the countries in the non-aligned movement at the UN saw the potential for a discussion about the resource potential of Antarctica, a possibility which made UN stewardship of the continent an attractive proposition for countries without claims to Antarctic territory (Beck 1986). The Indian delegation gave in to the pressure from claimant countries to withdraw the suggestion for discussion at the UN (Howkins 2008) and in the following years, the Antarctic Treaty was signed and subsequently ratified.

When SCAR reported to the ATS the results of scientific assessments on the potential for mineral resource exploitation in the Antarctic, in the early 1980s (Beck 1986), two main consequences emerged. First, the discussions that would lead to the negotiation of CRAMRA began in the ATS. Second, the 'question of Antarctica' was reintroduced to the UN General Assembly, in 1983 (Beck 2006). During the 1983 discussion, it was suggested that the Antarctic was the 'common heritage of mankind' (Beck 1986, 277–8), and that the signatories to the Antarctic Treaty, in creating an exclusive club of countries who limited access to the continent, were part of 'one of the remaining vestiges of colonialism' (Beck 1986, 277–8). Another strong criticism of the ATS was the 'substantial research activity' criterion for becoming a Consultative Party to the Treaty, a

criterion which most non-aligned countries, having recently gained independence from colonial rule, could not meet (Beck 1986, 192–3).

Following the 1983 discussion, the 'question of Antarctica' became an annual agenda item at the UN General Assembly, with the expectation that a report on the activities of the ATS would be delivered (Beck 1988). The discussions revolved around the question of wider participation in the negotiations for CRAMRA, with several resolutions adopted on this subject (Beck 1989). When it became clear that Australia might not ratify CRAMRA, the discussions at the UN became less heated (Beck 1989; Hayward et al. 2006), and when the Madrid Protocol was signed in 1991, there seemed to be a way forward, but even this did not satisfy the ATS's critics (Beck 1992) and the 'question of Antarctica' was continuously debated at the UN General Assembly, albeit not always annually, until 2005 (Beck 2006).

The possibility of mineral resource exploitation remains a pressing question in and about Antarctica, despite the fact that prospecting for mineral resources is currently prohibited (Liggett et al. 2015). Would mineral resource exploitation undermine the Antarcticness based on the relationship with science? This question remains linked to the role of science in terms of advocating for governance such as conservation compared to describing the implications of conservation or non-conservation governance decisions.

Despite the current moratorium on mining activities in Antarctica until 2048, the question of what happens when the moratorium is over, given ongoing eager plans to drill for oil in the Arctic Ocean, remains at the forefront of Antarctic Treaty meetings and academic discourse alike. Issues such as bioprospecting, the use of biological material found in Antarctica, also occupy ongoing discussions in the Antarctic Treaty Consultative Meetings (Secretariat of the Antarctic Treaty 2019), as the possibility of creating regulations for these bioprospecting activities may provide a roadmap for future discussions on mineral resource activities (Hemmings 2010). As scientists carry out and report on both bioprospecting and resource exploration activities, the importance of science in determining future regulations and its role in understanding Antarcticness will become more apparent in the coming years.

'The canary in the coal mine': climate change and Antarctica

In recent years, the idea that Antarctica is a fragile and changing environment which is especially susceptible to the effects of climate

change has become commonly held and has integrated itself into Antarcticness, in part due to reporting across numerous mainstream media publications and documentaries such as the BBC's *Frozen Planet* (2011). Glasberg (2012) highlights how the discourse that the fragile Antarctic environment needs our protection and rescue from climate change effects has replaced older representations of Antarctica: as potential territory; as a place to be explored; or as the site of international scientific collaboration.

Does the process of science feeding into environmental narratives about Antarctica represent or manufacture Antarcticness? Antarctica has often been referred to as the 'canary in the coal mine', such as Glasberg (2012, xxii) calling it 'a canary in the mineshaft of ecological disaster'. As the planet warms, Antarctica has also become one icon of climate change consequences. Roberts (2021, 4) suggests that Antarctica can be viewed as 'a conduit through which emissions become consequences, in addition to being a site where the consequences of emissions are revealed'.

With Antarctica represented as a harbinger of climate change impacts and a warning to the world, the relationship between Antarctica and science has also become seen as prophetic. This raises unanswered questions for the future of scientific activity in Antarctica, and its relationship to decision making and to views of Antarcticness. Roberts (2021, 5) suggests that there is a moral argument to be made for changing the basis for the right to exercise power within the ATS, from conducting scientific research to possibly 'refraining from contributing to environmental change in Antarctica'. As climate change continues to affect the Antarctic, which in turn, has consequences for sea-level rise, the relationship between science and the Southern Continent is likely to shift and change with the climate.

Conclusion

The relationship between science and Antarctica, as viewed through the lens of Antarcticness or through creating the lens of Antarcticness, is not a linear story, with various tensions emerging over the course of Antarctic history, particularly during the twentieth century. For the majority of this relationship with the continent, science was a secondary activity. During the Heroic Era, science was used to fund explorers' expeditions to the continent, which often had decidedly colonial undertones. In the interwar years and early in the post-war period, this relationship between science and claims to Antarctic territorial claims became much more pronounced.

The great turning point in the relationship between science and the Antarctic was the International Geophysical Year (1957–8). During this period, science met diplomacy in the Antarctic, allowing for the conditions which made the negotiations for the Antarctic Treaty possible. The signing and ratification of the Antarctic Treaty, and the subsequent creation of the ATS, cemented the relationship between Antarctica and science. This relationship has drawn much criticism, which asks if science might act as a barrier to political decision making in the ATS.

The ATS has focused on various measures for the conservation of the Antarctic and science has been at the forefront of these conservation efforts. Despite the ongoing conservation of the Antarctic environment, questions about the potential for mineral resource mining have been asked for several decades, and when current conservation efforts come to a conclusion, these questions pose a challenge that Antarctic science may not be able to meet effectively.

The effects of human-caused climate change on the Antarctic further complicate the relationship among science, Antarctica and Antarcticness, as science is seen as both a tool for investigating climate change and also an activity which affects the Antarctic environment. Science and Antarctica have a long and complicated relationship, which has evolved over the past two centuries, interplaying with, being influenced by and producing varied notions of Antarcticness. The shifting relationship between science and Antarctica, and the study of this relationship, raises as many questions about the future of the Antarctic as it answers about the continent's past.

Notes

1 See Annex V to the Protocol on Environmental Protection to the Antarctic Treaty, Article 3, Clause 1: https://documents.ats.aq/keydocs/vol_1/vol1_9_AT_Protocol_Annex_V_e.pdf (accessed 15 September 2021).

References

Antonello, Alessandro. 2019. *The Greening of Antarctica: Assembling an international environment*. Oxford: Oxford University Press.

Badminton, Neil. 2017. 'The bothersome details of the world: Richard Byrd, Little America, and the problem of retreat'. *Journal for Cultural Research* 21: 415–16.

Barry, Donald. 2005. *Icy Battleground: Canada, the International Fund for Animal Welfare and the seal hunt*. St John's: Breakwater Books.

British Antarctic Survey. 1972. *Convention for the Conservation of Antarctic Seals*. Cambridge: British Antarctic Survey.

Beck, Peter J. 1986. *The International Politics of Antarctica.* London: Routledge.
Beck, Peter J. 1988. 'Another sterile annual ritual? The United Nations and Antarctica 1987'. *Polar Record* 24: 207–8.
Beck, Peter J. 1989. 'Antarctica at the UN 1988: Seeking a bridge of understanding'. *Polar Record* 25: 329–30.
Beck, Peter J. 1992. 'The 1991 UN session: The environmental protocol fails to satisfy the Antarctic Treaty System's critics'. *Polar Record* 28: 307–8.
Beck, Peter J. 2006. 'The United Nations and Antarctica, 2005: The end of the "Question of Antarctic"?' *Polar Record* 43: 217–27.
Brady, Anne-Marie, ed. 2013. *The Emerging Politics of Antarctica*. Abingdon: Routledge.
Carrick, Robert. 1960. 'Conservation of nature in the Antarctic'. *SCAR Bulletin* 6: 66–73.
CCAMLR. 2020. 'History of the convention'. Accessed 26 August 2021. https://www.ccamlr.org/en/organisation/convention-history.
Clancy, Robert, John Manning and Hank Brolsma. 2014. *Mapping Antarctica: A five hundred year discovery.* Dordrecht: Springer.
Dodds, Klaus. 2010. 'Governing Antarctica: Contemporary challenges and the enduring legacy of the Antarctic Treaty'. *Global Policy* 1: 109–10.
Dodds, Klaus, and Christy Collis. 2008. 'Assault on the unknown: The historical and political geographies of the International Geophysical Year (1957–8)'. *Journal of Historical Geography* 34: 570–2.
Farman, Joseph Charles, Brian G. Gardiner and Jon D. Shanklin. 1985. 'Large losses of total ozone in Antarctica reveal seasonal ClO_x/NO_x interaction'. *Nature* 315: 207–10.
Glasberg, Elena. 2012. *Antarctica as Cultural Critique: The Gendered politics of scientific exploration and climate change.* New York: Palgrave Macmillan.
Gould, Laurence M. 1971. 'Antarctica: The world's greatest laboratory'. *The American Scholar* 40(3): 402–15.
Harris, Colin M., and Janice Meadows. 1992. 'Environmental management in Antarctica: Instruments and institutions'. *Marine Pollution Bulletin* 25: 239–40.
Hayward, Marcus., Donald R. Rothwell, Julia Jabour, Robert Hall, Aynsley Kellow, Lorne Kriwoken, Gail Lugten and Alan Hemmings. 2006. 'Australia's Antarctic agenda'. *Australian Journal of International Affairs* 60: 439–56.
Hemmings, Alan D. 2010. 'Does bioprospecting risk moral hazard for science in the Antarctic Treaty System?' *Ethics in Science and Environment Politics* 10: 5–12.
House of Lords Library. 2020. *Discovery of Antarctica: 200th Anniversary.* London: House of Lords Library.
Howkins, Adrian. 2008. 'Defending polar empire: Opposition to India's proposal to raise the "Antarctic question" at the United Nations in 1956'. *Polar Record* 44(1): 35–44.
Howkins, Adrian. 2017. *Frozen Empires: An environmental history of the Antarctic Peninsula.* Oxford: Oxford University Press.
Kikkert, Peter. 2015. 'Grasping for the ends of the Earth: Framing and contesting polar sovereignty 1900–1955'. Unpublished PhD thesis, Western University, Canada.
Lajus, Julia. 2013. 'Linking people through fish: Science and Barents Sea Fish resources in the context of Russian-Scandinavian relations'. In *Science, Geopolitics and Culture in the Polar Region: Norden beyond borders*, edited by Sverker Sorlin, 111–42. London: Routledge.
Larson, Edward J. 2011. *An Empire of Ice: Scott, Shackleton and the Heroic Age of Antarctic science*. London: Yale University Press.
Launius, Roger D. 2010. 'Toward the poles: A historiography of scientific exploration during the International Polar Years and the International Geophysical Year'. In *Globalizing Polar Science: Reconsidering the International Polar and Geophysical Years*, edited by Roger D. Launius, James Rodger Fleming and David H. DeVorkin, 47–81. New York: Palgrave Macmillan.
Liggett, Daniela, Bryan Storey and Yvonne Cook. 2015. 'Exploring the last continent: An introduction to Antarctica'. In *Exploring the Last Continent: An introduction to Antarctica*, edited by Daniela Liggett, Bryan Storey, Yvonne Cook and Veronika Meduna, 1–8. London: Springer.
McDonald, George. 2018. 'Antarctica: Making the world's largest park larger'. Accessed 26 August 2021. https://www.greenpeace.org/new-zealand/story/antarctica-making-the-worlds-largest-park-larger.
Montreal Protocol. 1987. 'Montreal Protocol on substances that deplete the ozone layer'. New York: United Nations.

Needell, Allan A. 2010. 'Lloyd Berkner and the International Geophysical Year proposal in context'. In *Globalizing Polar Science: Reconsidering the International Polar and Geophysical Years*, edited by Roger D. Launius, James Rodger Fleming and David H. DeVorkin, 205–24. New York: Palgrave Macmillan.

Roberts, Peder. 2013. 'Nordic or national? Post-war visions of polar conflict and cooperation'. In *Science, Geopolitics and Culture in the Polar Region: Norden beyond borders*, edited by Sverker Sorlin, 55–78. London: Routledge.

Roberts, Peder. 2021. 'Does the science criterion rest on thin ice?' *Geographical Journal*, forthcoming. https://doi.org/10.1111/geoj.12367.

Secretariat of the Antarctic Treaty. 2019 'Final report of the Forty-Second Antarctic Treaty Consultative Meeting'. Accessed 25 August 2021. https://documents.ats.aq/ATCM42/fr/ATCM42_fr001_e.pdf.

Shortis, Emma. 2019. 'Lessons from the last continent: Science, emotion, and the relevance of history'. *RCC Perspectives: Transformations in Environment and Society* 4: 53–60.

Walton, David W.H., and Peter Clarkson. 2011. *Science in the Snow: Fifty years of international collaboration through the Scientific Committee on Antarctic Research*. Cambridge: Scientific Committee on Antarctic Research.

Wendebourg, Mara R. 2020. 'Southern Ocean fishery management: Is CCAMLR addressing the challenges posed by a changing climate?' *Marine Policy* 118: article 103847.

Zang, Douglas M. 1991. 'Frozen in time: The Antarctic Mineral Resource Convention'. *Cornell Law Review* 76: 722–3.

16

On the edge of Antarcticness

Emma J. Liu

I reflected for a long time on my perception of Antarcticness. I have been conditioned by years of scientific writing to present only the facts in a concise and prosaic manner. Evocative description and personal reflection are often discouraged. Yet I came to realise that the very essence of Antarcticness is entirely shaped by personal experiences, and by an individual's emotional response to those experiences.

In January 2020, I visited the South Sandwich Islands as part of a multidisciplinary scientific expedition to explore the unique ecology, volcanology and glaciology of these remote sub-Antarctic environments. In this contribution, I reflect instead on how this experience has affected me, both as a scientist and as an individual, and how it has ultimately changed my understanding of Antarcticness in the context of place attachment theory. I also consider the extent to which my own experiences align with those reported during the early discoveries of the South Sandwich Islands and explore the volcanological insights hidden in the content of these first-hand accounts.

Before my expedition, my perception of the Antarctic was remarkably different from what it is now. My original perceptions were based almost entirely on visual cues, all influenced heavily by cinematic portrayals of the Antarctic continent in the modern media. The highly praised documentary *March of the Penguins* (2005), for example, offers an intimate yet light-hearted insight into the life and relationships of Emperor penguins, set among broad expanses of glinting ice illuminated in soft lighting. These romantic representations conflicted in many ways with the nightmarish world conjured by the accounts of early polar explorers:

> Lands doomed by nature to everlasting frigidness and never once to feel the warmth of the Sun's rays, whose horrible and savage aspect I have no words to describe; such are the lands that we have discovered, what may we expect those to be that lie more to the South . . . (Cook 1777, February 1775).

Without personal experience to act as a reference, I found it difficult to reconcile these two depictions and at that time would have found it challenging to articulate what Antarcticness meant to me, should I have been asked.

I returned with a deep respect for those early polar explorers (see also Chapter 3) who paved the way for modern scientific endeavours in the polar regions: Cook, Nansen, Shackleton, Amundsen, Scott and lesser-known but no less remarkable early sailors, who all endured phenomenal feats in the name of exploration. I realise now that an emotional association is much stronger than simply a visual one, as it is your own. In some ways, this concept can be compared to reading a book either before or after watching a film based on the same book: either someone imagines the situation for you, or you create it yourself. If I were to return to the Antarctic, my perception of Antarcticness would continue to evolve in response to those new experiences.

Volcanic activity in the Antarctic and sub-Antarctic

Volcanism in the Antarctic is closely tied to several major tectonic processes that have taken place during the evolution of the continent and surrounding oceans, namely supercontinent breakup, the onset of subduction along the Pacific margin and continental rifting. The spatial and temporal association between the volcanic and tectonic evolution of Antarctica is reviewed in detail by Smellie (2020).

Prior to tectonic reorganisation into the plate configuration now known as Antarctica, the constituent land masses lay at the centre of the Gondwana supercontinent. The Jurassic (201–145 million years ago, Ma) was a period of great change in the evolution of the Antarctic continent. Rupture and the subsequent breakup of this supercontinent began in the Early Jurassic in response to either a mantle plume impinging on the base of the lithosphere (Storey 1995) or shallow, plate-driven processes (Peace et al. 2020). Continental breakup was associated with voluminous extrusive flood basalt volcanism around 183–182 Ma (Burgess et al. 2015) forming the Ferrar and Karoo large igneous provinces (LIPs),

outcrops of which are found across the Antarctic continent, Australia, New Zealand and parts of South Africa (Leat 2008; Smellie 2020).

Subduction of proto-Pacific oceanic crust also began in the Early Jurassic (185–181 Ma; Riley et al. 2017), forming a continental-margin volcanic arc along the Pacific margin of Antarctica that extended from the tip of the Antarctic Peninsula to Marie Byrd Land. The style of volcanic activity and the chemistry of the erupted magmas likely resembled those of the present Andean margin along the western side of South America (Pankhurst et al. 2000; Riley et al. 2017). Subduction-related volcanism continues to the present, although the only remaining site of active arc-trench subduction is in the northernmost tip of the Antarctic Peninsula (Smellie 2020). Magma production over this time was likely punctuated, with amagmatic intervals, but the rock record is sparse and incomplete as many of the associated deposits have since been removed by erosion (Leat et al. 1995; Riley et al. 2017; Smellie 2020).

Major continental extension began in West Antarctica during the mid-Cretaceous (around 85 Ma; Smellie 2020; Storey et al. 1999), largely in response to the separation of Zealandia, a now largely submerged land mass of which New Zealand is the present subaerial expression. Progressive thinning of the lithosphere, together with the associated continental rifting, established the West Antarctic Rift System (WARS). The WARS is approximately 3,000 kilometres in length, forming a large-scale extensional structure comparable to the East African Rift (LeMasurier 2008). Abundant alkaline magmatism is associated with the WARS and generally attributed to intra-plate mantle plume activity. Evidence for volcanic activity is particularly extensive in Marie Byrd and Victoria Lands.

Many of the volcanic landforms are hidden beneath the West Antarctic Ice Sheet; often, only the summits of the volcanoes remain. Glaciovolcanism, the eruptive style arising from interaction between magma and surface glaciers (Edwards et al. 2015), has therefore dominated the record of Cenozoic volcanic activity (Smellie et al. 2011, 2014, 2017). Mount Erebus, located on Ross Island in southern Victoria Land, is perhaps the most well-studied of all currently active Antarctic volcanoes. A molten lava lake of phonolite composition is hosted within its summit crater, from which persistent gas emissions emanate – background passive degassing is punctuated by sporadic episodes of more explosive activity (Iverson et al. 2014; Oppenheimer and Kyle 2008). Mount Erebus was first discovered and named by Captain James Clark Ross in 1841, sailing aboard *Erebus* and *Terror*. Ross noted that:

> it proved to be a mountain twelve thousand four hundred feet of elevation . . . emitting flame and smoke in great profusion . . . as we drew nearer, its true character became manifest. The discovery of an active volcano in so high a southern latitude cannot but be esteemed a circumstance of high geological importance and interest, and contribute to throw some further light on the physical construction of our globe. I named it 'Mount Erebus'. (Ross 1847)

The references to 'flame' and 'smoke' suggest to me that either the volcano was in a state of explosive eruption at the time of the discovery, or, perhaps more likely, that Ross is referring to the incandescence of the hot lava lake reflected in the plume of volcanic gases that emanate from the lake's surface, a phenomenon that I have witnessed at several similar volcanoes.

The South Sandwich Islands are a chain of active volcanoes in the sub-Antarctic, located east of the Drake Passage in the region of the Southern Ocean between South Georgia to the north and the Antarctic continent to the south (Holdgate and Baker 1979; Leat et al. 2016). The sub-Antarctic region represents a transitional space that bridges the separation between the world settled extensively by humans and that of the true Antarctic. Although its extent is not strictly defined by latitude, the sub-Antarctic encompasses islands from around 40°S (e.g. Gough Island) to those south of the Antarctic Polar Front (e.g. South Georgia, Heard Island) and includes large regions of the Southern Ocean. The Polar Front, also known as the Antarctic Convergence, is part of the Antarctic Circumpolar Current and represents a meridional boundary between ocean water masses: specifically, the confluence between cold, fresh Antarctic water and warmer, saltier sub-Antarctic waters (Freeman et al. 2016). Although situated fractionally outside the Antarctic circle – and therefore outside the region bound politically by the Antarctic Treaty (article VI) – the South Sandwich Islands lie south of the Antarctic Polar Front and thus share many climatological, biological and hydrological characteristics with lands further to the south.

The islands themselves are the emergent portions of deep-rooted volcanoes that extend several kilometres beneath the sea to the ocean floor, and many exhibit active expressions of volcanic activity (Figure 16.1; Holdgate and Baker 1979; Leat et al. 2016; Liu et al. 2020). From north to south along the arc, the volcanic centres include Protector Seamounts (submerged), Zavodovski, Leskov, Visokoi, Candlemas group (Candlemas and Vindication), Saunders, Montagu, Bristol,

Southern Thule group (Bellingshausen, Cook and Thule) and Kemp and Adventure calderas (submerged).

Together, this chain of volcanoes was formed by a tectonic process known as subduction, where the South American tectonic plate is dragged westwards beneath (subducted) the South Sandwich plate (Barker 1970, 1995; Larter et al. 2003). This process of subduction continues to the present day, generating molten magmas that rise buoyantly from the Earth's mantle, through the thin oceanic crust above, to erupt at the surface and ultimately build volcanoes. Eruptions can be explosive, injecting volcanic ash and gas high into the atmosphere, or effusive, extruding flowing lava, and often evolve from one style to the other as an eruption progresses. The South Sandwich Islands are still developing and in 1962 a submarine eruption (Gass et al. 1963) at the northern end of the volcanic arc began building a new seamount on the seafloor, Protector Shoal, that may eventually grow to become the newest island in the arc.

The spirit of discovery

James Cook claimed the first recorded sighting of the South Sandwich Islands during his second voyage on the HMS *Resolution* between 1772 and 1775. Cook's brief as he embarked on this expedition was to circumnavigate the globe at as high latitudes as possible. Although he did not find the much-coveted southern land mass, *Terra Australis Incognita*, Cook did indeed stumble upon the lands of the South Sandwich:

> that what we had seen which I name Sandwich Land was either a group of Islands or else a point of the Continent, for I firmly believe that there is a tract of land near the Pole, which is the source of most of the ice which is spread over this vast Southern Ocean (Cook 1777, 3 February 1775).

When my own expedition encountered Freezland Rock (originally Freezland Peak; Figure 16.1e) – the largest in a line of three rocky islets extending from the westernmost point of Bristol Island – I did not realise its historical significance at the time. I later learned that that this imposing shard-like rock was the first land said to be discovered within the South Sandwich archipelago:

> the fog fortunately cleared away a little and we discovered land ahead . . . three rocky islets of considerable height, the outmost

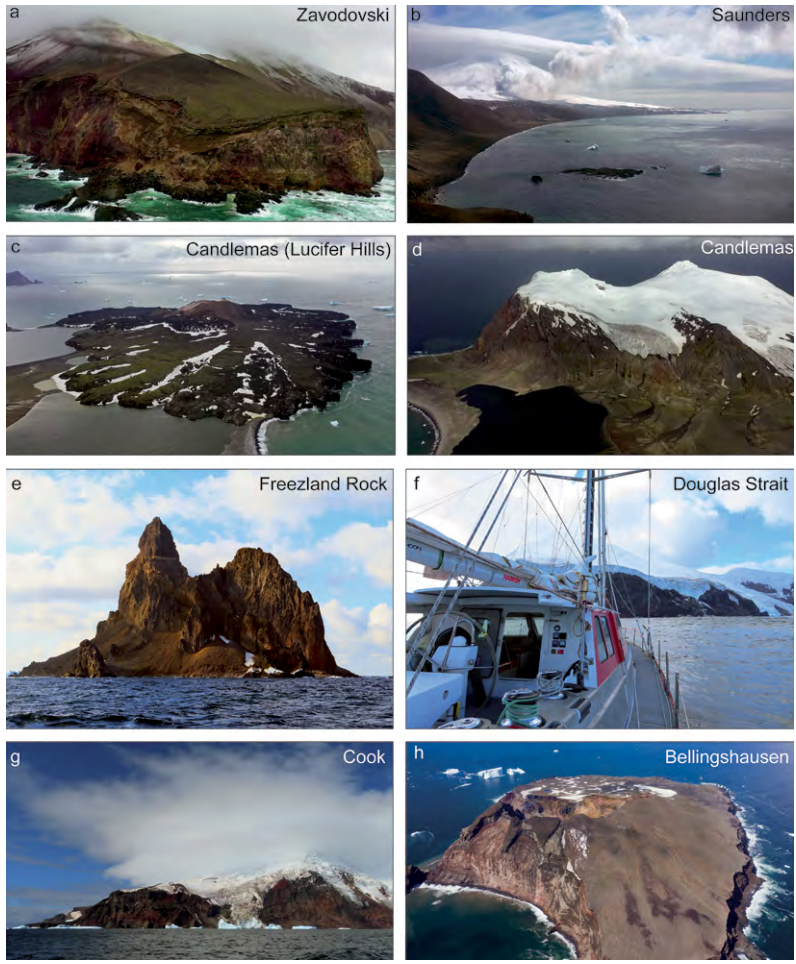
> terminated in a lofty Peak like a Sugar Loaf and obtained the name of Freezland Peak, after the man who first discovered it (Cook 1777, 31 January 1775).

Although originally thought to be of sedimentary and metamorphic origin (Kemp and Nelson 1931), Freezland Rock is entirely volcanic, constructed from layered pyroclastic material and intrusive structures (Holdgate and Baker 1979). I encountered these islets under conditions considerably more favourable than those reported by Cook. Rather than emerging through the fog, we arrived on the scene as the sun was setting on a clear and calm evening. The low light and clear air accentuated the jagged structure of the rocky islets, with every feature of the rock visible in high contrast. The fading light bathed the rocks in a warm, golden glow, creating a rather serene atmosphere that contrasts with the imposing imagery described in Cook's journals. This provides an example of how the conditions of an encounter can shape one's perception, and therefore the tone by which they then retell it to others. While Cook saw only savagery in this landscape, I remember it instead as a place of calm.

Following the discovery of Freezland Peak, Cook continued south and soon came upon another land mass which he named 'Southern Thule because it is the most southern land that have yet been discovered' (Cook 1777, 2 February 1775). He thought he could make out distant land in between, and therefore named the intermediate region Forster's Bay, later renamed Forster's Passage following confirmation that these were indeed distinct islands. Cook's expedition then turned around and worked their way north along the western side of the South Sandwich arc, reporting occasional sightings of land from within persistent thick fogs: Cape Bristol, Cape Montagu. At the time, these 'capes' were assumed to be promontories connected by some continuous land mass hidden from view in the distance – an extension of the same land mass thought to have spanned between Freezland Rock and Southern Thule. Treacherous sea ice close to shore prevented closer inspection. Saunders and Candlemas, however, were described relatively confidently in Cook's account as isolated islands.

Almost 50 years passed before the remaining subaerial islands of the arc – Zavodovski, Leskov and Visokoi – were claimed to be discovered by Thaddeus Bellingshausen in 1819 during his circumnavigation of the Antarctic continent:

> We saw an island and, on approaching, we observed on the south-western side of the island a crater, from which a thick, stinking



16.1 The volcanoes of the South Sandwich Islands (all photographs by Emma J. Liu, 2020 except for (b and h)): (a) Zavodovski; (b) Saunders, showing a substantial gas plume emanating from the summit of Mount Michael, by Tom Hart, 2020; (c) Candlemas, showing the volcanically active Lucifer Hills peninsula, constructed from multiple lava flows; (d) Candlemas, featuring the extinct volcanic centres of Mount Perseus and Mount Andromeda, both now heavily glaciated; (e) Freezland Rock, the first landing sighted in the South Sandwich by Cook in 1775; (f) Serenity in the Douglas Strait, between the islands of Thule and Cook; (g) Cook; and (h) Bellingshausen, by Tom Hart 2020.

> vapour was continually rising . . . from afar resembled the thick smoke from the funnel of a steamer, only of much greater volume and density. I named this island, in honour of the captain-lieutenant of the Vostok, Zavodovski Island (Bellingshausen, 23 December 1819 [Debenham 1945]).

In truth, the land was named 'Zavodovskiy'; the current and accepted spelling originated from an earlier mistranslation of the Russian name (Barr 2000). The original name for Visokoi Island was Torson, after one of the ship *Vostok*'s officers, but it was subsequently renamed Vysokyy – which later became Visokoi – in light of the said officer's involvement in the Decembrist Revolt (Barr 2000).

The 'stinking vapour' referred to by Bellingshausen almost certainly refers to the volcanic gases emitted to this day from the summit crater. That the emissions are described as being like 'the thick smoke from the funnel of a steamer' evokes strong imagery and provides a relatable analogy by which to compare to modern observations. Repeated use of 'thick' suggests that the gas plume was highly opaque, and therefore contained a high proportion of condensed water vapour. All other major gases emitted by volcanoes – carbon dioxide, sulphur dioxide or hydrogen sulphide – are colourless and transparent. Simonov, an officer on board the Vostok, offers a further account:

> After noon we closed with Zavadovskiy Island and noticed that the mountain located in its centre was emitting dense smoke, which until then we had taken for clouds. From this smoke we could detect the smell of sulphur. Next morning when the clouds surrounding the mountain dispersed, it was clearly evident that the smoke came from the crater of a cone located not at the summit of the mountain but on the side, two thirds of the way up (translation in Barr 2000).

The remark that clouds had dispersed by morning agrees with my own observations at many volcanoes, where early morning is often the clearest time to view the summit region as the atmospheric conditions inhibit the condensation of water vapour. Bellingshausen's expedition was not alone in observing strong sulphurous gas emissions from the volcano. A later account by Peter Kennett from a voyage in 1961 aboard the RRS *Shackleton* (attempting an ambitious geophysical survey of the northern islands of the South Sandwich, including landing ashore on Zavodovski) also alludes to the strong odour of the emissions (Figure 16.2a):

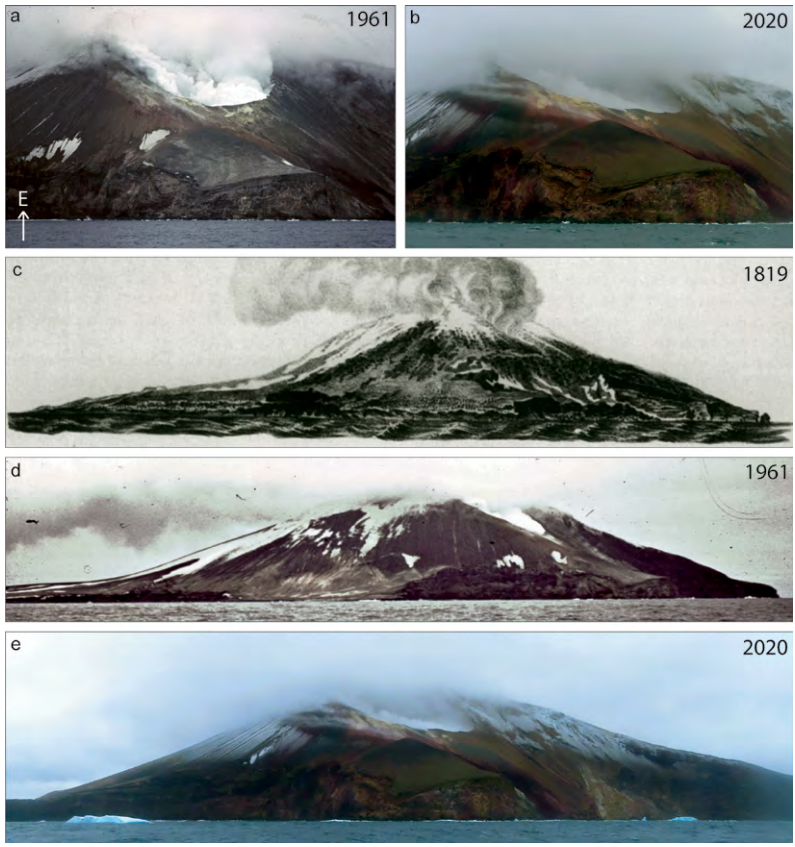
> We caught our first sight of Zavodovski Island at about 11 o'clock – as it loomed up through the fog caused by its own emission of steam and smoke, and we were soon near enough to see the crater itself belching forth vast quantities of sulphurous fumes which effectively stank us out while we were to leeward (Peter Kennett, personal communication).

Bellingshausen noted that 'there was some snow on the mountain, but very little on the lower ranges and none at all on the side of the crater', suggesting that volcanic activity was generating considerable geothermal heating of the land. On landing ashore, Simonov describes that 'our travellers had gone almost halfway up the mountain and had found the ground warm'. Similarly, Kennett also found the lack of snow cover noteworthy, reporting that 'although the cliffs are of columnar basalt the surface of the rest of the island is composed of featureless plains of ash, none of it with any snow cover' (pers. comm.).

The accounts of Simonov and Novosil'skiy – another member of Bellingshausen's landing party – indicate that although the volcano was not in a state of eruption at that time, lava flows may have been emplaced relatively recently before the ship's arrival:

> We climbed the mountain to such a height that the crater of the volcano was almost before our eyes, and could see that the smoke was emerging in clouds from fissures, without any eruption of fire or lava. It was impossible to climb farther up the mountain both due to its steepness and from the instability of the old, weathered lava, which at every step crumbled beneath our feet and carried us downward (Simonov; translation in Barr 2000).

Novosil'skiy elaborates further, describing 'black paths, as if scorched, running down from the summit of this volcano' (quoted in Barr 2000). Lava flows of mafic composition appear jet black when fresh, but become weathered within months to years – especially in wet climates – often becoming dark red (oxidised) in colour and more friable, similar to Simonov's 'old, weathered lava' that crumbled easily underfoot. During my own expedition, this time-dependent discolouration could be seen most clearly at Candlemas Island, where a new peninsula, Lucifer Hills, has grown progressively from many lava flows. Viewed from the air (Figure 16.1c), the differing relative ages of the lava flows can be discerned from the contrasting colour of the rock and the extent of lichen cover; this is even more apparent in hand specimen.



16.2 Volcanic crater of Mount Curry/Mount Asphyxia, Zavodovski in (a) 1961, image courtesy of P. Kennett aboard the RRS *Shackleton*; and (b) 2020, Emma J. Liu. View of the western coast of Zavodovski through time, in (c) 1819, a drawing by expedition artist Pavel Mikhailov during Bellingshausen's expedition, reproduced from Debenham 1945; (d) 1961, image courtesy of P. Kennett aboard the RRS *Shackleton*; and (e) in 2020, Emma J. Liu.

Evidence of oxidative weathering of past eruption deposits can be observed in the exposed western shore of Zavodovski below the crater (Figure 16.2e). Bellingshausen described these cliffs as 'sheer and inaccessible' and 'the colour, like that of the mountain itself, is dark red with a yellowish tinge in parts'. It appears that the general appearance of the western shore of Zavodovski has remain largely unchanged since 1819. Compiling drawings and photographs taken from similar positions

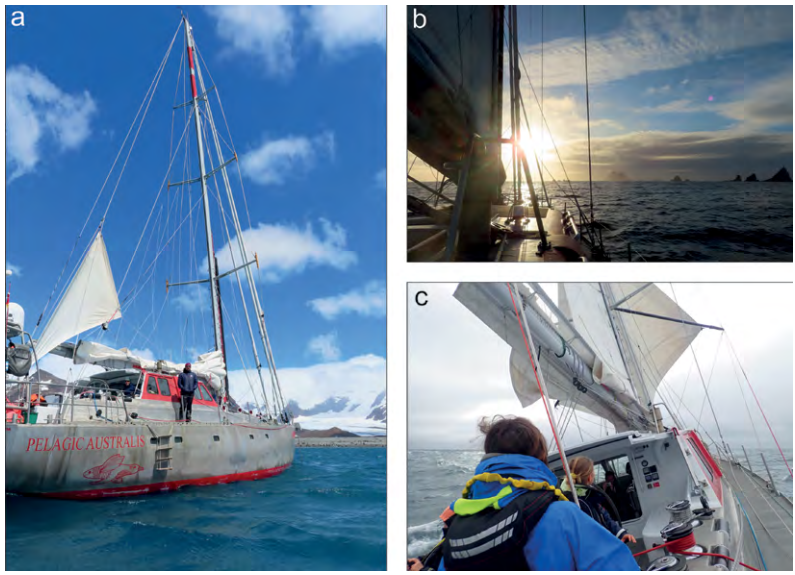
in 1819, 1961 and 2020 (Figure 16.2c–e), we can see that the position, size and shape of the crater has remained similar over time, with fumarole vents – marked by yellow sulphurous precipitates on the ground – remaining concentrated on the northern rim of the crater (left-hand side in Figure 16.2a–b). The 1961 photograph appears to shows more voluminous gas emissions than in 2020, although this may also be an artefact resulting from different atmospheric conditions. Of considerable interest is that the mantle of fragmented explosive material that drapes the underlying thick lava flows (seen most clearly on the small promontory in Figure 16.2a–b) existed in its present form in 1961, including many of the large blocks on its surface, indicating that the most recent major explosive activity predates the middle of the twentieth century.

In the time between Cook and Bellingshausen's pioneering expeditions and the first systematic scientific investigations in the 1960s and later (Baker et al. 1964), the South Sandwich Islands were visited infrequently by sealing vessels. From the sparse accounts, it seems that these sailors were left with an impression of the islands not dissimilar to Cook's early accounts:

> The land has a most terrific appearance being nothing more than a complete rock of about 6 or 7 miles in length . . . and covered with ice and snows so much that it was hardly possible to distinguish the rock, the snow, and the clouds above them from one another, and there being no appearance of a landing place after standing in within 5 or 6 miles it was the opinion of most on board that nothing of consequence could be got which agreeing with my own ideas on the subject I hauled off to the southward in hopes to find a better chance elsewhere (John Biscoe, 21 December 1830 [Biscoe 1901]).

A transitional space

We reached the South Sandwich Islands aboard the *Pelagic Australis*, a 22.5 metre sailing vessel (Figure 16.3a). Although the romantic notion of traditional sail-powered exploration appealed, the rationale was practical: the ability to anchor close to shore in shallow water greatly increased our chances of successful landings compared to an offshore anchorage in a larger vessel with a deep draught. The small size of the *Pelagic Australis* did leave us much more exposed to the highly changeable swell conditions of the Southern Ocean. After departing the Falkland



16.3 The *Pelagic Australis*, our home for the six weeks of the expedition: (a) At anchor in Salisbury Plains, South Georgia, by Emma J. Liu, 2020; (b) Calm sailing near Clerke Rocks, South Georgia, by Emma J. Liu, 2020; and (c) Navigating a strong swell in the South Sandwich Islands, by Skip Novak, 2020.

Islands, it took seven full days and nights of continuous sailing to reach our first destination in the South Sandwich Islands of Saunders (Figure 16.1b). We sailed most of the way under favourable winds, only relying on engine power when the winds dropped too low for us to maintain a speed of 8 knots:

> Life aboard the *Pelagic Australis* quickly settled into a structured routine. We were each assigned to watches, operating on rotation over 24 hours with 3 hours on and 6 hours off. Days and nights blurred, with sleep patterns quickly aligning with the watch schedule rather than by the sun. In the early days of the expedition I spent a lot of my time between watches asleep – some days I would sleep 18 hours out of 24 – mainly to keep the seasickness at bay (extract from personal diary, 6 January 2020).

After a few days, this excessive sleep left me feeling persistently disorientated, which in hindsight probably didn't help with the sickness.

The point at which we crossed the Antarctic Polar Front was noticeable. The air temperature dropped perceptibly and fogs became thicker and more common. Similar meteorological changes were noted by Cook during his second expedition, where the persistent poor visibility encountered south of the island of South Georgia seemed to take a noticeable toll on morale:

> I now reckoned we were in the latitude 60°S and farther I did not intend to go, unless I met with some certain signs of soon meetings with land . . . I was now tired of these high Southern latitudes where nothing was to be found but ice and thick fogs (Cook 1777, 27 January 1775).

The crossing of the Front is significant as it represents the climatological and hydrological transition into the Antarctic realm. For me, the change in the meteorological conditions paralleled a growing awareness of Antarcticness and the challenges that lay ahead. Our ability to land on, or even approach, the islands would be dictated almost entirely by the sea swell conditions, which in turn would be decided by winds blowing over the sea many hundreds of kilometres from where we were, probably at that very moment. As the realisation dawned that we really were at the mercy of environmental forces outside our control (see also Chapters 4 and 14), I began to feel a developing sense of pressure to achieve the science I had promised.

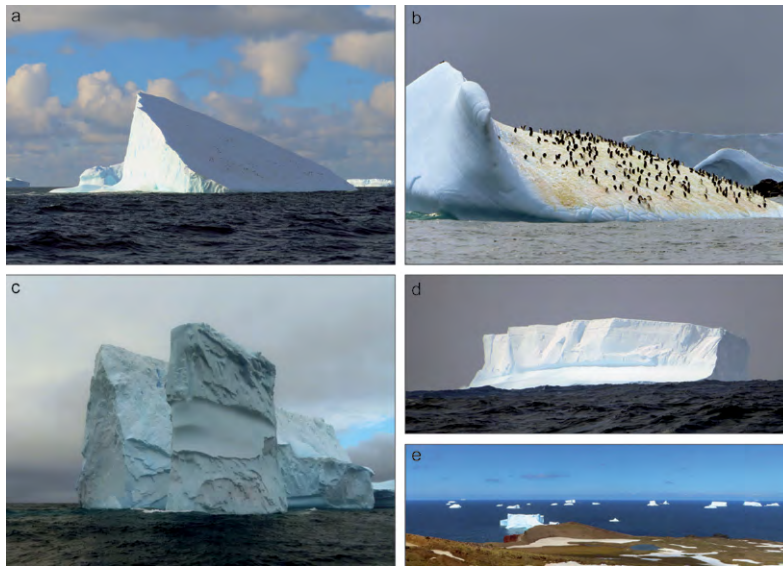
We encountered the first icebergs whilst still several days northwest of Saunders: small fragments, termed growlers and bergy bits (Murphy and Cass 2012), at first, but soon after, the first icebergs appeared (Figure 16.4). Icebergs come in all shapes, the most archetypal of which are tabular bergs. These steep-sided, flat-topped icebergs resemble the 'ice islands' described by Cook when the HMS *Resolution* fell in 'all at once with a vast number of large Ice islands, and a Sea strewed with loose ice' (Cook 1777, 31 January 1775) in a comparable geographic location to our own. Many of the icebergs originate from the Weddell Sea, transported northwards by the Weddell Sea Gyre and then eastwards by the Antarctic Circumpolar Current (ACC; Renner et al. 2009). The ACC passes north of the South Sandwich Islands, diverted by the topographic profile of the arc (Garabato et al. 2002). The appearance of icebergs was the second major milestone in the progressive transition to Antarcticness, each berg a messenger letting us know that we were headed in the right direction: south.

Science at the edge of Antarcticness

The aim of my research on this expedition was to study the volcanic processes taking place along the South Sandwich arc, with a focus on measuring the chemistry of the volcanic gases being released. These gases reveal much about the magmatic source regions in the roots of volcanoes, and regular measurements can be used to monitor volcanic activity and contribute to eruption forecasting (Aiuppa et al. 2017; de Moor et al. 2016; Edmonds 2021). I was also to collect samples of erupted lava from the various volcanoes along the arc, to learn more about their respective eruptive histories, and to augment the insights gained from gas measurements regarding the subsurface magmatic plumbing systems. The data and findings from this study are presented in Liu et al. (2020). Here, I focus only on selected aspects of the expedition that shaped my understanding of Antarcticness.

There are several techniques at our disposal to determine the chemistry and emission rate of volcanic gases. We can deploy an instrument called a Multiple Gas Analysis System – a MultiGAS (Aiuppa et al. 2005; Shinohara 2005). A small pump draws air into the instrument, where it passes sequentially through a series of different sensors, each measuring the concentration of a particular gas species (carbon dioxide, sulphur dioxide or hydrogen sulphide) by either optical or electrochemical methods. We then use these concentrations to determine ratios of different gases, such as the amount of carbon dioxide relative to sulphur dioxide, as changes in the relative proportions of different gases reflect the pressure, temperature and oxidation state of the magma, at the last point of equilibration with the emitted gas (Ghiorso and Gualda 2015; Moretti and Papale 2004). For volcano monitoring, these ratios provide an important geochemical indicator of the depth of magma storage and degassing, and whether this is changing through time (Aiuppa et al. 2007; de Moor et al. 2016; Werner et al. 2013).

We are also interested in the rate at which gases are being released into the atmosphere, often referred to as the gas 'flux'. We can calculate this flux using remote sensing of ultraviolet (UV) wavelengths, but only for sulphur dioxide. Although carbon dioxide and water vapour are also emitted by volcanoes, high concentrations in the background atmosphere make them challenging to detect by remote methods. New techniques are now beginning to emerge for spectroscopic quantification of carbon dioxide at sufficient resolution (Aiuppa et al. 2015; Santoro et al. 2017). As solar radiation passes through the volcanic plume, sulphur dioxide will



16.4 Icebergs vary considerably in size and morphology (all photographs by Emma J. Liu, 2020, except for (a)): (a) Inclined tabular iceberg offshore of Saunders Island, by Kieran Wood, 2020; (b) Many bergs close to shore become a haven for offshore colonies of penguins; (c) Tall iceberg just offshore from Zavodovski, exhibiting an almost translucent blue colour; (d) Large tabular berg sighted far from land; (e) A sea strewn with icebergs and bergy bits, viewed from Bellingshausen Island.

absorb sunlight at known wavelengths. We exploit this property to determine the concentration of sulphur dioxide present in a cross-section through the plume (Galle et al. 2003; McGonigle et al. 2002; Platt and Stutz 2008). A UV camera system (Figure 16.5b) contains two cameras, each detecting light at different wavelengths: one focuses on a wavelength at which sulphur dioxide absorbs strongly, and the other at a wavelength that is not absorbed (Burton et al. 2015; Kern et al. 2015; Mori and Burton 2006). By subtracting the two co-acquired images to obtain the difference, and calibrating the instrument to convert changes in light intensity to path concentrations of sulphur dioxide, we can determine how much sulphur dioxide is present in a cross-section through the plume. If we also know the wind speed, then we can calculate how fast the plume is moving through this cross-section, and therefore derive an emission rate, usually expressed in either kilograms per second or tonnes per day.

16.5 Scientific activities and sampling techniques (all photographs by Skip Novak, 2020): (a) Summit attempt on Mount Michael, Saunders Island, before being turned around by the blizzard conditions; (b) Measuring sulphur dioxide emission rates on Saunders Island using an ultraviolet camera; (c) Shore landing by zodiac on Saunders Island; (d) Shore landing on Bellingshausen required swimming ashore attached to a rope line; (e) Gazing into the deep volcanic crater on Bellingshausen, the gas emissions from the numerous active vents are clearly visible; and (f) The rope-line shore landing was required again for Candlemas Island.

Lastly, there are some measurements that cannot be made in the field. For example, the isotopic composition of the volcanic gas emissions (e.g. carbon isotopes, $\delta^{13}C$) offers valuable information about the source of the gases, and their pathway through the magmatic system en route to the Earth's surface (Sano and Marty 1995). These measurements are best made in the laboratory, using instruments that are generally not field portable. We therefore collect samples of the gas in non-reactive foil bags and send them to the laboratory as fast as possible before the samples have time to degrade. It is preferable to collect these samples at a range of distances from the volcanic vent, and therefore at varying degrees of mixing with the atmosphere. From these data, we can populate a mixing line and extrapolate from the isotopic composition of background air to that of a pure magmatic gas (Fischer and Lopez 2016; Liu et al. 2020).

From a volcanological perspective, Mount Michael on Saunders Island was our primary target. Satellite observations from the past two decades have shown that detectable quantities of sulphur dioxide emanate from the volcano and that elevated temperatures persist within the summit crater. These remote sensing observations suggest the

presence of an open lava lake hosted within the crater, with magma residing close to the surface over long periods of time (Gray et al. 2019; Lachlan-Cope et al. 2001). To collect samples of the volcanic gases for the chemical measurements described above, we were to climb to the summit crater. We also planned to measure the temperature of the lava lake with a thermal imaging camera, to compare the temperature of the lava lake to that estimated previously from satellite remote sensing (Gray et al. 2019), and ultimately confirm or refute the existence of exposed molten lava at the surface.

We made our summit attempt on the second day at anchor at Saunders Island (Figure 16.5a). Although the weather was clear and dry at sea level, the summit of the volcano remained blanketed in a thick layer of cloud and hidden from view. The winds were forecast to change direction later in the day, and I remember remaining optimistic that this shift to stronger westerlies would drive away some of the clouds that stayed resolutely fixed on the local height point:

> We were a team of five for the ascent, and we set off shortly after first light. At first, we made good progress and reached the foot of the glacier on the southern flank after only a couple of hours. We'd seen from the previous day that the glacier was heavily crevassed, so we roped up for safety. Over the next hour we ascended slowly up to the shoulder of the volcano. There were crevasses everywhere and we'd often disappear up to our waist; we were thankful for the security of the rope. As we emerged on to the ridge, I realised that up until that point we'd been sheltered from the wind in the lee of the topography. The wind on the ridge was fiercely strong, blowing fragments of snow and ice fragments into our faces and eyes . . . The temperature was falling, and after half an hour the conditions were showing no sign of improving. I knew we had at least another 450 m of vertical ascent to the summit and were facing the prospect of zero visibility from this point forwards (extract from personal diary, 7 January 2020).

We eventually made the decision that we would turn around. I was completely torn, as a large part of me longed to continue the ascent regardless. I'd imagined every detail of this ascent and our arrival at the summit for several years and it was quiet agony to see it slipping away. Yet I also knew that there was really no decision to make: there was only one option. To continue ascending uncharted terrain in poor visibility and driving snow would have been beyond reckless. In the Antarctic, there is

no margin for error. A similar conundrum likely befell Cook as he discovered, yet resisted the temptation to land, on the new capes he had discovered:

> it would have been rashness in me to have risked all which had been done in the Voyage, in finding out and exploring a Coast which when done would have answered no end whatsoever (Cook 1777, 6 February 1775).

In hindsight, it is clear to me that no useful measurements would have been possible in those conditions even if we had made the summit. We would have risked all else achieved on the expedition, to achieve no end. Recognising and acknowledging hard limits in situations largely outside your control, even when the objective is so highly prized, has been an important aspect of finding my own Antarcticness – one that has shaped my character.

We sailed overnight to reach Southern Thule. Mistakenly, I had thought that I had gained my 'sea legs' during the journey to Saunders, but the several days spent ashore had re-equilibrated me to land life. It was a miserable passage, made even worse by the need to prepare (and repair) equipment ahead of the next landing. Even just the thought of detailed work below deck made the nausea rear again. Southern Thule is actually a collection of three islands: Thule, Cook and Bellingshausen. Thule and Cook were once connected. Hydrographical surveys and geophysical imaging of the Douglas Strait revealed that region of ocean floor between the two islands was actually an enormous submerged crater, known as a caldera, formed by a large-scale collapse following a major explosive eruption of currently unknown age (Smellie et al. 1998). Bellingshausen is the youngest of the three islands, formed during comparatively recent volcanic activity. My science objectives here were to collect samples of volcanic rocks of different ages, ideally spanning the caldera-forming event and the more recent activity on Bellingshausen. Analysing the chemistry of these rocks helps to reconstruct the sequence of events, and to decipher the processes taking place in the magmatic roots of the volcanoes that led to these shifts in explosive behaviour.

I had managed to fall asleep by the time we reached the Douglas Strait and laid anchor. However, I keenly remember waking in the early hours of the morning, and feeling . . . stillness. The boat was rocking only very gently, the engines were powered down and quiet, and most of the other members of the expedition were still in their bunks. Briefly disoriented and not knowing where we were, I ventured out onto the back

deck and was met with a scene of peace and serenity (Figure 16.1f). On either side of the strait, tall cliffs rose steeply from the shoreline – their red and black colours exposing their volcanic origin – and were capped by glaciers that glinted in the low morning light. The sky was clear and blue, amplifying the colours in the rock. The water in the Strait was calm, with only a light swell, sheltered from the open ocean beyond by the cocoon made by Cook and Thule islands on each side. For an hour or so, I could have been the only person in the world, absorbed watching birds fly past the boat, swaying to the gentle rhythm of the rocking boat, and feeling the warmth of the sun on my face. The contrast of this serene moment against the misery of the previous days' sailing in rough seas and poor visibility was not lost on me. For the first time since reaching the South Sandwich, I was not rushing or planning, and instead allowed myself to just stop and be in the present. I could not have felt further from the savage realm described by Cook – 'Lands doomed by nature to everlasting frigidness and never once to feel the warmth of the Sun's rays' – and other early sailors.

Although it is one of the smallest islands in the South Sandwich, Bellingshausen is a built like a fortress. Steep cliffs surround the island on all sides (Figure 16.1h), as the ocean has eroded the lava flows that comprise most of the subaerial portion of the volcano. The only suitable landing site was on the far north of the island, in a small bay on Isaacson Point, but even there the waves were breaking too far out to drive the dinghy into shore – it would surely capsize. Several of our group could perform their work from the air, using drones to collect high-resolution aerial imagery of the penguin colonies, but we needed to physically land ashore. As on Saunders, I wanted to take samples of the volcanic gases emanating from small gas vents (fumaroles) in and around the crater of Bellingshausen (Figure 16.5e). To collect gas samples from different sites along the volcanic arc was crucial to establishing whether the source of volatile elements such as carbon (i.e. mantle versus subducting plate versus overlying crust) remained consistent along the arc.

We had prepared for this scenario and had a strategy to get both personnel and equipment ashore using a rope line extending from the dinghy to the shore (Figure 16.5c), but it was a last resort. Clipped to the rope line, and kitted out in full dry suits and buoyancy aids, we were secure, but we still needed to swim. No matter how confident a swimmer you are, there is a considerable activation energy to overcome in throwing yourself into Antarctic waters, surrounded by icebergs on the horizon. All around us, penguins returning were propelling themselves into shore and navigating the breaking waves with impressive aplomb.

The hilarity of just how un-penguin-like my own exit from the water would be helped to take my mind off the plunge. When I jumped into the water from the dinghy, the icy cold hit immediately and it took several moments to remind my arms and legs what they needed to do. One stroke after another, and soon I was being pulled onto the beach by others from the team already ashore and shedding their dry suits. It was a short and sharp shock, rewarded by the extraordinary euphoria of realising that we had not only just swum in the Southern Ocean but now also had several hours ahead of us to collect all the samples and measurements we needed.

From the most southerly point of the volcanic arc, we sailed north towards Candlemas and Zavodovski, unintentionally retracing the route sailed by Cook in 1775. After several days of productive work, the weather forecast turned against us whilst at Candlemas. Reports came in of a deep low-pressure system arriving in the next couple of days bringing strong northerly winds. These winds would prevent us travelling back towards South Georgia, potentially marooning us in the South Sandwich for a week or more. Again, a difficult decision needed to be made: to shelter in the South Sandwich in the hope of a weather window to land at Zavodovski, at risk of leaving us exposed, or to cut and run to stay ahead of the storm, leaving enough time to complete our remaining science objectives in South Georgia. As the forecast worsened, and the window to leave began to close, we stowed our equipment for the open ocean once again. As we passed Zavodovski, we circumnavigated the island to make as many observations from the boat as we could. The conditions were terrible, with frequent squalls bringing walls of horizontal rain and gusty winds. Several groups, volcanology included, launched drones to acquire close-up imagery remotely, for later interpretation (see Figure 16.2a). The level of detail and scientific insight able to be extracted from these aerial images is testament to how technological innovation is enabling research observations that previously would never have been possible, especially in harsh environments (James et al. 2020).

A fragile planet

The South Sandwich Islands and their surrounding oceans are exceptionally biodiverse with many endemic species (Hart and Convey 2018; Trathan et al. 2014). Terrestrial habitats provide safe breeding grounds for globally significant populations of seabirds, notably penguins (Figure 16.6; Hart and Convey 2018; Lynch et al. 2016). The enormous

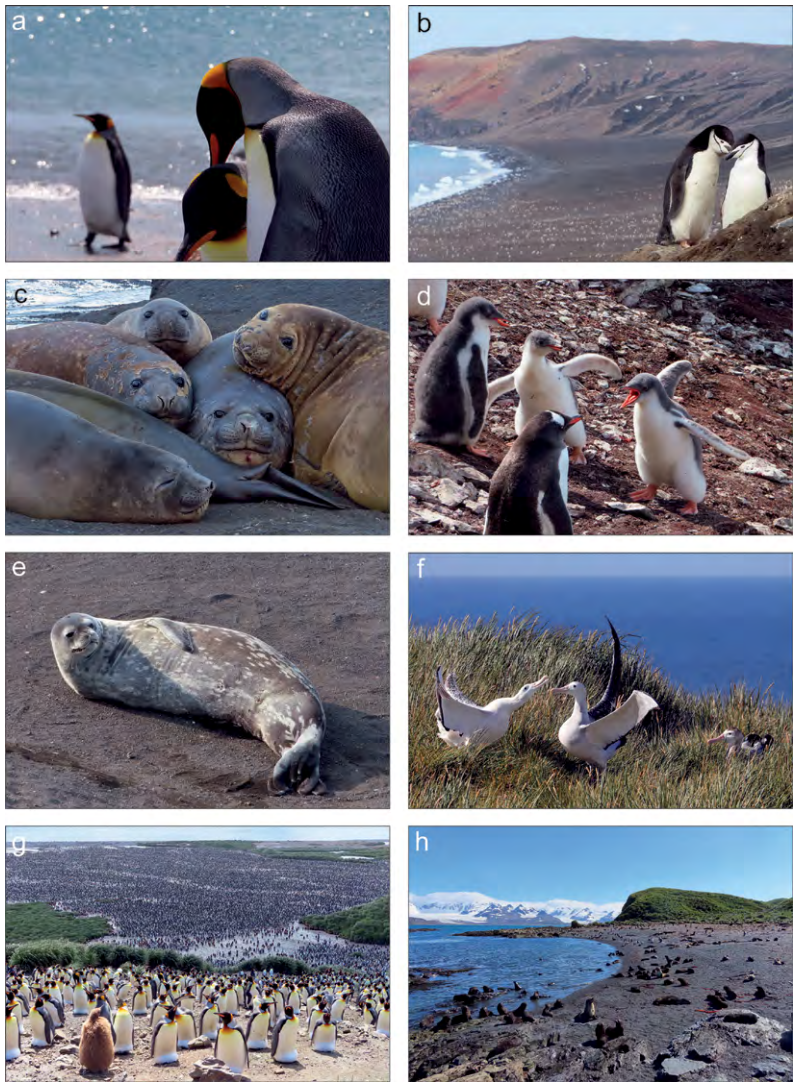
size of the colonies, at least on Zavodovski, have been recognised since the early discoveries of the South Sandwich Islands:

> Millions of penguins stood on shore, packed so close together that there was no passage between them. And since this was the first time they had seen humans, our arrival provoked no anxiety among them (Simonov quoted in Barr 2000).

To prevent economic exploitation of these species-rich yet fragile ecological havens, the South Sandwich Islands together with South Georgia were declared a Marine Protected Area (MPA) in 2012, which was further expanded in 2013 and again in 2019. Long-term sustainable management of the MPA is administrated by the Government of South Georgia and the South Sandwich Islands (Trathan et al. 2014; Hart and Convey 2018). The flora and fauna that call the South Sandwich Islands, and indeed the Antarctic more broadly, their home, cannot be excluded from any attempts to define Antarcticness. Rather, these indomitable plants and animals epitomise its very essence – progress in the face of adversity, learning (evolving) in response to hardship, and success when failure ought to be expected.

To ensure that this key aspect of Antarcticness is not lost, access to the islands is strictly controlled, and for those granted permission biosecurity is taken seriously. After each landing, all equipment and clothing items are scrubbed and disinfected, and any plant spores or trapped dirt picked out painstakingly with tweezers. Endemic island populations, of both plants and animals, are generally highly adapted and therefore often lack the defence mechanisms to resist an invasive competitor (Convey 1996). The introduction of a non-native species, even unintentionally, has irreversible ecological impacts (Hughes et al. 2015). The introduction and rapid, pervasive colonisation of South Georgia by the invasive flora is one such example. Despite strict biosecurity protocols, 82 non-native plant species are recorded from South Georgia, of which 35 species are historic and presumed extinct, 3 are widespread and naturalised and 5 are common locally (Floyd 2019).

The designation of MPA status shields the South Sandwich Islands from many of the modern pressures that affect much of the rest of the world and its oceans, such as overfishing, pollution and habitat destruction through land use change. In response to the prioritisation of environmental stewardship, these islands have seen a recent revival of fur seals and whales, whose populations were decimated almost to extinction



16.6 Wildlife of the South Sandwich Islands and South Georgia (all photographs by Emma J. Liu, 2020 except for (f)): (a) King penguins, Salisbury Plain, South Georgia; (b) Chinstrap penguins, Saunders Island, South Sandwich; (c) Elephant seals, Saunders Island, South Sandwich; (d) Gentoo penguins, Cooper Bay, South Georgia; (e) Weddell seal, Saunders Island, South Sandwich; (f) Albatross, South Georgia by Ted Cheeseman, 2020; (g) King penguins, Salisbury Plain, South Georgia; and (h) Fur seals, adults and pups, South Georgia.

by human activities, and of fish stocks, with efforts to sustainably manage fisheries (Trathan et al. 2014).

Anthropogenic climate change's effects are being felt acutely in both the sub-Antarctic and the Antarctic continent. Temperatures are rising year on year (Dunn et al. 2020) and the rate of ice loss is increasing (e.g. Pattyn and Morlighem 2020; Rignot et al. 2013). Terrestrial habitats are shrinking due to the climatic effect on ecological niches, and changes in the ocean (such as temperature, salinity and ocean currents) are affecting the availability of food sources; both increase competition for resources among species that exist in already challenging environments. The rate at which warming-related environmental change is taking place exceeds any to which the natural world can adapt effectively. In the face of mounting anthropogenic pressures, the Antarctic and sub-Antarctic regions highlight the fragility of our planet in stark detail. If we do not act soon, the memory of Antarcticness will be all that remains. The physical world that inspired it will be forever lost to us.

Antarcticness as a sense of place

The emphasis on the harshness and hostility of the environment in the accounts of early explorers in the region projects the view that the writer feels they are a visitor in an inhospitable world. The use of language such as 'lofty' and 'terrific' conveys a sense of awe, but tempered by apprehension; perhaps their documentation of the present was influenced by concerns for their journey still ahead: 'Bouvets Discovery was yet before us, the existence of which was to be cleared up and lastly we were now not in a condition to undertake great things' (Cook 1777, 6 February 1775). However, I do not feel that this is my Antarcticness.

As a scientist, I am familiar with experiments that are carefully designed; laboratory schedules that are rigorously followed; and conditions that are meticulously controlled. I spend considerable time in the field in remote places, but this expedition to the edge of Antarcticness forced me to embrace (in ways that previous expeditions have not) a lack of absolute control, and ultimately, to accept that the fate of my research – and indeed, of me – was in many ways out of my hands (see Chapter 4). The South Sandwich Islands are harsh, inhospitable environments and the oceans around them are exposed and unforgiving. Every minute ashore was a privilege, and every observation and measurement was hard won.

Yet I also associate my time in the South Sandwich with moments of great tranquillity. Those were times where I found myself able to simply

stop and appreciate the colours and details of the environment around me, and challenge myself to think about just how far away from human civilisation we truly were: 800 kilometres is a long way. For once, my research was not focused on mitigating the effect of the natural world on human communities and infrastructure. Instead, the emphasis was on exploring and discovering new features of the natural world that exist and thrive largely outside of human observation (see also Chapter 13).

Place attachment is the emotional bond between an individual and their meaningful environments (Scannell and Gifford 2010). Attachment is rooted in the concept of feeling a sense of place in relation to a particular space, which may stem from practical dependence, cultural significance, personal or group identity, or an experience of personal growth, among others factors (Scannell and Gifford 2010). Jorgensen and Stedman (2001) suggest that a sense of place encompasses the sub-concepts of place identity, place attachment and place dependence, with place attachment being the process of forming an emotional connection to a particular environment. Place attachment is stronger for settings that evoke personal memories (Twigger-Ross & Uzzell 1996), as 'it is not simply the places themselves that are significant, but rather what can be called "experience-in-place" that creates meaning' (Manzo 2005). Although attachment is usually defined in positive terms, place relationships can also represent negative or challenging emotions as either whole or part of the attachment (Manzo 2005).

Attachment can vary in terms of specificity (Scannell and Gifford 2010): an attachment can be made to either a specific place – such as Saunders Island, South Sandwich Islands – or a class of places, such as 'wilderness' (Williams et al. 1992) or in this case the Antarctic and sub-Antarctic. Scannell and Gifford (2010) propose that place attachment can be defined in terms of three facets: person, process and place. In this model, the nature of the attachment is influenced by the positionality of the person who is experiencing the place, the manner in which they experience it, and the specific characteristics of the place being experienced. The literature on this topic is vast, and I make no attempt to review the breadth of opinion comprehensively. Nonetheless, qualitatively, the discussions around the affective and cognitive elements of place attachment have guided me in my attempt to identify my perception of Antarcticness.

As my recall becomes progressively hazy with time, there are several emotions that retain their clarity: crushing disappointment when turning my back on the summit of Mount Michael, peaceful solitude that morning in the Douglas Strait, brief panic at the sudden grip of the cold water

while landing ashore at Bellingshausen, and the race-against-time urgency to wrap up our work at Candlemas to stay ahead of the storm. Together, these define my perception of Antarcticness. There is a particular piece of orchestral music that I played over and over during my expedition and which will be forever coupled to my memories of the experience. The piece was *Unbreakable* by Thomas Bergersen, which narrates a journey through anticipation, exhilaration, distress and finally triumph. Listening to this piece while writing this chapter rekindled the sense of place much more strongly than any photograph or written journal entry.

Returning to my opening remarks expressing that essence of Antarcticness is shaped by personal experiences, the sense of place I associate with the South Sandwich Islands is rooted in the emotional journey that I experienced in the course of undertaking scientific research in unfamiliar and unpredictable conditions, balancing a (real or perceived) pressure to deliver with the practical realities of the situation in front of me. The suffix '-ness' is used with an adjective to say something about the state, condition or quality of being that adjective. 'Antarctic' is both a noun and an adjective and therefore can refer to a place and also describe that place, simultaneously. Although my experience was shaped by the specific case of the South Sandwich and by scientific curiosity, I propose that Antarcticness – or more appropriately, to possess Antarcticness – is the quality of seeking to explore and embracing the emotional journey, both positive and negative, that this entails. Applied more explicitly to the Antarctic and sub-Antarctic (as this broad definition could equally be applied to high mountain wildernesses, for example), the emotional journey relates specifically to the challenges and triumphs arising from the unique climatological and ecological characteristics of life south of the Antarctic Polar Front. In this way, I reconcile the experiences described by early polar explorers with my own.

The relationship between place attachment and environmental stewardship (see Chapter 9) is complex (Vaske and Kobrin 2001), but many studies argue that the greater the attachment to a physical location, the more likely a person is to engage in its protection (Scannell and Gifford 2010). Discussing what it means to possess Antarcticness, and encouraging people to find their own interpretation based on their own experiences (whether real or imagined), through public engagement and science communication activities, is crucial to building support for sustainable environmental management of the Antarctic and sub-Antarctic wildernesses.

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References

Aiuppa, Alessandro, Cinzia Federico, Gaetano Giudice and Sergio Gurrieri. 2005. 'Chemical mapping of a fumarolic field: La Fossa crater, Vulcano island (Aeolian Islands, Italy)'. *Geophysical Research Letters* 32(13): article L13309.

Aiuppa, Alessandro, Luca Fiorani, Simone Santoro, Stefano Parracino, Marcello Nuvoli, Giovanni Chiodini, Carmine Minopoli and Giancarlo Tamburello. 2015. 'New ground-based lidar enables volcanic CO_2 flux measurements'. *Scientific Reports* 5(1): 13614.

Aiuppa, Alessandro, Tobias P. Fischer, Terry Plank, Philippe Robidoux and Rossella Di Napoli. 2017. 'Along-arc, inter-arc and arc-to-arc variations in volcanic gas CO_2/ST ratios reveal dual source of carbon in arc volcanism'. *Earth-Science Reviews* 168: 24–47.

Aiuppa, Alessandro, Roberto Moretti, Cinzia Federico, Gaetano Giudice, Sergio Gurrieri, Marco Liuzzo, Paolo Papale, Hiroshi Shinohara, and Mariano Valenza. 2007. 'Forecasting Etna eruptions by real-time observation of volcanic gas composition'. *Geology* 35(12): 1115–18.

Baker, P.E., M.W. Holdgate, R.E. Longton, P.J. Tilbrook, J.F. Tomblin, R.W. Vaughan and C.J.C. Wynne-Edwards. 1964. 'A survey of the South Sandwich Islands'. *Nature* 203(4946): 691–3.

Barker, Peter F. 1970. 'Plate tectonics of the Scotia Sea region'. *Nature* 228(5278): 1293–6.

Barker, Peter F. 1995. 'Tectonic framework of the East Scotia Sea'. In *Backarc Basins: Tectonics and Magmatism*, edited by Brian Taylor, 281–314. Boston: Springer.

Barr, William. 2000. 'First landings on Zavodovski Island, South Sandwich Islands, 1819'. *Polar Record* 36(199): 317–22.

Biscoe, John. 1901. 'Journal of a voyage towards the South Pole on board the brig *Tula* under the command of John Biscoe with the cutter *Lively* in company'. In *The Antarctic Manual for the Use of the Expedition of 1901*, edited by G. Murray, 305–35. London: Royal Geographical Society.

Burgess, S.D., S.A. Bowring, T.H. Fleming and D.H. Elliot. 2015. 'High-precision geochronology links the Ferrar large igneous province with early-Jurassic ocean anoxia and biotic crisis'. *Earth and Planetary Science Letters* 415: 90–9.

Burton, M.R., G.G. Salerno, L. D'Auria, T. Caltabiano, F. Murè and R. Maugeri. 2015. 'SO_2 flux monitoring at Stromboli with the new permanent INGV SO_2 camera system: A comparison with the FLAME Network and seismological data'. *Journal of Volcanology and Geothermal Research* 300: 95–102.

Convey, Peter. 1996. 'The influence of environmental characteristics on life history attributes of Antarctic terrestrial biota'. *Biological Reviews* 71(2): 191–225.

Cook, James. 1777. *A Voyage Towards the South Pole, and Round the World: Performed in His Majesty's ships the Resolution and Adventure, in the years 1772, 1773, 1774, and 1775*, vol. 1. London: W. Strahan & T. Cadell.

Debenham, Frank, ed. 1945. *The Voyage of Captain Bellingshausen to the Antarctic Seas 1819–1821*. London: Hakluyt Society.
Dunn, Robert J.H., Diane M. Stanitski, Nadine Gobron and Kate M. Willett. 2020. *State of the Climate in 2019: Global climate*. Washington, DC: American Meteorological Society.
Edmonds, Marie. 2021. 'Geochemical monitoring of volcanoes and the mitigation of volcanic gas hazards'. In *Forecasting and Planning for Volcanic Hazards, Risks, and Disasters*, edited by Paolo Papale, 2: 117–51. Oxford: Elsevier.
Edwards, Benjamin R., Magnús T. Gudmundsson and James K. Russell. 2015. 'Glaciovolcanism'. In *The Encyclopedia of Volcanoes*, second edition, edited by Haraldur Sigurdsson, 377–93. Amsterdam: Academic Press.
Fischer, Tobias P. and Taryn M. Lopez. 2016. 'First airborne samples of a volcanic plume for $\delta^{13}C$ of CO_2 determinations'. *Geophysical Research Letters* 43(7): 3272–9.
Floyd, Kelvin. 2019. *Non-Native Plants on South Georgia*. GSGSSI Season Report 2018/19, 40.
Freeman, Natalie M., Nicole S. Lovenduski and Peter R. Gent. 2016. 'Temporal variability in the Antarctic Polar Front (2002–2014)'. *Journal of Geophysical Research: Oceans* 121(10): 7263–6.
Galle, Bo, Clive Oppenheimer, Andreas Geyer, Andrew J.S. McGonigle, Marie Edmonds and Lisa Horrocks. 2003. 'A miniaturised ultraviolet spectrometer for remote sensing of SO_2 fluxes: A new tool for volcano surveillance'. *Journal of Volcanology and Geothermal Research* 119(1–4): 241–54.
Garabato, Alberto C., Karen J. Heywood and David P. Stevens. 2002. 'Modification and pathways of Southern Ocean deep waters in the Scotia Sea'. *Deep Sea Research Part I: Oceanographic Research Papers* 49(4): 681–705.
Gass, I.G., P.G. Harris and M.W. Holdgate. 1963. 'Pumice eruption in the area of the South Sandwich Islands'. *Geological Magazine* 100(4): 321–30.
Ghiorso, Mark S., and Guilherme A.R. Gualda. 2015. 'An H_2O–CO_2 mixed fluid saturation model compatible with rhyolite-MELTS'. *Contributions to Mineralogy and Petrology* 169(6): article 53.
Gray, D.M., A. Burton-Johnson and P.T. Fretwell. 2019. 'Evidence for a lava lake on Mt Michael volcano, Saunders Island (South Sandwich Islands) from Landsat, Sentinel-2 and ASTER satellite imagery'. *Journal of Volcanology and Geothermal Research* 379: 60–71.
Hart, Tom, and Peter Convey. 2018. 'The South Sandwich Islands: A community of meta-populations across all trophic levels'. *Biodiversity* 19(1–2): 20–33.
Holdgate, M.W. and Baker, P.E. 1979. *The South Sandwich Islands: I. General description*. Cambridge: British Antarctic Survey.
Hughes, Kevin A., Luis R. Pertierra, Marco A. Molina-Montenegro and Peter Convey. 2015. 'Biological invasions in terrestrial Antarctica: What is the current status and can we respond?' *Biodiversity and Conservation* 24(5): 1031–55.
Iverson, Nels A., Philip R. Kyle, Nelia W. Dunbar, William C. McIntosh and Nicholas J.G. Pearce. 2014. 'Eruptive history and magmatic stability of Erebus volcano, Antarctica: Insights from englacial tephra'. *Geochemistry, Geophysics, Geosystems* 15(11): 4180–202.
James, Mike R., Brett Carr, Fiona D'Arcy, Angela Diefenbach, Hannah Dietterich, Alessandro Fornaciai, Einat Lev, Emma J. Liu, David C. Pieri, Mel Rodgers, Benoît Smets, Akihiko Terada, Felix W. von Aulock, Thomas R. Walter, Kieran T. Wood and Edgar U. Zorn. 2020. 'Volcanological applications of unoccupied aircraft systems (UAS): Developments, strategies, and future challenges'. *Volcanica* 3(1): 67–114.
Jorgensen, Bradley, and Richard Stedman. 2001. 'Sense of place as an attitude: Lakeshore owners' attitudes toward their properties'. *Journal of Environmental Psychology* 21(3): 233–48.
Kemp, S., and A.L. Nelson. 1931. 'The South Sandwich Islands'. *Discovery Rep.* 3: 133–98.
Kern, Christoph, Peter Lübcke, Nicole Bobrowski, Robin Campion, Toshiya Mori, Jean-François Smekens, Kerstin Stebel, Giancarlo Tamburello, Mike Burton, Ulrich Platt and Fred Prata. 2015. 'Intercomparison of SO_2 camera systems for imaging volcanic gas plumes'. *Journal of Volcanology and Geothermal Research* 300: 22–36.
Lachlan-Cope, Tom, John L. Smellie and Russell Ladkin. 2001. 'Discovery of a recurrent lava lake on Saunders Island (South Sandwich Islands) using AVHRR imagery'. *Journal of Volcanology and Geothermal Research* 112(1–4): 105–16.
Larter, Robert D., Lieve E. Vanneste, Peter Morris and David K. Smythe. 2003. 'Structure and tectonic evolution of the South Sandwich arc'. *Geological Society, London, Special Publications* 219 (1): 255–84.
Leat, P.T., J.H. Scarrow and I.L. Millar. 1995. 'On the Antarctic Peninsula batholith'. *Geological Magazine* 132(4): 399–412.

Leat, Philip T. 2008. 'On the long-distance transport of Ferrar magmas'. *Geological Society, London, Special Publications* 302(1): 45–61.
Leat, Philip T., Peter T. Fretwell, Alex J. Tate, Robert D. Larter, Tara J. Martin, John L. Smellie, Wilfried Jokat and Gerhard Bohrmann. 2016. 'Bathymetry and geological setting of the South Sandwich Islands volcanic arc'. *Antarctic Science* 28(4): 293–303.
LeMasurier, Wesley E. 2008. 'Neogene extension and basin deepening in the West Antarctic rift inferred from comparisons with the East African rift and other analogs'. *Geology* 36(3): 247–50.
Liu, E.J., A. Aiuppa, A. Alan, S. Arellano, M. Bitetto, N. Bobrowski, S. Carn, R. Clarke, E. Corrales, J.M. de Moor, J.A. Diaz, M. Edmonds, T.P. Fischer, J. Freer, G.M. Fricke, B. Galle, G. Gerdes, G. Giudice, View A. Gutmann, C. Hayer, I. Itikarai, J. Jones, E. Mason, B.T. McCormick Kilbride, K. Mulina, S. Nowicki, K. Rahilly, T. Richardson, J. Rüdiger, C.I. Schipper, I.M. Watson and K. Wood. 2020. 'Aerial strategies advance volcanic gas measurements at inaccessible, strongly degassing volcanoes', *Science Advances* 6(44): article eabb9103.
Liu, Emma J., Kieran Wood, Alessandro Aiuppa, Gaetano Giudice, Marcello Bitetto, Tobias P. Fischer, Brendan T. McCormick Kilbride, Terry Plank and Tom Hart. 2020. 'Volcanic activity and gas emissions along the South Sandwich arc'. *Bulletin of Volcanology* 83(1): article 3.
Lynch, Heather J., Richard White, Ron Naveen, Andy Black, Marcia S. Meixler and William F. Fagan. 2016. 'In stark contrast to widespread declines along the Scotia arc, a survey of the South Sandwich Islands finds a robust seabird community'. *Polar Biology* 39(9): 1615–25.
Manzo, Lynne C. 2005. 'For better or worse: Exploring multiple dimensions of place meaning'. *Journal of Environmental Psychology* 25(1): 67–86.
McGonigle, Andrew J.S., Clive Oppenheimer, Bo Galle, Tamsin A. Mather and David M. Pyle. 2002. 'Walking traverse and scanning DOAS Measurements of volcanic gas emission rates'. *Geophysical Research Letters* 29(20): article 46.
Moor, J. Maarten de, A. Aiuppa, G. Avard, H. Wehrmann, N. Dunbar, C. Muller, G. Tamburello et al. 2016. 'Turmoil at Turrialba volcano (Costa Rica): Degassing and eruptive processes inferred from high-frequency gas monitoring'. *Journal of Geophysical Research: Solid Earth* 121(8): 5761–75.
Moretti, Roberto, and Paolo Papale. 2004. 'On the oxidation state and volatile behavior in multicomponent gas–melt equilibria'. *Chemical Geology* 213(1): 265–80.
Mori, Toshiya, and Mike Burton. 2006. 'The SO_2 camera: A simple, fast and cheap method for ground-based imaging of SO_2 in volcanic plumes'. *Geophysical Research Letters* 33: article L24804.
Murphy, Donald L., and Jacob L. Cass. 2012. 'The International Ice Patrol: Safeguarding life and property at sea'. *Coast Guard Journal of Safety & Security at Sea, Proceedings of the Marine Safety & Security Council* 69(2): 13–16.
Oppenheimer, Clive, and Philip Kyle. 2008. 'Volcanology of Erebus volcano, Antarctica'. *Journal of Volcanology and Geothermal Research* 177(3): v–vii.
Pankhurst, Robert J., Teal R. Riley, C. Mark Fanning and Simon Kelley. 2000. 'Episodic silicic volcanism in Patagonia and the Antarctic Peninsula: Chronology of magmatism associated with the break-up of Gondwana'. *Journal of Petrology* 41(5): 605–25.
Pattyn, Frank, and Mathieu Morlighem. 2020. 'The uncertain future of the Antarctic ice sheet'. *Science* 367(6484): 1331–5.
Peace, Alexander L., Jordan J.J. Phethean, Dieter Franke, Gillian R. Foulger, Christian Schiffer, J. Kim Welford, Greg McHone, Sergio Rocchi, Michael Schnabel and Anthony G. Doré. 2020. 'A review of Pangaea dispersal and large igneous provinces: In search of a causative mechanism'. *Earth-Science Reviews* 206: article 102902.
Platt, Ulrich, and Jochen Stutz. 2008. 'Differential absorption spectroscopy'. In *Differential Optical Absorption Spectroscopy: Principles and applications*, edited by Ulrich Platt and Jochen Stutz, 135–74. Berlin and Heidelberg: Springer.
Renner, Angelika H.H., Karen J. Heywood and Sally E. Thorpe. 2009. 'Validation of three global ocean models in the Weddell Sea'. *Ocean Modelling* 30(1): 1–15.
Rignot, E., S. Jacobs, J. Mouginot and B. Scheuchl. 2013. 'Ice-shelf melting around Antarctica'. *Science* 341(6143): 266–70.
Riley, Teal R., Michael J. Flowerdew, Robert J. Pankhurst, Mike L. Curtis, Ian L. Millar, C. Mark Fanning and Martin J. Whitehouse. 2017. 'Early Jurassic magmatism on the Antarctic Peninsula and potential correlation with the subcordilleran plutonic belt of Patagonia'. *Journal of the Geological Society* 174(2): 365–76.

Ross, J. 1847. *A Voyage of Discovery and Research in the Southern and Antarctic Regions during the Years 1839–1843*. London: John Murray.
Sano, Yuji, and Bernard Marty. 1995. 'Origin of carbon in fumarolic gas from island arcs'. *Chemical Geology* 119(1): 265–74.
Santoro, Simone, Stefano Parracino, Luca Fiorani, Roberto D'Aleo, Enzo Di Ferdinando, Gaetano Giudice, Giovanni Maio, Marcello Nuvoli and Alessandro Aiuppa. 2017. 'Volcanic plume CO_2 Flux measurements at Mount Etna by mobile differential absorption lidar'. *Geosciences* 7(1): article 9.
Scannell, Leila, and Robert Gifford. 2010. 'Defining place attachment: A tripartite organizing framework'. *Journal of Environmental Psychology* 30(1): 1–10.
Shinohara, Hiroshi. 2005. 'A new technique to estimate volcanic gas composition: Plume measurements with a portable multi-sensor system'. *Journal of Volcanology and Geothermal Research* 143(4): 319–33.
Smellie, John L. 2020. 'The role of volcanism in the making of Antarctica'. In *Past Antarctica*, edited by Marc Oliva and Jesús Ruiz-Fernández, 69–87. London: Academic Press.
Smellie, John L., P. Morris, Philip Timothy Leat, D.B. Turner and D. Houghton. 1998. 'Submarine caldera and other volcanic observations in Southern Thule, South Sandwich Islands'. *Antarctic Science* 10(2): 171–2.
Smellie, John L., Sergio Rocchi and Pietro Armienti. 2011. 'Late Miocene volcanic sequences in northern Victoria Land, Antarctica: Products of glaciovolcanic eruptions under different thermal regimes'. *Bulletin of Volcanology* 73(1): 1–25.
Smellie, John L., Sergio Rocchi, J.S. Johnson, Gianfranco Di Vincenzo and J.M. Schaefer. 2017. 'A tuff cone erupted under frozen-bed ice (northern Victoria Land, Antarctica): Linking glaciovolcanic and cosmogenic nuclide data for ice sheet reconstructions'. *Bulletin of Volcanology* 80(1): article 12.
Smellie, John L., Sergio Rocchi, Thomas I. Wilch, Maurizio Gemelli, Gianfranco Di Vincenzo, William McIntosh, Nelia Dunbar, Kurt Panter and Andrew Fargo. 2014. 'Glaciovolcanic evidence for a polythermal neogene East Antarctic ice sheet'. *Geology* 42(1): 39–41.
Storey, Bryan C. 1995. 'The role of mantle plumes in continental breakup: Case histories from Gondwanaland'. *Nature* 377(6547): 301–8.
Storey, Bryan C., Philip T. Leat, Stephen D. Weaver, Robert J. Pankhurst, John D. Bradshaw and Simon Kelley. 1999. 'Mantle plumes and Antarctica–New Zealand rifting: Evidence from mid-Cretaceous mafic dykes'. *Journal of the Geological Society* 156(4): 659–71.
Trathan, Philip N., Martin A. Collins, Susie M. Grant, Mark Belchier, David K.A. Barnes, Judith Brown and Iain J. Staniland. 2014. 'The South Georgia and the South Sandwich Islands MPA: Protecting a biodiverse oceanic island chain situated in the flow of the Antarctic circumpolar current'. In *Advances in Marine Biology*, edited by Magnus L. Johnson and Jane Sandell, 69: 15–78. London: Academic Press.
Twigger-Ross, Clare L., and David L. Uzzell. 1996. 'Place and identity processes'. *Journal of Environmental Psychology* 16(3): 205–20.
Vaske, Jerry J., and Katherine C. Kobrin. 2001. 'Place attachment and environmentally responsible behavior'. *Journal of Environmental Education* 32(4): 16–21.
Werner, Cynthia, Peter J. Kelly, Michael Doukas, Taryn Lopez, Melissa Pfeffer, Robert McGimsey and Christina Neal. 2013. 'Degassing of CO_2, SO_2, and H_2S associated with the 2009 eruption of Redoubt volcano, Alaska'. *Journal of Volcanology and Geothermal Research* 259: 270–84.
Williams, Daniel R., Michael E. Patterson, Joseph W. Roggenbuck and Alan E. Watson. 1992. 'Beyond the commodity metaphor: Examining emotional and symbolic attachment to place'. *Leisure Sciences* 14(1): 29–46.

17

Haunted by Antarcticness

David Rosenthal

I am a painter of realistic landscapes with extensive experience in Antarctica. Several of my Antarctic paintings are reproduced below as my primary illustration of Antarcticness, alongside some brief thoughts about my experiences of living and working in Antarctica.

Between 1989 and 1999 I spent over 60 months actually on the ice. I had lots of time to think about my experiences and about my place in Antarctica as an artist. When I began painting in Maine back in the 1970s, I was motivated by my love of nature. I was most captivated by the pure light and beauty of winter. Long before I began to paint, the light and beauty of the cold winter landscape was etched into my imagination, and would become my favourite subject as an artist. I chased the cold light to Alaska in the Arctic and then to Antarctica.

Before going to Antarctica, I thought I knew a lot about it. I read about it, I talked to friends who had worked there, and my experiences in the north made me think I knew what to expect.

The reality was far beyond what I had imagined.

Antarctica is truly a place of unimaginable beauty. The blazing cold light of the sun, and myriad forms of ice, make for landscapes and atmospheric effects rarely if ever seen anywhere else on Earth.

As an artist, I was very suited to painting Antarctic landscapes. Antarctica has all the elements that inspire me. I am a realist painter with a scientific background who can actually reveal some of the beauty in a meaningful way. My working method, relying on small pencil sketches done in the field to create my paintings in the studio, gives me the flexibility to capture scenes in the most extreme conditions. Perhaps my best asset is my love of the subject, which allowed me to total 60 months on the ice, and around twelve years concentrating on Antarctica as a subject for my work.

As the human behind the art, I was always haunted by the feeling that I did not belong in Antarctica. There was no warm embrace by nature or feeling that the ice was home. Warm feelings that I had always associated even with cold winter scenes in the north were not present. Seeing the beauty of Antarctica was accompanied by feelings of awe and personal insignificance.

For me, this is Antarcticness.

17.1 *Glacier Twilight*. Painting by David Rosenthal, 1999.

17.2 *Iceberg Twilight*. Painting by David Rosenthal, 1999.

17.3 *Gatlin Glacier and Icefall*. Painting by David Rosenthal, 1996.

17.4 *Moon Over Ice Shelf*. Painting by David Rosenthal, 1992.

18
Not concluding Antarcticness

Ilan Kelman

Emerging

The authors in this volume have been inspired by Antarctica and have inspired others about Antarctica. They have shown their imaginations and developed their imaginaries, through words and images, and through creating and interpreting knowledge. This knowledge is of Antarcticness leading to key themes emerging and overlapping (Table 18.1).

The theme of seeking control through Antarcticness is about creating an Antarctic identity and having one's identity created by Antarctica. This need to control often relates to nature. The chapters highlight Antarctic identity tropes of purity, wilderness and being unspoiled, yet then go on to challenge these tropes in pursuit of a deeper, more realistic and more entangled identity. Antarcticness is about being untamed and placid, dangerous and embracing, untouched and contaminated, and alien and comforting. It involves responsibility to and stewardship of the environment, under the assumption of a modicum of control for limiting human impacts.

Consequently, the Antarctic environment (pristine or otherwise) cannot be divorced from human interests, producing the identity geopolitics of controlling the continent's governance and management. The Antarctic Treaty System is the formal approach. The chapters show how much more occurs outside the Treaty System's remit through the governance and management of Antarctic images, interests and impacts on and from the continent. Every schoolteacher mentioning Antarctica

Table 18.1 Axes of Antarcticness

Theme	Aspects	Chapters
Seeking control	Nature	2, 3, 4, 6, 7, 8, 9, 12, 16
	Geopolitics	3, 5, 7, 10, 11, 12, 13, 17
	Discrimination	5, 7, 10, 15
Losing control	Caution	2, 4, 6, 9, 13, 14, 16
	Patience	2, 4, 6, 9, 14, 16
Physicality	Environment	2, 4, 5, 6, 7, 16, 17
	Movement	2, 6, 12, 13, 16
Emotionality	Isolation	2, 4, 5, 8, 9, 13, 14, 17
	Closeness	3, 10, 11, 12, 14, 15, 16
	Performance	3, 6, 7, 8, 11, 12, 13, 14, 16

and every law reducing use of plastics and fossil fuel crosscuts the Antarcticness of seeking control.

This goal of seeking control over Antarcticness through identity geopolitics alters through time, exactly as the authors describe with respect to discrimination and overcoming it. Antarctica has been highly colonial, as described and challenged by the authors. Sexism has been a significant part of its historical identity, now obviated to some degree, with much more yet to be done. Disparities remain in the countries with a foothold there, the activities these countries' residents undertake, and the characteristics of the people with the privilege of reaching or thinking about the continent. A certain level of elitism emerges in seeking control and influence over Antarctica and Antarcticness.

It does not always work. Another Antarcticness theme is losing control. Many chapters unapologetically explain how the Antarctic environment controls us, no matter how much we plan and prepare. For people travelling there, if the intention is to leave Antarctica alive, then Antarcticness must mean caution and patience. Little room exists for surviving serious mistakes or for using second and third chances, given the monikers of iciest, snowiest, highest, whitest, coldest, driest, windiest, most isolated and – fittingly – the end. For all our collective experience, technology, safety and wisdom, the environment wields the most power for Antarctic life and death.

From the authors, undertones of losing control emerge beyond actions on the continent. They relate to human values and attitudes. Are we losing control of the ice sheets due to human-caused climate change? Do we lose ourselves in Antarctic imaginations and inspirations fabricated from afar, yielding unrepresentative Antarcticness? Has immersing

ourselves in 'the Antarctic for the world' discourse meant that it becomes lost as a tick-box icon on a travel bucket list? When in and around the continent, a large measure of control is ceded to the environment. Meanwhile, the Antarctic environment might be losing control to human influences, depictions and expectations.

These two themes of seeking control and losing control map out physically and emotionally.

Physicalities of Antarcticness match the superlatives continually ascribed to the continent's environment. Inescapable are low temperatures, low humidities, low precipitation, most of which is frozen, high winds and (over some areas) high elevations. Crevasses can eat you up and the oversea ice can crack, plunging you into frigid waters. Calving glaciers cause mini-tsunamis and flying ice fragments, volcanoes wait to rumble and blow, and storms whip up waves and whiteouts. This is the environment of Antarcticness, forcing and inhibiting movement. The chapters commonly express travel as an element of Antarcticness, implying the aphorisms that the journey is as important as the destination and that getting there (and back) is half the fun – and perhaps also half the experience, knowledge and wisdom. As baselines of Antarcticness, many of the authors embody movement to, within and from Antarctica, as well as the environment's trends and variations.

Emotionalities of Antarcticness sketch the duality of isolation and closeness, both mentally and physically. The continent is the most isolated on Earth, yet the few habitations are small-scale, forcing people into close proximity. Togetherness is a theme within movement – for science, tourism and exploration – just as teamwork and collective enterprise are essential for understanding and surviving the Antarctic environment. The analytics and artistry of people in Antarctica expose isolation and closeness simultaneously, reinforcing each other. Our connections to and separations from Antarctica are emotional, whether we are there physically or not, producing Antarcticness.

Performance anchors Antarcticness, looping back to the theme of seeking control. Whether capturing the sun's movement with a camera, enrapturing schoolchildren through flag design, observing the re-creation of past Antarctic histories or painting the soft lights and darknesses, Antarctica is a performative space. We see this also when analysing spiritual spaces, collecting volcanic samples, improvising (with analogies in performing arts) when plans go awry, and deconstructing the continent's scientism.

It all gives the illusion of control by allowing us to capture Antarcticness as we would wish to present it – and as we wish it would

(and would not) be represented or, perhaps, simply to be. The performative space might be a journal or a conference, seeking to assert control over our views of, interests in and understandings of the Antarctic.

Ideas symbolise and symbols ideate Antarcticness. After all, what is this pompous neologism, boldly purporting its own significance? Surely it is but a synthesised assemblage of what a continent might provide, coupled with an attempt to extend tendrils for capturing disparate activities and opinions? Chapter 11 consequently gifts 'flagness' compared to Chapter 16's sub-Antarcticness in parallel with Chapter 8's ant-architecture(-ness). The art diplomacy of Chapter 12 and the science diplomacy of Chapter 15 merge Antarcticness themes (enacting togetherness), notwithstanding the isolation pervading Chapters 2, 5 and 9. The explicit performativity across many chapters through art and science witnesses Antarcticness losing control by seeking control because emotionality and physicality intertwine. Inclusivity – anyone can be an Antarctican – and exceptionalism – Antarctica is just so different and people going there are special – sculpt the imaginations and inspirations, devising and generating the insights which create and define Antarcticness.

Coalescing

Antarcticness is neither anything nor everything people want it to be. Instead, it is all the themes, ideas and experiences entangled. It enmeshes the continent's characteristics, presumed and actual, alongside their presence and absence. Antarctica is labelled seventh, white, ice, southern, unowned, unknown, high, cold, dry, windy, isolated, scientific, the end, the bottom, uninhabited and peaceful. How much do the labels apply?

Antarctica is not stable, accessible, open for business or safe. Despite being uninhabited, it is not peopleless. Aside from all the physical visits, it remains in the imaginations of and continues to inspire those who are fortunate enough to be able to engage with Antarcticness in any form at any level. Meanwhile, human activity shapes Antarctica's characteristics through physical and political changes impacting everywhere south of 60°S.

This book is but one example of consolidating Antarctic ideas and interests. The consolidation here is Antarcticness.

The scope of this volume is investigating and describing the meanings and potential meanings of Antarctica through science, art and their combination. Fulfilling this scope through poetry, prose, photography and paintings has morphed Antarcticness from a whimsical

notion – which might or might not have merit – into a tangible object in our hands or on our screen. It is to be examined, engaged with, deconstructed, reviewed and critiqued. Ephemerality is forced into tangibility, as with the book's three aims.

The first aim is to present original research, art and interpretations of different experiences and explorations of Antarctica. This aim was completed through the authors' contributions, providing something new about the Antarctic in their own way from their own inspiration and imagination. Each reader can select their favourite chapters, bypass others, and consider what was not presented and how to do better in the future.

The second aim is to involve and connect as a wide a diversity of authors, backgrounds, disciplines and formats as feasible in a book format. The authors come from and are based in all non-Antarctic continents and all career stages. Some of them have spent time in or near Antarctica and some have not. They present their imaginations and indicate their inspirations, with some of them being experienced writers and others contributing in this format for the first time. They offer a balance of men and women, of ages, of subject areas, of professional backgrounds and of chapter types. Lack of inspiration and imagination comes through in this book being in English only, with a linear construction, and imbalanced towards authors who are career academics.

The third aim is to present the work within explanations and narratives of what Antarctica does and does not mean politically, culturally and environmentally. Antarcticness in these forms emerges from each chapter, almost always explicitly, with the main exceptions being the two poets who deliberately asked that their Antarcticness remain implicit. Antarcticness is also evident in the images, sometimes explicitly, sometimes implicitly and sometimes both. What imaginations and inspirations develop through the different renditions and through how we could do better together?

In particular, how well do the research, presentation and communication of the unifying theme of Antarcticness coalesce into management and action pathways for Antarctica and for Antarctica connected to the world? The lifeblood of science is exploring and exchanging, not just for its own edification, but also to try to do better for society and the environment with what we have. What does and could Antarcticness mean for doing better, which, in the end and at the end of the world, is not as much about management and action pathways for a place, but is much more about management and action pathways for humanity?

In order to move forward, the Antarcticness journey here now draws to a close. Or perhaps it is just beginning.

Afterword

Dwayne Ryan Menezes

What is 'Antarcticness'?

To me, it is about relationships, whether within, with or outside Antarctica, but anchored in some way in Antarctica and, thus, rendered distinctive – possibly even transformative – as a result.

Relationships between geophysical and ecological attributes that make the continent distinctive.

Relationships between activities/values/governance and a region that represent specific paradigms.

Relationships between people and space that make the latter a place imbued with special meaning.

Relationships between visitors and environment that make the former an imagined community with some shared attachment or experience.

Relationships between the phases of one's life, before and after one's interaction with Antarctica.

All of the above, and much, much more.

My own relationship with Antarctica – and budding sense of Antarcticness – bridges five junctures, or perhaps entire phases, in my life.

As a young – and hodophilic – child in what was then Bombay and later in Doha, my most constant companion was an old, sepia-toned globe that I loved to spin, before dropping my finger anywhere on its surface to stop it from rotating, and declaring that place, to which my finger would point, as one where I would live or visit someday. In reality, it simply indicated what I would read about later. I remember heading straight for the poles at almost every turn, so I could land in Greenland, Iceland or indeed Antarctica. Both the Arctic and the Antarctic intrigued me greatly, even if, or perhaps because, they seemed so distant, so different and, amid the very warm and seemingly endless Indian and Arabian summers, so enticingly cold!

Years later, once I had devoured almost everything Arctic and Antarctic in my library, I clearly recall how excited I used to get when a cousin in Toronto – a geophysical surveyor by profession – flew regularly between Labrador, Nunavut, Northwest Territories, Yukon and Alaska, and regaled me with his Arctic tales, and when an uncle in Melbourne, who ran a tour operator specialising in Africa, added South America and Antarctica to its portfolio and then went on an Antarctic expedition himself. I marvelled at their stories; I delighted in their pictures; I vicariously embraced, and felt embraced by, an embryonic sense of Arcticness and Antarcticness that would only develop and come to fruition in my own life much later.

At Cambridge, I found myself enveloped by the city's rich Antarctic heritage. I lived down the road from the Scott Polar Research Institute (SPRI) and was a member of Gonville and Caius College, both of which have long polar histories. While Scott had an honorary degree from Caius, Edward Wilson, a Caian, joined Scott's *Discovery* expedition (1901–4) and *Terra Nova* expedition (1910–12) and took on the latter a Caius flag made by the Master's wife. That expedition also included Cantabrigians Charles Wright, Frank Debenham, Griffith Taylor and Raymond Priestly, the first two of whom were Caians. Debenham returned to Caius, co-founded SPRI and became its first director. Although Scott and Wilson would not return from their ill-fated mission, the flag was brought back to Caius and now hangs in its Hall.

Later, during my time with the Commonwealth, while serving as consultant to the Commonwealth Secretary-General, I travelled to Greenland in a personal capacity and was struck by a similar awe, reverence and personal insignificance that many in this volume describe feeling in Antarctica. That affective and transformative experience did not end when I left Greenland, but crystallised into a deep affection and profound respect for the place and its people. My time thereafter with the UK Polar Network, exposure to the Antarctic Flags project, immersion in the polar research and policy community, participation in Arctic and Antarctic conferences, and independent deliberations on the Commonwealth and the Polar Regions enabled an ex situ maturing of my embryonic Arctic and Antarctic consciousness.

In 2015–16, I launched Polar Research and Policy Initiative (PRPI) as a London-based international think-tank dedicated to Arctic, Nordic and Antarctic affairs. The timing could not have been more propitious: the UN General Assembly adopted the 2030 Agenda for Sustainable Development, including the 17 Sustainable Development Goals; government delegations at COP21 reached the historic Paris Agreement;

the Arctic Council celebrated its twentieth anniversary; the parties to the Antarctic Treaty marked the twenty-fifth anniversary of the Protocol on Environmental Protection; and the UK marked the centenary of Shackleton's Imperial Trans-Antarctic Expedition. Yet that an exclusively polar think-tank could succeed and endure, and in London, is proof of rising polar consciousness – a cause and a consequence.

Since then, I have had the privilege of returning to the Arctic and engaging with the Antarctic on countless occasions, and bringing together a global community of researchers, policy-makers, industry executives, civil society leaders, explorers and journalists who share our interests in, and commitment to, these regions. Today, PRPI is the world's largest platform for Arctic analysis and commentary, with around four million site visits annually, and, until the Covid-19 pandemic hit, it also convened 50–60 high-level Arctic and Antarctic dialogues around the world each year. PRPI's growth brings us back to relationships. PRPI is, after all, an expression of, and conduit for the expression of, Arcticness and Antarcticness. It informs, shapes, mediates and feeds Arcticness and Antarcticness, just as much as it is informed, shaped, mediated and nourished by them. Its effectiveness is both a contributor to and a consequence of a more pervasive and deepening Arctic and Antarctic consciousness.

Beyond the exploration, science, conservation and governance, this is a personal account of some of the ways in which I encountered Antarctica at five different stages in my life. In a way, Antarctica, along with the Arctic, is what links these phases. This mix of personal and professional, analytical and emotional, physical and spiritual, direct and vicarious, in situ and ex situ is also how, I imagine, many others encounter Antarctica from their childhoods onward. The complex, multi-linear, synergistic, affective and evolving relationship one develops with Antarctica is what embodies Antarcticness to me. Reading the contributions that constitute this comprehensive, accessible, meaningful and valuable volume, I recognise that every contributor grapples with Antarcticness in their own way, in the light of their own experiences, and yet they touch upon various themes that have also intrigued and fascinated me over the years.

The credit for conceiving the conceptual frameworks of Arcticness and Antarcticness, and for bringing this important volume to life, is due entirely to Ilan Kelman, who was recently – and indeed deservedly – ranked by Reuters as one of the world's top climate scientists. 'In determining and disputing Antarcticness,' he notes, 'we each have our own pathways to generate.' As is evident in my own personal and

professional engagement with Antarctica and the creation of Antarcticness, Kelman too observes: 'We create Antarcticness for ourselves, steeped in our own preconceptions and prior encounters with the continent, in person or otherwise. The mind's Antarcticas form a myriad of Antarcticnesses. These are the imaginations. The inspirations and imaginations interfuse. Our imagination inspires just as inspiration feeds our imagination. The voyage of Antarcticness launches.'

Following Kelman's introduction, Gabriela Roldan and Hanne Nielsen consider the representations of Antarctica found at the Antarctic gateway cities of Ushuaia (Argentina), Punta Arenas (Chile), Christchurch (New Zealand), Hobart (Australia) and Cape Town (South Africa), and how Antarcticness matters to these communities as 'a multi-layered connection constructed and reconstructed over time in the fabric of their social identity'. They explore how the dominant representations and narratives of Antarcticness in these cities, which claim strong connections with Antarctica as starting points for Antarctic encounters, not only satisfy the political agendas of their host countries with regards to Antarctic leadership and sovereignty ambitions, but also assist these towns in gaining visibility on the world stage as polar specialists.

For Jan Schmutz, Pedro Marques-Quinteiro, Walter Eppich and Mirko Antino, it is Antarctica's simultaneously beautiful, dynamic and dangerous environment that best captures their definition of Antarcticness. Building on their research on teamwork, and highlighting Shackleton's Imperial Trans-Antarctic Expedition as representing the quintessential team that dealt with Antarcticness successfully, they offer fundamental ABC (Anticipation, Building Social Relationships, Collective Reflection) strategies for teams to influence their effectiveness in extreme environments such as Antarctica, where 'things often do not go according to plan' and where 'they must quickly adapt and improvise to ensure mission success'.

Andrew Avery looks at how, from the early 1940s to the early 1980s, Antarcticness was about a way of life, and a type of rugged masculinity rooted in empire, to the men who lived on the bases of the all-volunteer, all-male Falkland Islands Dependency Survey (FIDS) – renamed the British Antarctic Survey (BAS) in 1961 – that played a vital role in sustaining British colonisation in, and enforcing British sovereignty over, the Antarctic Peninsula. 'Being a Fid was more than a job,' he points out; 'it was a test of one's masculinity' – 'a late addition to a long tradition of colonial masculine archetypes'. Often commencing with the 'pursuit of heroic dreams' of one's boyhood, it was an identity based on suffering, isolation from the metropole, and the performance of coloniality and

domesticity in one's life in Antarctica. 'Synonymous with masculinity', Antarcticness was about 'toughness, fortitude and adventure'.

Acknowledging the coloniality and masculinity of traditional representations of Antarctica as the last frontier of human conquest for the predominantly white, male, fearless hero, Rosa Jijón, the first ever Antarctic artist-in-residence from Ecuador, takes on the challenge of 'unveil[ing] other narratives, trans-feminist and decolonial, to propose a reversed reading of Antarcticness' – a 'southern, decolonial, feminist, mestizo Antarcticness', so to speak. Her works include artistic actions to 'un-conquer' Antarctic territories, deconstruct Antarctic identity, dismantle 'conventional ideas on the purity and emptiness of the Antarctic landscape', assemble 'a different point of view of Antarctica, and so Antarcticness . . . that makes it urgent to reclaim our world heritage', and let Antarctica continue to be seen, going forward, not as a space of conquest but as a 'repository of our universal memory' and a 'repository of the possible future of humanity'.

Another key shift is the humanities and social sciences coming to the fore in Antarctic research, evident in the growing focus on music, art, literature and other aspects of culture. Ellen Frye looks for Antarcticness in the religion and spirituality of Antarctica, including its religious architecture, art and music, and finds that Antarctica can make religious-spiritual themes, such as hope, faith and death (as also suffering, peace and gratitude), seem more relevant. It can promote hope and faith, because of the awe and reverence its beauty and magnificence can inspire, or because of the suffering and gratitude that surviving harsh weather and near-death encounters may make one experience. It can make death seem more real, because it 'is always nearby, in the crevasse of a glacier, swirling in a whiteout, or drowning into the sea'. She also links Antarcticness and spirituality: 'It is the statelessness of Antarctica itself that serves to highlight more precisely the nature of spirituality itself: a freely practised situation of unworldliness, or conditions ripe for the mystical, or perhaps in yet another manifestation of the word, it is Antarcticness'.

While most visitors on expedition cruises are awestruck just on setting foot on the Antarctic Peninsula, Wilson Cheung observes that some venture further into the interior on expeditions and encounter the rhythm of the wilderness to which they must adapt. He looks at the dynamic, interactive relationship that emerges between the expedition visitor and the Antarctic wilderness, with the visitor integrating, and being integrated by and within, the natural rhythm of the latter, transforming the Antarctic 'space' into one's 'place' or 'Antarctica with us',

a never-ending process. In the absence of an official time zone, for instance, the visitor has to follow the cyclical rhythms of sunlight, bodily rhythms and weather. By voluntarily placing oneself in a disadvantaged situation to explore one's unknown as part of the wilderness, and with the challenges of the expedition disclosing one's limitations and facilitating greater self-understanding, Antarctica offers a place for self-actualisation. Antarcticness, for Cheung, embodies that dynamic, affective relationship between the Antarctic wilderness and expedition visitors, wherein 'the practice of expedition is processes of Antarcticness' – or processes of becoming connected to particular materialities, other people and particular places affectively.

It is not just the destination that has a transformative impact on a visitor to Antarctica, for so does the journey, as is evident in the beautiful travel account presented by Madeleine Hann and her colleagues that illustrates how the processes of Antarcticness extend also to the preparation, voyage, togetherness, destination, return and post-expedition memories and pursuits. The account weaves together the experiences of a cohort of women in STEMM (science, technology, engineering, mathematics and medicine) who, as part of the Homeward Bound programme, travelled or will travel on a three-week voyage to Antarctica after spending a year of preparation. The returnees speak of their realisation they had become 'Antarcticans' and of a 'collective feeling of Antarcticness', while the new cohort discusses their expectations. They remark that Antarctica has 'a unique power to ignite our imagination'; 'promises adventure and discovery in exchange for our curiosity, determination and willingness to accept that we are not in control'; reminds us that 'we are part of something larger'; represents 'peace and collaboration' and 'the expanse of human ingenuity'; and presents 'a unique opportunity for an inward journey'. They saw in Antarctica 'the permission and the insistence to be our raw, free, unconstrained and strong selves', drawing from it 'strength to make the world a better place, together'.

When it comes to activities fostering a sense of Antarcticness, few are as effective and prominent as the Antarctic Flags project, which seeks to connect schoolchildren – many of whom are unlikely to journey to the continent themselves – to Antarctica by sending their flag designs to be flown there. Sammie Buzzard and Tun Jan Young sketch the history of the project, from the time it was conceived by 'Our Spaces', to the UK Polar Network's involvement with it, and also how it overcame the challenges posed by the Covid-19 pandemic. Given that Antarctica does not have a symbol to represent its ideals of science for peace and is often portrayed

'as a place of mystique that provides a tabula rasa for imaginative and utopian projection', the project offers the opportunity to 'explore the possibilities presented by the Antarctic Treaty's visions', champion 'concepts that may at first seem tenuous and far-fetched, such as ideals of Antarcticness', and perhaps even build a civil society that Antarctica can rely on to advocate for its ideals of Antarcticness.

Visual art has proven to be especially powerful in constructing or conveying Antarcticness. For Adele Jackson, her work *Antarctic Sun Lines* – 'a series of Antarctic solargraphs that visually locate the continent in relation to planetary dynamics and the natural forces that sustain life on Earth' – sees 'the global environmental significance of the Antarctic location' as key to its Antarcticness, and concerns itself also with human understandings of, and impacts on, the Earth's systems. As she created solargraphs during deployments to Antarctica, her images grew to be more than just 'aesthetic souvenirs of time spent in the far south'; instead, the solargraphic method provided 'the Earth and the sun the power to draw a representation of their relationship' – with the sun stationary, the orbiting Earth 'the moving element in solargraph making' and human infrastructure represented through the foregrounding of research bases, scientific instruments and gateway city landmarks. 'Drawing connections – literally and figuratively – is where', she says, '*Antarctic Sun Lines* and Antarcticness converge', pointing out also that international cooperation, a key facet of Antarcticness, as enshrined in the Antarctic Treaty, was just as vital to *Antarctic Sun Lines*.

Daniela Cajiao and Yu-Fai Leung argue that any characterisation of Antarcticness would be incomplete if it focused solely on a biophysical description, and did not consider also the 'glorious history of human exploration to this last majestic frontier', the 'sobering history of human exploitation of Antarctic resources', the 'wonderful stories of scientific expeditions' and the 'intriguing political manoeuvres and policy discourse in the Antarctic Treaty System'. Returning to the themes of tourism and research, they focus on a specific human dimension of Antarcticness: how it is experienced emotionally and cognitively. Again, they observe the transformative relationship that emerges between the visitor and Antarctica through interactions with its wildlife and landscapes, a process that enables one to 'experience elements of Antarcticness' and 'elevate their awareness of ecological footprints', and that continues even after one has left the continent. Furthermore, the slow tourism experience represented by the challenging Antarctic voyage, with the change of pace and the logistical uncertainties, offers tourists the opportunity to slow down and align themselves with the elements (vastness, tranquillity,

timelessness) and feelings (isolation, awe, spiritual) of Antarcticness upon arrival, which may itself characterise a tourist's Antarcticness.

Iqra Choudhry explores the important but complicated relationships between science and Antarctica 'as viewed through or through creating the lens of Antarcticness', from the Heroic Age, when 'science was used to validate and quantify the efforts to explore the continent, the relationship of which could be taken to represent Antarcticness', to the subsequent period, when scientific activity replaced exploration as the key activity in Antarctica, now seen as the 'world's greatest laboratory', reinforcing the science–Antarctic relationship as Antarcticness, and beyond. Scientific activity led to the introduction of measures that enshrined conservation as a key component of Antarcticness, with the relevance of science to Antarctica and Antarcticness likely to grow as the end of the moratorium on mining activities in Antarctica draws near, and we grapple with the issues of resource exploration and bioprospecting. More recently, Choudhry says, the idea of a fragile Antarctic environment as iconic of climate change and needing our protection has integrated itself into Antarcticness, replacing 'older representations of Antarctica: as potential territory; as a place to be explored; or as the site of international scientific collaboration'.

For the volcanologist Emma Liu, despite being conditioned by her scientific writing to avoid evocative description and personal reflection, she found that 'the very essence of Antarcticness is entirely shaped by personal experiences, and by an individual's emotional response to those experiences'. Although her career has made her accustomed to 'carefully designed' experiments, 'rigorously followed' schedules and 'meticulously controlled' conditions, her expedition to the 'the edge of Antarcticness' (the South Sandwich Islands) compelled her 'to embrace a lack of absolute control'. The region's 'indomitable' flora and fauna also epitomise, to her, the essence of Antarcticness: 'progress in the face of adversity, learning (evolving) in response to hardship, and success when failure ought to be expected'. On the basis of the sense of place she associates with the South Sandwich Islands that is anchored in her own emotional journey over the course of her scientific research there, she posits that Antarcticness is 'the quality of seeking to explore and embracing the emotional journey, both positive and negative, that this entails' – 'the challenges and triumphs arising from the unique climatological and ecological characteristics of life south of the Antarctic Polar Front'.

The artist David Rosenthal, who provides some of his paintings as his illustration of Antarcticness, says that while he was well suited to

painting Antarctic landscapes, he was always 'haunted' by the sense that he – 'as the human behind the art' – 'did not belong' in Antarctica. He found Antarctica to be 'a place of unimaginable beauty', which did not evoke a sense of warmth or homeliness, but which did indeed evoke feelings of awe and personal insignificance, which, for him, constitute Antarcticness. The scientist James Bradley contributes to this volume too with a photo-essay – a collection of photographs taken from an expedition to Ross Island and McMurdo Station – to convey the essence of Antarcticness and 'the essence of feelings, experiences, emotions and perspectives picked up along the way'. The volume also features as an interlude a haiku on Antarcticness by Ilan Kelman, evoking some of its most striking themes: fear, awe and reverence.

Kelman draws the volume to a close by laying out the disparate – even if related – threads with which he stitched together this extraordinary 'synthesised assemblage'. The two Antarcticness themes of 'seeking control' and 'losing control', he says, map out physically and emotionally, and then the physicalities and emotionalities become Antarcticness themes. He adds: 'Performance anchors Antarcticness' and 'Antarcticness moulds into a performative space'; 'ideas symbolise and symbols ideate Antarcticness'; and yet, 'because physicality and emotionality intertwine', explicit performativity sees Antarcticness 'losing control by seeking control'. After all, inclusivity and exceptionalism both play a role in creating, defining and even contesting Antarcticness.

To conclude, this is, I am pleased to reiterate, a truly comprehensive, easily accessible, deeply meaningful and enormously valuable volume. By investigating 'the meanings and potential meanings of Antarctica' through 'poetry, prose, photography and paintings', Antarcticness has been 'morphed' indeed 'from a whimsical notion which might or might not have merit – into a tangible object . . . to be examined, engaged with, deconstructed, reviewed and critiqued. Ephemerality forced into tangibility,' as Kelman remarks.

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Illustrations and captions are denoted by the use of *italics*.

'Orientated around the construct of Antarcticness, Ilan Kelman brings together a range of exciting scholars and artists to consider the contemporary Antarctic. In its diversity, originality and beauty it is a triumph. If you want to know why to care about the future of Antarctica, read it.' – Alan D. Hemmings, University of Canterbury, New Zealand

Antarcticness joins disciplines, communication approaches and ideas to explore meanings and depictions of Antarctica. Personal and professional words in poetry and prose, plus images, present and represent Antarctica, as presumed and as imagined, alongside what is experienced around the continent and by those watching from afar. These understandings explain how the Antarctic is viewed and managed while identifying aspects which should be more prominent in policy and practice.

The authors and artists place Antarctica, and the perceptions and knowledge through Antarcticness, within inspirations and imaginations, without losing sight of the multiple interests pushing the continent's governance as it goes through rapid political and environmental changes. Given the diversity and disparity of the influences and changes, the book's contributions connect to provide a more coherent and encompassing perspective of how society views Antarctica, scientifically and artistically, and what the continent provides and could provide politically, culturally and environmentally.

Offering original research, art and interpretations of different experiences and explorations of Antarctica, explanations meld with narratives while academic analyses overlap with first-hand experiences of what Antarctica does and does not – could and could not – bring to the world.

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Cover image credit: Antarcticness togetherness during Homeward Bound. Photograph by Anne Charmantier 2019.

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