



THE SCRAMBLE FOR THE POLES
KLAUS DODDS AND MARK NUTTALL

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THE GEOPOLITICS OF THE ARCTIC
AND ANTARCTIC

KLAUS DODDS AND MARK NUTTALL

polity

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First published in 2016 by Polity Press

Polity Press
65 Bridge Street
Cambridge CB2 1UR, UK

Polity Press
350 Main Street
Malden, MA 02148, USA

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ISBN-13: 978-0-7456-5244-3
ISBN-13: 978-0-7456-5245-0(pb)

A catalogue record for this book is available from the British Library.

Library of Congress Cataloging-in-Publication Data

Dodds, Klaus.

The scramble for the poles : the geopolitics of the Arctic and Antarctic / Klaus Dodds, Mark Nuttall.

pages cm

Includes bibliographical references and index.

ISBN 978-0-7456-5244-3 (hardcover : alk. paper) -- ISBN 0-7456-5244-1 (hardcover : alk. paper) -- ISBN 978-0-7456-5245-0 (pbk. : alk. paper) -- ISBN 0-7456-5245-X

(pbk. : alk. paper) 1. Geopolitics--Polar regions. 2. Polar regions--International status. I. Nuttall, Mark. II. Title.

G593.D 64 2015

320.1'20911--dc23

2015009805

Typeset in 10.5 on 12pt Sabon by
Servis Filmsetting Ltd, Stockport, Cheshire
Printed and bound in the UK by Clays Ltd, St Ives plc

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PREFACE

When we think of polar scrambles we might be forgiven for alighting upon comparisons with historical, and indeed contemporary, scrambles for Africa and other parts of the colonized world. In the nineteenth century, European states including Britain and France were at the forefront of carving out territories and digging up resources as their domestic societies underwent further industrial and urban development. Some scholars detect a ‘new scramble for Africa’, this time involving not only the United States but also actors associated with the global South, such as China, India and Brazil (Carmody 2011). The role of China in particular has elicited the greatest attention, including its so-called ‘no questions asked’ policy, as relating to the governance and human rights cultures of client states in Africa. But states are not the only actor involved in this scrambling enterprise. International institutions such as the World Bank and the International Monetary Fund, alongside a ragbag of agents including multinational corporations, criminal cartels and private military contractors, are also complicit in the ‘opening up’ of African economies and the associated patterns of dispossession, exploitation and violence (Watts 2012).

The historical and contemporary polar scrambles we interrogate in this book are not without their own stories of dispossession, exploitation, marginalization and violence. As Edward Said (1978, 1993) reminded us, alongside a coterie of geographers and historians of the colonial past and present, the way in which land, people and environments are mapped, administered and exploited is rarely free from contestation. We find, for example, plenty of evidence of what Joseph Conrad once termed ‘militant geography’, a temporal and spatial marker of what we might think of as predatory forms of mapping

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and charting, ever eager to enclose yet more territories and resources (Driver 2000; Gregory 2004). This lust for knowledge and geography, informed and enriched by a series of imaginary geographies, positioned the colonial world as awaiting the civilizational imprint of European explorers, missionaries, scientists and military personnel.

In the nineteenth century, there was no shortage of ‘militant geography’ in the Arctic region, as British and other European explorers and sailors sought to transit through the Northwest Passage. If moisture and heat acted as deterrents to those militant geographers in Africa, the cold and ice were equally capable of exposing the limits of European bodies, ideas and practices. While moisture and heat remain unforgiving on bodies and objects, frigid polar waters and arid land-based ecosystems end up preserving the ‘colonial present’. The Arctic landscape is littered with the traces of earlier European exploitation and administration in the form of huts, settlements, tracks, whalebones and mining projects.

On 9 September 2014, Canadian Prime Minister Stephen Harper was photographed standing in front of a large television screen. Unveiling an image of the hull of a sunken ship, he pointed his finger at the screen with obvious excitement. The image in question was that of HMS *Erebus*, one of the ships belonging to the ill-fated Franklin expedition, a Victorian-era adventure designed to chart and open up the Northwest Passage as a shorter route to Asia for the benefit of European maritime travel and trade. What followed was an interesting, even remarkable, series of associations being offered up by Harper. In essence, this shipwreck was being positioned as a proxy for Canadian Arctic sovereignty even though the expedition was organized, financed and promoted by the British government and scholarly societies, such as the Royal Geographical Society in London, years before the creation of the Canadian federation. Sir John Franklin, the leader of the expedition in 1845, might have been surprised to be told that almost 170 years later a Canadian political leader would appropriate his ill-fated journey and lost ships for national purposes.

But this expedition was unusual (figure 0.1). The disappearance of the Franklin expedition in 1848 provoked impassioned appeals by Lady Jane Franklin and extraordinary searches, resulting in the further mapping of the North American Arctic (David 2000; Potter 2007). Franklin left England in May 1845 aboard HMS *Erebus* alongside HMS *Terror*, commanded by Captain Francis Crozier. Sailing up the west coast of Greenland into Lancaster Sound, the ships made progress through Barrow Strait and circumnavigated

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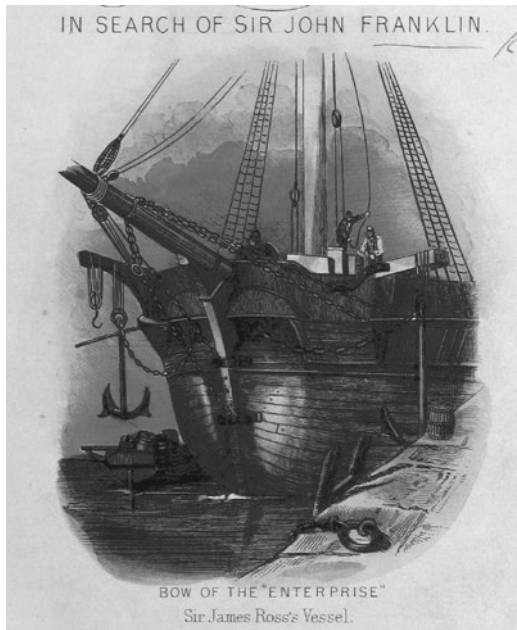


Figure 0.1 The Search for Sir John Franklin (reproduced with permission of the British Library)

Cornwallis Island. They spent the winter south-west of Devon Island at Beechey Island (where three crew members died). In September 1846 HMSs *Erebus* and *Terror* were stranded in pack ice somewhere north-west of King William Island and were abandoned in April 1848. The British Admiralty sent a search mission in 1849 commanded by James Clark Ross, but no sign of the ships was found. Over the next decade, government-sponsored and privately financed expeditions (including some sent by Franklin's wife Lady Jane) were dispatched. The Franklin search became something of a national obsession, as many have written about it in depth, both in terms of the Franklin expedition itself and the search for the Northwest Passage (e.g. G. Williams 2003, 2009; Lambert 2009), and in a broader thematic treatment of nineteenth-century Arctic exploration, polar imaginaries and imperial Britain (e.g. Spufford 1997; David 2000; Hill 2008). Traces of men and equipment were found by some of the search expeditions, as well as by Inuit, including notes detailing events up to April 1848 (Franklin is known to have died in June 1847). John Rae was involved in several search parties and in 1853–4

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he ventured north to map parts of Canada's continental coastline. He met Inuit at Repulse Bay who sold him some objects, including silverware, from the Franklin expedition. The Inuit reported they had seen white men dragging sledges, and that they had died of starvation, and finally that they had discovered bodies that showed evidence of cannibalism (Spufford 1997). Rae returned to England in 1854 with the expedition's artefacts and the news that some of the desperate and starving survivors might have resorted to cannibalism. These revelations were met with shock and disbelief and offended the sensibilities of those who believed 'civilized' British officers and crewmen would not have begun to eat one another (including Charles Dickens who felt compelled to express his abhorrence in an essay). The Inuit testimony was dismissed as the false account of 'savages', yet led Lady Franklin to believe that some of the expedition survivors might be living among them. The lost ships remained elusive, however, and became central to an enduring narrative about the Arctic. As Glyn Williams put it, 'No episode in the history of oceanic enterprise offers a greater contrast between anticipation and disillusionment than the centuries-long search for the northwest passage' (Williams 2009: xv), and the Franklin episode is a supreme example of this.

Franklin's expedition – and the many voyages that ventured north to look for him and the crews of HMSs *Erebus* and *Terror* – also figured prominently in the nurturing and development of a Canadian northern identity. The Northwest Passage, remote, distant, yet symbolic of heroic deeds, polar exploration and of 'the true North strong and free' has long provided inspiration for writers, poets, folk singers, other musicians and playwrights (Grace 2001). Few Canadians are likely to visit these northern waters, yet the historical adventures, epic journeys and disasters associated with the discovery and mapping of Canadian national territory in the Arctic and the emergence of Canada as a nation have become inextricably linked to and bound up with contemporary ideas of sovereignty and Canada's aspirations to become an Arctic power. In 1992, Parks Canada, a Canadian national heritage authority, declared HMSs *Erebus* and *Terror* to be historical monuments even though no one knew their exact location. The ascribing of such a status was testament to the sense of the powerful presence of the ships and their association with the idea of Canada as a northern place. In some ways, the feeling that the Canadian North is suffused, even haunted, with the essence of Franklin's two ships has been important to the story Canada has been telling itself and others about its identity and its place in the circumpolar world. Finding the remains of one of them has not solved the mysteries of the Franklin

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expedition but it has been useful for Canadian political discourses about sovereignty and claims to Arctic territory and resources. As the Canadian novelist Margaret Atwood (1991) reflected, the North remains a fertile imaginative landscape, filled with ‘strange things’ and strangers.

Over the years, various branches of the Canadian government, oil companies such as Dome Petroleum and private salvage hunters have been drawn to the enigma of the missing ships. In the most recent search, which led to the discovery of HMS *Erebus*, Shell Canada was involved, raising intriguing possibilities of why a multinational energy company might be concerned with such a quest in the first place. One factor, of course, might be that Shell Canada owns a large number of drilling leases in the North American maritime Arctic and perhaps senior executives thought that being associated with the search for the wreckage of an imperial British Arctic expedition was a good thing. Better to be seen as having an interest in polar heritage than being associated with global climate change and rapacious resource extraction in the Arctic region and beyond. It is worth recalling at this point that Shell has suspended its drilling operations on a number of occasions in the North American Arctic, and has faced considerable criticism from environmental groups and northern communities for its current and planned activities. Recently the Danish toymaker Lego was criticized for its long-standing relationship with Shell.

On the other hand, as scholars such as Adriana Craciun (2012, 2014) have noted, the connection between nineteenth-century expeditions, resource extraction and what we might think of as geopolitics and security, have a historical and gendered provenance that is difficult to ignore. Ever since the first European encounters with Arctic regions, explorers, traders, sailors and scholars have all played their part in promoting the interests of various states and companies in mapping, exploiting, administering and controlling spaces such as the Northwest Passage and the Arctic Ocean. Such attention to the Arctic and the efforts expended in sending expeditions of discovery, claiming ownership, asserting sovereignty and exploring the region’s resource potential furnished the inspiration for Jules Verne’s 1889 novel *The Purchase of the North Pole*, in which Barbicane and Company ‘announced that it had “acquired” the territory for the purpose of working – “the coal-fields at the North Pole!”’ at an auction in New York. A Canadian Prime Minister of European descent (with the support of agencies such as the Royal Canadian Geographical Society) is in that sense part of a longer trajectory of agents, objects, ideas and practices eager to find extractive value in Arctic ecosystems,

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even if it was just passing through them rather than hunting seals and whales, fishing, cutting timber and drilling for oil.

The discovery of Franklin's vessel should be one of those moments when we pause and think about those aforementioned historic connections and contemporary framings of the Arctic as a space for projecting a specific national sovereignty and identity politics. Harper claimed that the Franklin expedition was helping to 'map together the history of our country'. Running counter to that nationalist appropriation is another important aspect of the 'discovery story'. Inuit oral histories and traditional knowledge played a crucial role in transmitting memories and stories about the expedition and, despite the earlier ignorance about the power of indigenous testimony, such stores of knowledge were acknowledged by Parks Canada to be crucial to the latest search operations. All of which raises an awkward juxtaposition; the invocation of a long-lost nineteenth-century British expedition as a lynchpin to Canada's self-identity while at the same time acknowledging in the Arctic context the long-standing presence of Inuit remains the most evocative expression of Canadian sovereignty. For a Canadian Prime Minister deeply committed to promoting the idea that Canada is a 'northern nation', the discovery of a long-lost ship quickly became caught up in a highly opportunistic campaign to promote, once again, Canadian Arctic sovereignty.

For a geographer and an anthropologist, by way of contrast, this shipwreck news story, as we have just noted, is indicative of how Arctic geopolitics works in the here and now, including the constellations of power, knowledge and geography that make possible scrambles past and present. Past associations, albeit selected with great care by politicians and the like, are combined with contemporary opportunism and an outlook towards the future that is at times fearful, and at times hopeful. For politicians, the submerged wreck becomes both an object of Arctic geopolitics and a site for Arctic geopolitics. It is one that is more hopeful than, say, concentrating on past episodes of forced relocation of Inuit or contemporary concerns about poverty, housing and domestic violence. The point about associations is that powerful agents of Arctic geopolitics, such as prime ministers and presidents, pick and choose where possible. As the head of Pauktuutit, the organization representing Inuit women in Canada, Rebecca Kudloo noted at the time, 'If the [Canadian] government is willing to spend millions of dollars on a missing Franklin ship, why aren't they spending millions of dollars on violence against women?' And as British-based historian of nineteenth-century Arctic exploration, Shane McCorristine concluded, 'The remains of Franklin

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himself are still missing and the *Terror* is still lost but in a curious way, which I think the Canadian government recognizes, this expedition remains a haunting presence in the Arctic, a ghost story that continues to fascinate' (2014: 100).

Prime Minister Harper wanted Canadian personnel to discover the wreck and its location in the Northwest Passage because this is highly significant for a country that still worries about the mobility of others in a maritime space that it considers part of its 'historic waters' rather than an international strait (Steinberg 2014). Franklin's dream of an accessible Northwest Passage seems to be closer to realization as polar sea ice appears to be melting away. Others dispute that historic waters designation and believe that the passage is just that – a place for third parties to transit through without being impeded either by the Canadian government and/or sea ice (Byers 2013). Thus, the shipwreck, as a previously lost object with a Victorian English provenance, is actively enrolled in a more contemporary geopolitical project regarding security, sovereignty and stewardship.

Our Franklin vista is, thus, intended to open up a broader conceptual and empirical landscape involving both the Arctic and Antarctic. In what follows we outline and evaluate a series of entry-points for making sense of the contemporary 'scrambles' and 'scrambling' affecting the Polar Regions. We use these terms guardedly but do so because they are commonplace in media, academic and political literatures, and reportage. Moreover, we believe that they help us to make sense of what is at stake – politically and geographically. There are a multiplicity of 'scrambles'; scrambles to gather geographical knowledge about the seabed, scrambles to fish the Southern Ocean, and scrambles to 'open up', 'save' and/or 'protect' the Arctic and Antarctic. There are 'drivers' that are empowering these 'scrambles' and we conclude in our last chapter that these 'scrambles' carry with them a series of demands whether it be to speed up, slow down, intensify, refrain or block. Such 'scrambles', we posit, do not mean that the Arctic and Antarctic are doomed to be conflict-laden spaces in the future. Rather, we believe that these scrambles carry with them multiple futures, some of them more hopeful instead of dreadful, and some of them more likely rather than simply possible.

Throughout, we think of scrambles in two senses – scramble in the sense of preparing to act (often associated with war-like gestures such as scrambling jets) but also in the sense of ideas and things being broken up or scrambled like a radio broadcast that becomes unintelligible to the listener. Geophysical and geopolitical change is afoot. The Arctic is warming, the Antarctic is warming and cooling

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depending on where you care to investigate, and most observers would acknowledge that interest from the wider world in both Polar Regions is far greater than it was say in the 1940s and 1950s. It is also more complex, involving states with historical interests in the Polar Regions and states and non-state organizations who have more recent, even tangential, associations. In February 2015, a suspected case of illegal fishing in the Southern Ocean involved a New Zealand warship attempting to apprehend fishing vessels belonging to a Spanish syndicate with ships registered in Equatorial Guinea. Old clichés such as the Antarctic and Arctic being ‘poles apart’ just won’t do anymore (if they ever did, given global trading networks and the movement of fish, seal and whale products as well as minerals from the Polar Regions to the rest of the world).

Our interest in polar scrambling encouraged us to travel, live and reflect on and in the Arctic and Antarctic. Our biggest debts of gratitude must go to our respective families in London (Klaus Dodds) and Edmonton (Mark Nuttall) for allowing us to make those journeys north and south and for spending long periods away from home. Klaus Dodds is immensely grateful to colleagues at Royal Holloway and elsewhere for many conversations and collaborations with Peter Adey, Duncan Depledge, Simon Dalby, Stuart Elden, Alan Hemmings, Valur Ingimundarson, Timo Koivurova, Alasdair Pinkerton, Richard Powell and Phil Steinberg. An ESRC Research Seminars Grant (with Richard Powell, 2010–12) proved invaluable for bringing together critical polar scholars and led to an editorial collection entitled *Polar Geopolitics*. The Geopolitics and Security Group at Royal Holloway, University of London remains a great place to be part of and the masters students who participated in his polar studies option are thanked for their engagement. He also thanks those who have supported his Arctic-based research, including the British Academy, the Canada-UK Council, the House of Lords Select Committee on the Arctic and the Royal Norwegian Embassy in London. Mark Nuttall thanks the Department of Anthropology at the University of Alberta, and the Greenland Climate Research Centre, Greenland Institute of Natural Resources and Ilisimatusarfik/University of Greenland in Nuuk for institutional support and for continuing to give the time, space and resources to carry out research on a number of polar topics, as well as colleagues and students who are too numerous to mention, for discussion, conversation and reflection. He is grateful to research grant support from the Henry Marshall Tory Chair Research Programme at the University of Alberta, from the Academy of Finland, and from the Greenland Climate Research Centre. We both

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gratefully acknowledge the support of a British Academy-Association of Commonwealth University Joint Project Grant (2010–11), which enabled us to begin some initial planning for this book. Our subsequent planning took shape during conversations in Edmonton, London and Nuuk, and the chapters that follow are expansions and reflections on a number of themes that have preoccupied us since. We thank the two anonymous reviewers for their careful reading and very useful criticism, and we owe a debt of gratitude to Rachael Squire for reading through the manuscript and offering incisive comments throughout. Ian Tuttle did a splendid job copy-editing the manuscript. None of the aforementioned colleagues and institutions bears any responsibility for the analysis presented in this book.

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We owe sincere thanks, lastly, to Louise Knight, Pascal Porcheron and colleagues at Polity for their patience and goodwill. This book has been a long time in the making.

SCRAMBLING FOR THE EXTRAORDINARY

In 1868, the Arctic explorer and physician Isaac Israel Hayes delivered a lecture to the American Geographical and Statistical Society entitled ‘The progress of Arctic discovery’, where he noted the onset of ‘great scrambles’ to acquire geographical knowledge about new territories, usually for commercial and political benefit (Hayes 1868). He was not alone in imagining the North Pole and the prospect of an ‘open polar sea’ as a powerful incentive for further scrambling, as nations sent men in ships, planes, balloons and airships or on skis in the hope of discovering new geographical points and commercially appealing spaces (Craciun 2009).

For much of the eighteenth century onwards, explorers, traders, administrators and scientists sought to map, to colonize and to administer the North American Arctic. It was a scramble for territory and for the resources that lay at and below the surface. We can also see attempts to find and transect the Northwest Passage or the Northeast Passage as forms of scrambling to get *through* and *across* the Arctic, not so much for the importance of discovery and knowledge of the Arctic regions in and of themselves, but for global imperial ambitions and the expansion of colonial ventures (Bloom 1993; Bloom et al. 2008).

Hayes was also not alone in advocating further effort to map and chart the Arctic region. In his 1860 account of Arctic exploration and discovery, Samuel Smucker underscored the importance for Great Britain to acquire a greater knowledge of polar geography and northern maritime routes for the country’s ‘vast and yearly increasing dominion, covering almost every region of the habitable globe’, and he argued that

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it becomes necessary that she should keep pace with the progress of colonization, by enlarging, wherever possible, her maritime discoveries, completing and verifying our nautical surveys, improving her meteorological researches, opening up new and speedier periodical pathways over the oceans which were formerly traversed with so much danger, doubt, and difficulty, and maintaining her superiority as the greatest of maritime nations, by sustaining that high and distinguished rank for naval eminence which has ever attached to the British name. (Smucker 1860: 34)

From the early part of the nineteenth century, demands were placed on treasury chests and sponsors to fund, equip and dispatch polar expeditions, and on ships and men to sail, crew and map in northern regions for the purpose of reaching and extending power and influence over other places, peoples, ecologies and items of trade. For Smucker, the chart of Britain's colonies was 'a chart of the world in outline, sweeping the globe and touching every shore' (Smucker 1860: 34), but he was dismissive of the enduring importance of a north-west passage to Asia and pragmatic about its use. If it was ever to be found, he said, it would always be a hazardous and protracted journey to get through it and navigate the ice-choked waters – the fact that the polar seas of the northern hemisphere were thickly clustered with various lands as well as ice only convinced him of their impenetrability. The Northwest Passage would only be a useful sea route – and therefore the arduous nature of exploration, and the sufferings and perils of Arctic voyaging worth enduring – until shorter and quicker routes to Asia were made possible 'by railroads through America, or canals across the Isthmus' (Smucker 1860: 33).

At the time Smucker was compiling his compendium of discoveries in northern regions, others were hard at work assessing the Arctic's resource potential. Henrik Rink reported on the surveying and state of knowledge of Greenland's minerals, prospects for extraction and 'mining-speculation of private companies' (Rink 1974 [1877]: 79), while the Yukon Gold Rush in the late 1890s saw thousands of hopeful fortune-seekers scrambling, literally, up and along the Chilkoot Pass and other routes to the Klondike (Berton 1972; Porsild 1998). Charles Mair's *Through the Mackenzie Basin*, his 1908 account of the signing of Treaty 8 in the Athabasca district north of Edmonton, celebrated the possibilities of access to the great resource potential of northern Canada.

While such 'scrambles' predated the coinage of the term 'geopolitics' in 1899, it was precisely those kind of power-knowledge scrambles by colonial powers and post-revolutionary republics like

the United States that inspired an interest in how state power, literally, rested on mapping, moving and exploiting the earth (Ó Tuathail 1996). For the earliest geopolitical writers, the ebb and flow of European empires in Africa, Asia and other parts of the world was a source of fascination and even fear, as contemporaries such as British geographer Halford Mackinder worried about the prospect of future conflict over a world that was ever more mapped, colonized and exploited (Dodds and Atkinson 2000). The Polar Regions were not immune from this auditing, and resources such as minerals, fish, seals and whales were caught up in transnational and inter-imperial rivalries, with indigenous peoples, energy corporations and communities becoming enmeshed in those global resource scrambles (Anderson et al. 2009).

Making sense of historical and contemporary scrambles over the Arctic and Antarctic requires us to discuss three elements. The first element involves some reflection on how the Arctic and Antarctic have been defined and delimited in the past and present. As Hayes sensed in his 1868 lecture, where the Arctic began and ended was a moot point. Did sea ice signify a biogeographical boundary or was the presence of open water indicative of an Arctic that might be as much sea as it was ice and snow? This then allows us to move onto addressing both scrambles and scrambling, i.e. as object and as verb. Exactly what was, and is, being scrambled over, and who should be involved in those scrambles? Finally, we conclude with a sense of the geopolitical consequences of scrambling with some examples that will prepare the reader for a more detailed examination of how the Polar Regions have been caught up in power-knowledge scrambles, and made complicit in scrambles *inter alia* to secure access to resources, to generate knowledge, to exert power over peoples and societies, and to claim and administer territories, both onshore and offshore.

Defining the Arctic and Antarctic

The manner in which we define places such as the Polar Regions is variable. As critical geopolitical scholars have noted, our very definitions are always deeply geopolitical, highlighting some spaces, objects, relationships and communities at the expense of others (Dalby 1991; Ó Tuathail and Dalby 1998; Dodds 2012). For example, although people may think they know what the Arctic is and where to locate it on a map (as well as what it is supposed to look like), defining and delineating its southern boundaries are tasks that embroil researchers

in controversy. Definitions of the Arctic vary considerably according to scientific, environmental, geographical, political and cultural approaches, perspectives and biases (which are reflected in the different ways the working groups of the Arctic Council define 'the Arctic'). To complicate this further still, climate change is eroding many of the physical boundaries and features, and reshaping the contours of geography that have been drawn as seemingly fixed points on maps, such as the tree line, the southern extent of discontinuous permafrost, ice shelves, glaciers and the distribution of perennial sea ice. The presence of ice has long been thought of as precipitous for the mobility of indigenous peoples and more latterly European explorers in the Arctic region, while its projected disappearance and potential absence intimate prospects for increased access and new shipping routes.

In February 1968 British adventurer and polar traveller Wally Herbert stepped out from Point Barrow, Alaska, onto the sea ice with three companions. For the next 15 months they travelled by dog team and sledge across the Arctic Ocean to Phipps Island, north of Spitsbergen. Their sledges were designed so that they could be converted to boats for crossing stretches of open water. They moved slowly with their dogs pulling their equipment across the permanent pack ice or rowed from floe to floe, across an ocean strewn with the rubble of floating ice. At the end of this long journey, they had not only made a claim to become the first people to cross the Arctic Ocean, they may have become the first to reach the North Pole without using any form of motorized transport, given that Robert Peary's claim to have done so in 1909 remains controversial. In terms of adventuring, Herbert and his colleagues probably made a last great polar journey in the sense of achieving something that had not been done previously, but they also made the kind of crossing of the Arctic Ocean, primarily on ice, that may no longer be possible because of geophysical changes involving sea ice, ocean and wind currents, and subsurface, surface and air temperatures. Yet icescapes of continual flux and a process of topographical reshaping are part of the lived experiences of many who live in the Arctic, and who perceive the environment as one of emergence and becoming (Nuttall 2009).

So, where does the Arctic begin? And how far south does it extend? (See figure 1.1). We could say something similar for Antarctica as well (figure 1.2). For example, how far does the Antarctic region extend? And where do oceanic bodies such as the Southern Ocean begin and end? These are not the questions of the geographical pedant, rather they carry considerable potential for so many areas of interest to us. The boundaries that we impose on the earth's surface,

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Figure 1.1 Defining the Arctic

depth and height influence and shape our legal systems, our governance, our resource management, our strategic awareness and our cultural imagination. In the Polar Regions, where human habitation has been demanding and prone to be humbled by immense physical and environmental challenges and constraints, these boundaries and demarcations can take on a quixotic quality at times. But they remain important nonetheless.

Examining the Arctic, initially, many physical scientists would say that the biogeographical definition criteria of the region must include high latitude, long winters and short, cool summers, low precipitation, glaciers, ice sheets, permafrost, frozen lakes, rivers and sea in winter, and the relative absence of trees. But science is not a single discipline. To practise science means to seek knowledge about the world, and scientific disciplines have different views of how to go about it. An astronomer, for instance, would suggest the southern boundary of the Arctic could be established as the latitude beyond which the sun does not set at high summer, or rise during the depths of winter. This occurs at that imaginary line called the Arctic Circle at $66^{\circ}33'3\text{N}$. Where the Arctic Circle is supposed to lie is determined by the angle of the earth's axis in relation to the plane of its motion around the sun. This inclination means the sun's rays never shine immediately straight down on the Earth's surface north of the Arctic Circle and cannot effectively warm it significantly. This has the effect of reducing the amount of solar heat that the Earth's surface can absorb at high latitudes, creating what are arguably the most recognized Arctic characteristics – long, cold and dark winters, and short, cool summers with constant daylight for several weeks.

This astronomical determination does not influence how oceanographers define the Arctic, however. To them, the Arctic is the region where ocean temperature remains near the freezing point of salt water (about 1.7°C) and its salt content about 32 parts per thousand. A terrestrial ecologist, on the other hand, might describe the Arctic as existing only beyond the tree line, i.e. the point beyond which it is not possible for trees to grow. These astronomical and physical characteristics make the Arctic seemingly easy to define for those in specific fields, and to fix on maps and globes, yet Arctic-like conditions are found far south of the Arctic Circle and many Inuit, regarded often stereotypically as a quintessentially Arctic people dwelling far to the north, live in parts of Canada, Greenland and Alaska which are several hundred miles south of the Arctic Circle. If the tree line is taken as the southern boundary, western Alaska, the Aleutians and Iceland would be considered Arctic, although according to strict climatic criteria they would be excluded (Nuttall and Callaghan 2000).

According to climatic definitions, the Arctic is the region north of the 10°C isotherm. An isotherm (meaning a line of equal temperature) is a line on a climatic map linking points with the same mean annual temperature. The 10°C isotherm marks the southern limits of the high latitudes of the planet where the average monthly temperature is at or below 10°C , and the average for the coldest month is below 0°C .