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## **Antarctica in the Anthropocene: Approaches, Issues and Debates**

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The Antarctic is a region that traditionally occupied the remote reaches of the geographical imagination. In the Anthropocene, however, the ‘frozen continent’ has become central to the planet’s present and future. Even as ice cores taken from its interior reveal the deep environmental history of the planet, warming ocean currents are ominously destabilising the glaciers around its edges. The continent contains over ninety per cent of the world’s ice, with the potential to raise sea levels by nearly sixty metres, if it were all to melt. While such a wholesale melt of the Antarctic ice sheet is not imminent, estimates (based on a business-as-usual greenhouse gas emissions scenario) indicate the continent’s ice could contribute over a metre of sea-level rise by the end of this century and over fifteen metres by 2500 (DeConto & Pollard 2016). And warming global average temperature – along with associated effects, such as ocean acidification and species migration – are only some of the hallmarks of the global-scale threats to the region’s environment arising from activities remote from the continent itself. Marine microplastics pollution, possibly originating from outside the region, has been found in Antarctic waters (Waller et al. 2017). The thinning of the ozone layer in the atmosphere above the continent, identified by Antarctic scientists in the 1980s, has begun to abate due to international action to reduce the use of ozone-depleting gases, but recovery of ozone concentration to 1980s levels is not expected until the second half of this century (World Meteorological Organization 2018, p. 3). For many decades framed as a ‘last wilderness’, 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.

Scientific research into the impact of these global environmental changes on the Antarctic region is therefore crucial and has become increasingly prominent outside the polar research community. The continent’s spectacular icescapes and charismatic wildlife frequently feature on the cover of leading scientific journals such as *Nature* and transfer readily into popular forums. Popular culture has certainly registered the important links between Antarctica and

global environmental change, as evidenced by Hollywood films such as the disaster movie *The Day After Tomorrow* (2004) and the children's animation *Happy Feet Two* (2011). Large calving icebergs that might formerly have been enjoyed as spectacular natural events are now treated as political events and presaged by news headlines around the world.

The Anthropocene, then, not only brings attention to Antarctica's integral role in the global climate system; it also asks us to rethink our assumptions about a place 'often depicted as paradigmatically non-human' (Roberts, Howkins & van der Watt, 2016, p. 2). Labelled variously a 'continent for science', a 'giant laboratory' and a 'last wilderness', Antarctica in the popular imagination has until very recently been largely thought of as a pristine environment defined by its remoteness from human settlement. But the global biophysical impacts of the Anthropocene significantly challenge the notion of Antarctica as a remote place, cut off from the planet by the circumpolar current and extreme weather of the Southern Ocean. In the Anthropocene, Antarctica becomes nearer in thought, entangled with our everyday actions. If the Anthropocene signals (in geographer Jamie Lorimer's words) 'the end of the idea of Nature as a pure place untouched by human hands' (2017, p. 121), then the Antarctic, as the material embodiment of this ideal, faces a radical reframing.

The concept of the Anthropocene also brings home the fact that humans never encountered a truly 'pure' Antarctica. When European explorers caught sight of its icy coasts in the early nineteenth century, the gasses in its ice were already recording the atmospheric changes brought about by the Industrial Revolution (British Antarctic Survey 2014). Antarctica and the subantarctic islands were the site of a massive sealing and whaling industry in the nineteenth century, with fur seals driven close to extinction. Explorers who stoically battled the Antarctic elements for national and scientific priorities were also interested, in some cases, in the potential for exploiting the continent's mineral resources.<sup>1</sup> In the same year the Antarctic Treaty entered into force (1961), the United States installed a nuclear reactor to power McMurdo Station, its largest research base. The Treaty designated Antarctica a 'continent for science and peace', but the decades that followed also saw krill, icefish and later toothfish become the subject of industrial fishing in the region, and whales being hunted by Japanese factory ships. And although the 1991 Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol) introduced a series of measures to limit the environmental impact of activities in Antarctica, including the banning of non-native species (bar humans), the human 'footprint' on Antarctica is not trivial and cannot be blamed solely

(or even mostly) on the burgeoning tourist industry. While over fifty thousand tourists visited the Antarctic region in the 2017-18 summer season – some of them perhaps motivated by an Anthropocenic ‘last chance to see’ impulse – research suggests that scientific programmes have a greater environmental impact,<sup>2</sup> with infrastructure and related disturbance ‘similar in size to the total ice-free area of Antarctica ... [and] disproportionately concentrated in some of the most sensitive environments’ (Brooks et al. 2019, p. 185).<sup>3</sup> In 2017, there were seventy-six research stations on the continent (COMNAP 2019).

While these kinds of impacts are ‘local’ rather than global problems, in the sense that they are a result of human activity in the region, they nonetheless form part of a new understanding of Antarctica as an anthropogenic icescape, enmeshed with the human world in ways that require ongoing analysis, critique and reassessment. This creates a challenge for scholarship, as the disciplines designed to think critically about human culture and society have only recently begun to apply their conceptual frameworks to Antarctica. Before turning to this topic, however, it is necessary to tease out the multiple and contested uses of the term ‘Anthropocene’, particularly as they relate to the Antarctic region.

### **Antarctica in the Anthro-scene**

In this volume we understand ‘the Anthropocene’ to broadly indicate the period in which human activity of various kinds has become a key driving force of planetary environmental change. In the last two decades, the concept has gained considerable traction in scholarship across a wide range of disciplines. The exact scientific definition of the term, and indeed its acceptance as a geological unit, is far from settled, with the Anthropocene Working Group (AWG) still in the process of preparing an official proposal to the appropriate subset of the International Commission on Stratigraphy (Zalasiewicz et al. 2017, p. 59). Although the scholarly community eagerly anticipates the results of this proposal submission, the concept has gained an interdisciplinary currency which seems unlikely to be diminished by any lack of scientific consensus. The idea of the Anthropocene has been so productive within a wide range of disciplines that it now constitutes its own subfield, with corresponding conferences and journals<sup>4</sup> – an ‘Anthro-scene’, as geographer Jamie Lorimer (among others) has described this ‘event-space’, which now extends beyond academia to the media and other parts of the public sphere (2017, p. 118). As Lorimer writes in an overview of relevant scholarship, the term has ‘proliferated promiscuously in ways unforeseen by its creators’, and

while future acceptance by geoscientists might give it a ‘scientific legitimacy’, this ‘matter[s] less than the pressing problems the Anthropocene names’ (p. 131).

Within the humanities, law and social science disciplines (henceforth HLSS), debates about the Anthropocene and the length of the period it describes are themselves productive, generating new insights. Criticisms of the term, often made alongside suggested alternative namings and framings, have centred on its homogenising power to disguise global inequities, presenting as it does ‘humanity’, rather than certain sectors of it, as the source of destructive planetary-wide environmental change. Also at issue is its apparent reinstatement of human ascendancy, ‘conceptually hardening modern humanity’s perceived entitlements ... enshrining humanity’s domination over the planet’ when exactly the opposite conceptual move is required (Crist 2007, p. 52). Related debates about the date of the Anthropocene’s beginning have political meaning, signalling a different root cause of the planet’s current trouble: a suggested starting date of the onset of the Industrial Revolution, for example, ties the concept to the emergence of capitalism, whereas another suggestion – the beginning of European settlement of the Americas – points towards Western colonial expansion (Lorimer 2017, p. 132). The AWG is currently proposing the mid-twentieth century as the most likely starting point of the Anthropocene, but the question remains to be decided (Zalasiewicz et al. 2017, p. 58). We have therefore imposed no restrictions here on how contributors to this volume understand the Anthropocene, leaving them to make their own implicit or explicit case for interpretation, and to embrace or question the term as they see fit.

Within the huge body of HLSS-based scholarship on the Anthropocene, the Antarctic region’s scientific relevance – as an ‘icy archive’ of greenhouse gas data, a global climate ‘canary’ and a source of massive sea-level rise – is taken as read. Much less explored are the distinct opportunities that the continent currently offers as a subject of social and cultural enquiry. The chapters in this volume bear out this claim, but here we offer a few broad ways in which Antarctica presents a useful and distinctive place – intellectually speaking – from which to address some of the challenges of the Anthropocene.

The growth of the Anthropocene as a subject of scholarly discussion has been accompanied by an increasing interdisciplinarity in academic exchange. Within the environmental humanities, critics such as Noel Castree have urged researchers to ‘get their hands dirty in the places [where] scientists operate’ and seek ‘institutional and epistemological forms of

engagement that might alter important conversations occurring outside the humanities’ (2014, p. 244). The Antarctic scholarly community is unusually well placed to initiate and maintain these kinds of interdisciplinary engagements. With Antarctica long labelled the ‘continent for science’, researchers in the HLSS disciplines interested in the region have had to carve out a place for themselves within a science-dominated field – a situation that has generated opportunities as well as challenges. The key body representing Antarctic-based HLSS scholarship is the Standing Committee on Humanities and Social Sciences (SC-HASS) within the international Scientific Committee on Antarctic Research (SCAR).<sup>5</sup> SC-HASS holds its own regular conferences and forms a significant part of SCAR’s large biennial Open Science Conferences (OSCs). These represent truly multi-disciplinary events, where researchers in fields ranging from astronomy to literary studies meet and take part. And given SCAR’s role in providing advice to the Antarctic Treaty Consultative Meetings, and its connections with industry bodies such as the International Association of Antarctic Tour Operators, the opportunity for transdisciplinary exchange at these meetings is also significant.

This is not to suggest that Antarctic research is a paragon of disciplinary collaboration and inclusion. Authority is still heavily weighted towards the natural sciences and it is not unusual in Antarctic forums for scientists to be positioned as experts on topics that are the traditional purview of the HLSS disciplines (although the opposite situation is extremely rare). For example, at a SCAR OSC held in mid-2018, a well-attended Q&A panel event focused on ‘Polar Change and the Future of Society’. Sponsored by the journal *Nature*, the panel comprised five scientists (with another chairing), the head of the UK’s Polar Regions Department and one of the journal’s senior editors. Given the large number of social scientists presenting at the conference, their absence from the panel drew some comment.<sup>6</sup> For genuine intellectual exchange, HLSS researchers need a seat at this kind of table, and as well as the freedom to challenge the idea of the natural sciences as the altruistic generator of all relevant knowledge on Antarctica. Nonetheless, the continual growth and integration of HLSS into the Antarctic research community suggests that, in the future, this will be a particularly active space for disciplinary conversations.

Another striking aspect of Antarctica in the context of a global environmental crisis is its status as an internationally governed space. The Antarctic Treaty, which puts the seven territorial claims on the continent into a form of indefinite hiatus – effectively on hold, but not abandoned – has now been in place for sixty years. Long the subject of literary fantasies

about alternative societies that invert and rectify the injustices of the wider world, in the twenty-first century Antarctic governance continues to be seen in a utopian light, as presenting an example of international cooperation for the global ‘common good’ and environmental protection that might provide a model for future governance of other areas, especially outer space. Perhaps, this thinking goes, a reverse globalisation is possible, where humanity’s international governance of Antarctica, the erstwhile exception, sets the standard for the rest of human activities. Again, this harmonious image is in many ways naïve. Claimant states have never ceded their territories and, as Alan Hemmings argues in this volume, nationalist motives can influence seemingly noble scientific ventures. Criticisms directed at the Anthropocene as a homogenising concept that smooths over global inequities can equally be directed at the Antarctic Treaty System (ATS) itself. Nations such as Malaysia have protested at various points, particularly during the 1980s, about the perceived dominance of Antarctic governance by Western nations that are wealthy enough to sustain scientific programmes, instead calling for the region to come under UN governance. While some commentators celebrate the longevity and stability of the ATS, others (including Tim Stephens in this volume) point to the mounting pressures on the governance regime – such as increased access and a growing diversity of states involved in its governance – that the Treaty was not specifically designed to address (see also Hemmings 2017, p. 518). Despite these difficulties, however, Antarctica still functions not only as a ‘laboratory for science’ but, as Juan Francisco Salazar suggests in this volume, ‘also a laboratory for thinking alternative ways of living in the Anthropocene’.

Lastly, in an ‘Age of Humans’ the Antarctic offers an ironic but productive point from which to investigate human relationships with the nonhuman world. As we discuss below, critics challenge the rhetorical emptying-out of a continent that sees yearly visits from five thousand station-based workers of various kinds and over fifty thousand tourists (not to mention ships’ crews and tour expedition staff). Nonetheless, the Antarctic *is* distinct from other continents: the first recorded human landing was two centuries ago and, although people have been born in and made homes on the continent, no one lives there permanently. Antarctica thus raises a series of philosophical questions that are particularly pertinent at a time when the habitation and exploitation of outer space is being touted as a possible long-term response to global environmental degradation. What are our moral and ethical obligations to an environment that has no indigenous or permanent human population? How should we inhabit a place where we do not traditionally belong – if we should inhabit it at all? What human activities

should be considered legitimate in such a region? Should science take precedence over art or sightseeing? What modes of place-making have characterised our relationship with the Antarctic continent thus far? What human anxieties does such an environment generate? Should such a place be designated exceptional so as to protect it, or does such a discourse only serve to disguise the degree to which humans have already impacted it? Researchers in the HLSS disciplines have only recently begun to address these questions.

### **Antarctica and the HLSS Disciplines**

Until the years leading up to the turn of the twenty-first century, Antarctica only marginally entered into the field of view of the HLSS disciplines. While creative artists have produced responses to the continent for centuries, first working within a natural history tradition as members of exploratory expeditions, and later via residencies funded and managed by national programmes, researchers from the non-scientific disciplines have been far more reluctant to venture intellectually into the far southern latitudes (and have had fewer opportunities to travel there physically). This is truer of some disciplines than others. The unusual legal status of Antarctica, a region claimed by seven states but functioning as an international space governed by a unique treaty, has interested legal scholars for several decades (see e.g. Auburn 1982; Triggs 1986; Joyner 1998). Debate around environmental protection, tourism and heritage has also attracted researchers in the social sciences, largely coming from management and policy-related perspectives.

The humanities, however, have been far slower in their engagement with the continent. Antarctica's lack of an indigenous or permanent human population, together with an exceptionalist mindset which framed the continent as immune to the political, social and economic forces that affect the rest of the globe, might have made it seem off-limits to analysis outside an accepted natural-science framework. Only in the last decade has the subfield of humanities-based Antarctic research reached a critical mass and a confidence in its own identity, marked by the publication in 2016 of the collection, *Antarctica and the Humanities*. While researchers in the humanities, as well as the social sciences and law, are now thinking through humans' changing relationship with the nonhuman world of the far south, there is far more to be said. It is the humanities, after all, that examine (to use Helen Small's formulation) the 'meaning-making practices of human culture, past and present' (2013, p. 23). While it is easy to think of Antarctica as being devoid of culture, in fact this is a place that the vast majority of the human population only ever experiences through texts –

aural, oral, written and visual. The images that we make and stories that we tell about the past, present and future of Antarctica reveal as much about our relationship to the place, as does our behaviour, our international obligations and our domestic laws.

As mentioned above, one of the current debates within the HLSS community engaged with Antarctica is around the notion of ‘Antarctic exceptionalism’. This exceptionalism ‘creates a separate sphere for Antarctica’, emphasising its lack of inhabitants, conflicts and history – an attempt to maintain the continent as a ‘blank’ space in human terms (Glasberg 2012, p. 96). Researchers in the HLSS disciplines are increasingly demonstrating the dangers of unthinking exceptionalism, as shown in a number of the chapters in this volume.<sup>7</sup>

This challenge to exceptionalist approaches might raise the question of why a volume such as this is singles out Antarctica as an object of social, cultural, historical and legal analysis in the Anthropocene, rather than contextualising it within a broader, planetary category, such as the ‘polar regions’ or the ‘cryosphere’ (the snow and ice regions of the Earth). Certainly, current criticism focused on the wider cryosphere is directly relevant to the chapters collected here (see Sörlin 2015a; Dodds 2018; Gough 2013). Environmental historian Sverker Sörlin (2015b, pp. 95, 97) has argued for the emergence of an ‘Arctic Humanities’ which, like the environmental humanities, is born out of ‘crisis’ and, like the environmental humanities, must face ‘outward, to the tropics, the oceans, the deserts the plains and the cities’, thus ‘work[ing in] lock step with the humanities elsewhere’. Both the Antarctic and Arctic humanities could be seen as part of a broader cultural focus on the entangled meanings and material qualities of ice.<sup>8</sup> Writing in reference to Himalayan glaciers, Marcus Nüsser and Ravi Baghel (2014, p. 150) suggest the idea of ‘the cryoscape’ as a way of capturing the ‘coming together of human epistemic practices with the physical phenomena that constitute the cryosphere’. Given that the concept of landscape, with its ‘capacity to shuttle between ... different registers, act[ing] as a material point for imaginative and material worlds’ has already been proposed as a key way of understanding the Anthropocene, the ‘cryoscape’ seems a useful term for current ways of thinking about ice (Matless 2016, p. 118). There might even be an argument for an emergent ‘cryo-Humanities’.<sup>9</sup>

Ice, however, does not exhaust the meaning of ‘Antarctica’, which is a place demarcated formally by legal and geopolitical discourse, historically and socially within accounts of exploration and travel, and affectively in narratives of personal and spiritual encounter.

International legal jurisdiction over ‘the Antarctic’ varies between the relevant treaties and institutions which govern the Antarctic continent and Southern Ocean. The Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), for example, uses a simplified linear version of the Antarctic Convergence (the circumpolar zone of the Southern Ocean where seawater temperatures drop suddenly). This biophysical boundary might itself move south as the planet warms. The Antarctic Treaty, by contrast, uses a cartographic line, with all land and attached ice lying south of the sixty degrees south latitude line falling within its jurisdiction. The more recent Madrid Protocol on Environmental Protection applies to the same area.

In the context of a warming planet, the Madrid Protocol’s protection of the Antarctic region from the exploitation of mineral resources is significant.<sup>10</sup> Various expeditions have detected mineral deposits, including hydrocarbons, both in continental rock and in the surrounding sea bed, although it is unclear whether, or under what circumstances, these might be commercially viable. The Protocol’s ban on mining is indefinite, although it can be modified at any time according to the Antarctic Treaty’s procedures or reviewed from 2048. While there are no imminent plans to ‘mine Antarctica’, there is ‘a pervasive sense that the question of owning and exploiting the resources Antarctica remains a live one’ (Hemmings, Dodds & Roberts 2017, p. 10). The region’s key role in global carbon sequestration, as well as its ice, could play a significant part in the future of the planet (as discussed in Jeff McGee’s chapter in this volume).

Antarctica’s distinct historical and geopolitical status means that it cannot be equated with ice, nor can humanities-based approaches to understanding the continent’s meaning function in isolation from the social sciences and law. A central aim of this volume is therefore to bring together diverse voices from across these disciplines to consider human/nonhuman relationships and interactions in the Antarctic region in the Anthropocene.

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The chapters presented in this book are grouped into three sections. The first, ‘Governance and Geopolitics’, looks at a number of key challenges which the Anthropocene presents to the Antarctic Treaty System and Antarctic geopolitics. Tim Stephens opens the section by examining the pressures that global anthropogenic forces are placing on the legal governance

of the Antarctic region, asking ‘What might an ATS that understands and responds to the challenges of the Anthropocene look like?’. Stephens argues that the exceptionalist mentality that has seen the ATS remain ‘aloof’ from broader global issues requires urgent rethinking and that global climate change provides an important vehicle for this task. For the future of both the continent and the planet, Stephens urges a ‘closer integration’ between existing global climate change governance and the institutions of Antarctic governance.

Ice cores are an icon of contemporary climate science, and the drilling of these artefacts is frequently presented in the media in a positive light, as a heroic scientific venture undertaken in extreme conditions. In ‘Subglacial Nationalisms’, Alan Hemmings queries the motivation behind the quest for a ‘million-year’ ice core, detecting in this much-touted activity a nationalism ‘disguised as a contribution to ... international public goods’. The challenges of the Anthropocene, he argues, can readily be put to work in the service of nationalist agendas.

One response to the Anthropocene has been the proposal of planetary-scale technological fixes. In ‘Frozen Eden Lost’, Jeff McGee examines the idea of geoengineering Antarctica and the Southern Ocean to reduce the impacts of human-induced climate change. McGee outlines several actual proposals for large-scale human intervention in the Antarctic cryosphere and Southern Ocean, including increasing the reflectivity of ice-covered areas; enhancing sequestration of carbon in the deep ocean; and designing undersea walls or berms to slow the deterioration of ice sheets. He is primarily interested in the way these current scientific and policy discourses of Antarctic geoengineering are further challenging the sense of separateness between Antarctica and wider world. ‘The Anthropocene’, he contends, is ‘reshaping Antarctica in both a material and a discursive sense’.

The last chapter in this section, Juan Francisco Salazar’s ‘The Anthropocene Melt’, takes a more conceptual approach, reflecting on Antarctica as ‘an important object through which to think the Anthropocene’. Salazar is particularly interested in working through the relationship between ice and time. Antarctica, he argues, has always encouraged an orientation towards the future – something that the volume of science fiction set there, as well as contemporary scholarship, confirms (Leane 2013; Liggett et al. 2017; Tin et al. 2014). Insights produced from an engagement with the continent’s ‘geo-logics’, Salazar suggests, can be applied on a planetary level.

The second section of *Anthropocene Antarctica* turns from the legal and geopolitical to the textual and the cultural. The idea of the Anthropocene has put ecocriticism under some strain, with critics such as Timothy Clark (2015, p. 21) pointing to ‘the limits of cultural representation as a force of change in human affairs’. In this sense, it is perhaps significant that two of these chapters – Elizabeth Leane’s and Hanne Nielsen’s – focus on texts with high circulation. Leane looks at ecothrillers set in Antarctica, following the way in which the icescape – both as a reflection of the plot and an actor that advances the plot – functions to mediate between the global scale of environmental disaster and the local scale on which the action is played out. She also warns against the temptation to treat the future of Antarctica as though it were part of a thriller plot: the climate crisis has no firm deadline, and is best addressed not through heroic individual deeds in a race against the clock, but rather collective action in the mundane present.

In ‘Save the Penguins’, Nielsen takes advertising images as ‘a proxy for accessing dominant attitudes towards the far south’. Focusing particularly on images which emphasise the region’s environmental fragility, she traces the ways in which this idea is ironically put to work in the service of selling products and services. David Matless has pointed to the possibilities of certain landscapes – ‘coastlines, glacier snouts, ice sheet edges, felled forest and the like’ – to provide ‘stepping points for the humanities as a teller of Anthropocenic stories’ (2016, p. 118). Nielsen warns of the complexity of using Antarctic spectacles for environmental purposes, pointing out that such images can all too readily function as ‘Ice-wash’.

The remaining chapter in this central section, Carolyn Philpott’s ‘Listening “At the Sea Ice Edge”’, examines sonic art works by Douglas Quin and Philip Samartzis. Both artists incorporate into their compositions found sound – both anthropogenic and environmental – recorded during their journeys to Antarctica, bringing attention to the multi-sensorial quality of the icescape and surrounding water. Such Antarctic soundscape compositions, Philpott argues, are not only the preserve of a small coterie of enthusiasts, but are encountered in exhibitions and museums, on film and television, as well being available as recordings, enabling a wide range of people to sonically experience an environment that they are unlikely to encounter directly. These compositions have the ability to increase awareness and appreciation of the Antarctic environment, without the carbon footprint of travel or the local impact of landing on the continent. The soundscape compositions are also very much of the

Anthropocene in the sense that the human artist is no longer a sole creator, but rather working in collaboration with the nonhuman world.

The last section of the volume focuses on the question of human presence in Antarctica, thinking through questions of inhabitation, settlement and place in a continent renowned for its lack of humans. Like the idea of the Anthropocene itself, the tendency to erase human presence from Antarctica masks a more invidious absence of certain kinds of people – both from the continent itself and from accounts of its history. Researchers such as Morgan Seag, Meredith Nash, Lize-Marié van der Watt and Ben Maddison have examined the ways in which the operation of gender, race and class politics has determined who travels to Antarctica and why, and whose stories are repeated upon return (see e.g. Seag 2019; Nash et al. 2019). In this volume, Maddison turns to questions of indigeneity that have for too long been ignored in relation to Antarctica. While Maddison points to traditions of Antarctic travel and connection in various indigenous groups in far southern locations, his primary focus is the use of indigenous people and technologies in the ‘Heroic Era’ of exploratory ventures. ‘The assumption has been made’, he writes, ‘that because ... there were no indigenous “Antarcticans”, and because Antarctic exploration was overwhelmingly undertaken by Europeans, indigeneity could not be relevant to understanding its history’. His chapter demonstrates the falseness of this assumption and points to the need for further research on the relationships between indigeneity and the Antarctic region.

People are often surprised to learn that humans have been born in Antarctica, that families have lived there, and that children have been schooled there. Nelson Llanos provides a detailed account of this under-examined aspect of Antarctic history, drawing directly from interviews with inhabitants of Chile’s Villa Las Estrellas during the 1980s. Llanos explores the political context of Chile’s decision to people the base with military families, as well as the challenges faced by the inhabitants of this Antarctic town – particularly the ‘housewives’ – and the strategies they drew on to deal with their unusual geographic and social situation. Reminding us that Antarctica’s history is a lot more complex and varied than is often assumed, Llanos argues for greater attention to ‘the social aspects of human presence in the icy continent’, including ‘the history of the family, children and women, and all people who have remained outside of the history of Antarctica’. This chapter reminds us of the various scales of human-nature interaction with Antarctica, with the local and personal stories recounted here contrasting with the global questions of other chapters.

The final chapter in this section is historian Adrian Howkins' 'Placing the Past'. The way Antarctica relates to the concept of place has been a topic of interest in the last few years (see e.g. Antonello 2016). Against the universalising tendencies of the Anthropocene, Howkins draws on the example of the McMurdo Dry Valleys to make a case for local specificity, both in scientific and historical research. Howkins cautions against an overly homogenising approach to the history of particular places in Antarctica, instead calling for a 'focus on embracing both distinctiveness and connectivity'. Howkins' chapter suggests that Antarctica, in its very resistance to conventions of traditional notions of place, might be a productive site from which to interrogate the meaning of this concept in the Anthropocene.

This volume is offered in the spirit of further opening up conversation and analysis about human-nonhuman interactions in Antarctica and the Southern Ocean. The chapters that follow draw from a wide range of disciplines including literature, law, geopolitics, musicology and cultural history. What holds this collection together is our collective view of the Anthropocene as an important new lens that can assist us in teasing out these interactions in new and interesting ways. We therefore hope that you will find this volume a rich resource for this task that helps us better understand Antarctica's past and present, as well as its possible futures.

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<sup>1</sup> Australian geologist Douglas Mawson made no secret of the potential worth to his country and empire of what he termed the ‘commercial resources’ of Antarctica, which in his speculations included minerals, wind-energy and ‘sightseeing’, as well as more unexpected possibilities such as fox-farming and sanatoria. See Mawson 2010, pp. 213–216.

<sup>2</sup> A 2009 comparison of tourist versus national programme impact in terms of person days suggests the latter is larger by well over an order of magnitude (Jabour 2009, p. 225).

<sup>3</sup> This quotation is from a recent assessment of the footprint of national programmes.

<sup>4</sup> Since 2013, Elsevier has published *Anthropocene*, an ‘interdisciplinary peer-reviewed journal that addresses the nature, scale and extent of interactions between people and Earth processes and systems’. See <<https://www.journals.elsevier.com/anthropocene>>. SAGE’s *Anthropocene Review* is ‘a trans-disciplinary journal ... on all aspects of research pertaining to the Anthropocene’, its first issue having appeared in 2014. See <<https://journals.sagepub.com/home/anr>>.

<sup>5</sup> Information about the group can be found at <<https://www.scar.org/science/hass/sc-hass/>>.

<sup>6</sup> A video of the panel can be found at <<https://vimeo.com/304567022>>, with the Q&A panel beginning about twenty-five minutes in. The scientific make-up of the panel comes up towards the end of the event.

<sup>7</sup> This not, however, a wholesale rejection of exceptionalist thinking. Hemmings, for example, argues that a ‘new deliberate exceptionalism’, replacing the ‘reflexive exceptionalism we once had’, is needed to protect the region from ‘global norms’ that are ‘problematical in Antarctica because they have evolved in different parts of the world’ (Hemmings 2009, p. 71).

<sup>8</sup> Examples include Sörlin 2015a; Bjørst 2010; Glasberg 2011; Antonello 2017; and Dodds 2018.

<sup>9</sup> Geopolitics scholar Klaus Dodds has begun referring to an ‘ice humanities’ closely associated with the ‘blue humanities’. See Dodds’s profile on the *Marine Policy* journal website (Elsevier 2019).

<sup>10</sup> The Protocol came only after extensive discussion in the 1980s about the need for a convention on mining. Indeed, such an instrument – the Convention on the Regulation of Antarctic Mineral Resource Activities – was signed by numerous states in 1988, but never entered into force. The Madrid Protocol effectively replaced it.