

Extraterrestrial Human Geographies

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Chapter 1. Introduction, Research Questions, and Methodology

Introduction

The omniscient point of view behind the iconic photograph of Earth viewed from space sets the scene: we on Earth are now interacting with ourselves off-planet, and this new vantage point affects both the ways we understand Earth as a place and the spatiality of that off-planet vantage point (Figure 1; Figure 2 at end of chapter).



Figure 1: Earthrise. Earth from Apollo 8 mission, 24 December 1968. Image Credit: NASA
http://www.nasa.gov/multimedia/imagegallery/image_feature_1249.html

Humans have imagined living in outer space and on other worlds far longer than we've had the technology to begin to make such things happen, and the vast majority of humans alive today will never get beyond 100 kilometres above Earth's surface, if that. And yet the long history of diverse and now ubiquitous representations of space exploration — humans living in outer space, Earth from space, along with popular depictions of fictional space-faring humans and non-

humans in stories, novels, film, and television — mean that we have already expanded the boundaries of human-environment relationships to Earth orbit and beyond. If only in our imaginations, we are already living in outer space despite our terrestrial positions.

In 2007, Fraser MacDonald put out a call for human geographers to get involved in space studies research, given the ways that geopolitical systems on Earth are likely to affect the future uses of outer space by those groups that can access it. Hoping to jumpstart a critical geography of outer space, MacDonald argues that human geography's advances in analysing the concept of space as socially produced, as a system or network of interrelationships, and as an arena for social justice, make human geography particularly able to engage with concerns relating to current and future human activities beyond our home planet. "It is precisely contemporary human geography's relational understanding of [the concept of] space that makes it a good disciplinary launch pad for considering the meaning and politics of space exploration" (2007, 593). He acknowledged that some work has already been done in tourism studies, military studies, physical geography (particularly comparative planetary geomorphology), and literary geography, such as Kitchin and Kneale's *Lost in Space* (2002). Two years later, in the introduction to *Space Travel and Culture*, Parker and Bell noted the surprising — given the scope of the topic and the volume of popular and cultural material that has been produced about it — lack of discussion across the social sciences about space exploration (2009a). MacDonald specifically wondered at the lack of critical geographical analysis of space, "given that the outer-Earth has been a sphere of human endeavour for well over 50 years" (2007, 593). Furthermore, humans have lived on the International Space Station (ISS) continually since October 2000 (NASA 2009). While the ISS is hardly a colony, with two to twelve residents and an average

stay of less than six months, permanent human habitation in space is a reality. Only very recently have studies outside the sciences started to pay attention.

This MRP is intended to be a direct response to MacDonald's call, and specifically to explore in more depth the opportunities for cultural geography he anticipates:

A cultural and historical geography of space also offers numerous flights of fancy, from questions of astronomical embodiment to the politics of planetary representation. All of this is to say that a geography of outer space should be a broad undertaking, aside from the obvious project of a critical geo/astropolitics. (611).

My interest in this topic comes as much out from my identity as a geographer as from being a one-time astronomy student and a life-long science fiction fan. Whether through astronomical studies or newspaper articles on the International Space Station or science fiction stories in text or video form, outer space has long been a place in my imagination. "When asked 'Why are you a geographer?', Yi-Fu Tuan's eloquently simple response was 'I have always wanted to know what it is like to live on earth'" (Wisconsin Library Association, quoted in Hubbard & Kitchin, 430). I have always wanted to know what it is like to live in outer space. Thinking about outer space was not my sole motivation for pursuing graduate work in geography, but it is an interest I believe geography can help me understand. By examining how human geographers have already engaged with outer space and then looking more closely at how geographical theories of place intersect with a selection of representations of human engagement with outer space, this project extends MacDonald's foundation to be a launch pad for continued research into the cultural geographies of extraterrestrial spaces.

Research Questions

To narrow the scope of my project from the infinite to something more manageable, I have identified three research questions.

1. What has Anglo-American human geography said about outer space, especially in the literature published since Sputnik?
2. What kind of place is outer space, from the perspective of Anglo-American cultural geography, and based on descriptions of outer space from popular culture?
3. Following MacDonald's model, how else might contemporary Anglo-American cultural geography consider outer space, to benefit our understanding of both outer space and geography?

Chapter two will address the first question as a literature review of human geographical publications which consider extraterrestrial spaces. This survey will provide the overall context for the remaining questions as well as update MacDonald's review by including work published since 2007. Consideration of the second question in chapter three will begin with the knowledge that humans have been actively and directly exploring extraterrestrial spaces for several generations:

- Oct 2012 55th anniversary of Sputnik I
- April 2013 52st anniversary of first human in orbit
- Nov 2012 12 years of continuous human occupation of ISS
- Over 500 people have been more than 100km above the Earth's surface; 24 have left Earth orbit (17 still living). Most have reached low Earth orbit, 160-2000 km.

Furthermore, work on and on behalf of Earth is closely connected with the human experience of extraterrestrial spaces; the opportunity to see the Earth as a single entity requires leaving it (Figure 1, Figure 2). My second question will be explored through consideration of the concepts of place and space, with case studies drawn from two science fiction novels. Here, the importance of the question is to demonstrate that theories about place apply as easily to extraterrestrial locations, and that outer space can be (and is) understood as a place: Place need not be limited to sites on Earth. Finally, in chapter four, I will propose a range of additional

possibilities for cultural geographical research in and about outer space, using social media engagements with staff aboard the ISS and a consideration of recent efforts to explore the planet Mars. I was surprised to find that few geographers have asked these questions, and my greatest aspiration for this project is to spark interest in outer space by other geographers.

Methodology

Because this project is primarily a literature review, I will employ textual analysis of geography scholarship, with reference to science fiction, social media used by astronauts, and images and news stories about space exploration as examples. My use of fiction is not so much literary analysis as it is drawing on those texts as examples to illuminate points I wish to make about the scholarly geographical literature. This approach has some precedent, for example in Thrift's use of excerpts from Richard Ford's novel *Independence Day* to illustrate how place has been understood (Thrift 1999). In this context, I am relying on fiction as a source to describe something that no human has yet experienced, and using it as if it were that experience. This approach assumes that "[literature's] aim is not definitive truths, but interrogation of the reasonableness of alternatives" (Saunders 2006, 441). The texts used are not intended to be representative of science fiction or representations of outer space.

For the scholarly literature, I want to know what geographers have thought about outer space, and published work is the primary venue for this evidence. A fulltext search of *Annals of the Association of American Geographers* in the JSTOR database found less than ten uses of the phrase "outer space" over the history of the journal. Similar searches will be done on other core human geography journals, and for related terms such as "astronaut," "space exploration," and "space shuttle" as my primary method of identifying relevant literature. Unfortunately, there is

no equally efficient way to search the fulltext of books for these terms, so my identification of books has been and will be more serendipitous. In addition, citation searching of a few core publications, such as MacDonald's *Progress in Human Geography* paper, will identify additional recent works. The purpose of the review and subsequent discussion in chapters three and four is not to propose an explanation for why so little work on outer space has been done by human geographers to date but rather to highlight what has been and to suggest additional options for what could be done, going forward.

Outer Space

To begin, I want first to define the term: What and where is outer space? Human geography does not appear to have its own particular definition or designation of the location of outer space. The *Handbook of Space Engineering, Archaeology and Heritage* implicitly defines outer space as being exoatmospheric space, that which is outside Earth's atmosphere (Darrin & O'Leary 2009). As working definitions go, it is sufficient; however, the fact that there is no hard boundary marking the "end" of the atmosphere makes it an awkward scientific definition. The United Nations Committee on the Peaceful Uses of Outer Space has so far declined to specify the boundary between air space and outer space, and it is not defined in UN outer space treaties (United Nations 2008). Another boundary commonly used in aeronautical contexts is 100 km above mean sea level; NASA defines an astronaut as a person who has reached at least 50 miles (80km) above sea level (Fédération 2004, NASA 2005). While it may be useful to consider a boundary between Earth and outer space, emphasizing that distinction also keeps the focus on Earth and puts outer space just outside the door, so to speak: Not very far away at all, but also very explicitly not-Earth. I would argue instead that Earth itself is in outer space: outer space is

everywhere, it's here (or, rather, we're there). But it's also impossibly far away, distances that are literally astronomical in scale and potentially infinite in scope. Outer space is enormous, and so much more than our solar system, let alone the motley collection of orbiting artificial satellites that is frequently the primary focus of social scientific consideration of extraterrestrial spaces.

Outer space is at the same time a liminal space from the human perspective. Liminality is a transition from one state to another, and liminal space is where that transition occurs. Most human activity in outer space has been and is confined to Earth orbit, which is arguably the boundary between Earth and the vastness of the universe. At this point in history, humans can only venture to the threshold of outer space, bringing our life support — a portable bubble of Earth — along. From inside that open door, we peer out into the universe but we can never be there without the encumbrance of spacesuit, breathing equipment, supplies for the journey. Given these human physiological restrictions and the current state of technology to address them, it's not surprising that we end up so often squeezing all of outer space into that liminal space, dismissing it as irrelevant, or using it as a metaphor for whatever is unknown, “out there” both literally and metaphorically.



Figure 2: Blue Marble. Earth from Apollo 17 mission, 7 December 1972. Astronaut photograph AS17-148-22727
Courtesy NASA Johnson Space Center Gateway to Astronaut Photography of Earth
<http://earthobservatory.nasa.gov/IOTD/view.php?id=1133>

Chapter Two: What Has Human Geography Written About Outer Space?

If this undertaking sounds esoteric, then I hope to demonstrate that it is a lacuna in contemporary geographical scholarship that should be addressed with some urgency.

MacDonald 2007, 593

Introduction

The first question I want to consider, which was also one of the first questions I had when I began studying human geography, is about what human geographers have already written about extraterrestrial spaces. I have been thinking about outer space most of my life, as a science fiction reader and TV-viewer and as someone who planned to become an astronomer when I first went to university. When I learned that human geography studies the ways, processes, and structures by which humans understand and produce the spaces we encounter, I immediately wondered what it had to say about outer space. Although my approach is based in cultural geography, this review considers work from any sub-discipline of human geography I was able to find, both because I am interested in any way human geography has engaged the topic but primarily due to the dearth of specifically cultural geography sources. I have excluded the many papers that present methodologies, techniques, and critiques of satellite-based remote sensing from my review. Despite depending on extraterrestrial space to be possible, they generally do not acknowledge or make any reference to the role of outer space as the location of satellites as a component of their studies.

The starting point for this project was MacDonald's 2007 article in *Progress in Human Geography*, "Anti-Astropolitik — Outer Space and the Orbit of Geography," in which he

provides an overview of relevant literature and proposes additional areas of research. My introduction to geography began in 2008, so MacDonald's article was the first and only piece of writing on this topic I found at that time. To do a more thorough investigation for this project I began by reviewing the material discussed in "*Anti-Astropolitik*" and identified publications since 2007 that cited that piece. I also used library databases to perform subject and keyword searches in the literature for "outer space", "extraterrestrial", and "space travel" from current publications back through the 1950s. The earliest substantive engagement with the topic in human geography was from 1991 (Glassner), with the bulk of the scholarship appearing in the late 2000s.

This chapter begins with a review of MacDonald's article and then proceeds through a survey of key texts addressing extraterrestrial space within human geography divided into two sections: Legal & Political Geographies and Historical & Literary Geographies, with works considered chronologically within each section. Although there are sufficient works to easily separate them into the two thematic sets, within each set there was no other meaningful way to structure discussion. A fourth section discusses three works that discuss the planet Mars exclusively. The final section summarises work from related disciplines in the social sciences that engage with outer space.

MacDonald, "*Anti-Astropolitik*"

...[M]y primary objective is to establish geography as a whole as the obvious discipline to carry a broad range of cultural, historical, political and economic inquiries into outer space (MacDonald 2007, 594).

Fraser MacDonald justifies his argument for geographical engagement with outer space on the basis that the study of cosmology and the place of Earth in relation to it has long been part of geographical thought. In calling for geographers to consider outer space, MacDonald aligns the

project with ancient traditions described by David Livingstone as linking “the intimate relationships between human affairs and the celestial forces of the heavenly spheres” (Livingstone quoted in MacDonald 2007, 595). The article also connects the study of outer space with geography’s concern with colonialism and empire-building, identifying the space race as part of an international conflict over expansion and political dominance. In more theoretical terms, MacDonald poses several questions to established contemporary themes to wonder how they may be affected if outer space is taken into consideration. For example, how might Haraway’s analysis of the god-trick be complicated given that satellites continuously generate material evidence of that point of view (MacDonald 2007, 598)? How does the language of “the global” as critiqued by Cosgrove and Gregory shift meaning when “the outer-Earth and other extraterrestrial spaces are *already* part of our everyday lives” (599, emphasis original)? In the final section of the article, MacDonald focuses on militarisation, surveillance, and other geopolitical ramifications of human activity in Earth orbit, ending with a “critical astropolitics” responding to Everett Dolman’s book *Astropolitik: Classical Geopolitics in the Space Age*. His conclusion steps back from the tight geopolitical focus to reiterate the call in the introduction: “...space is part and parcel of the Earth’s geography....It is precisely this relational conception of space that might helpfully animate a revised geographical understanding of the Outer Earth’ (610).

According to the *Web of Science* database, in the five years since its publication the article has been cited in 16 subsequent papers, all but two published in geography journals:

GEOPOLITICS (3)
PROGRESS IN HUMAN GEOGRAPHY (3)
CULTURAL GEOGRAPHIES (2)
POLITICAL GEOGRAPHY (2)
ANNALS OF THE ASSOCIATION OF AMERICAN GEOGRAPHERS (1)
ENVIRONMENT AND PLANNING D SOCIETY SPACE (1)
GEOFORUM (1)
TRANSACTIONS OF THE INSTITUTE OF BRITISH GEOGRAPHERS (1)

ARCHAEOLOGIES JOURNAL OF THE WORLD ARCHAEOLOGICAL CONGRESS (1)
SOCIOLOGICAL REVIEW (1)

However, only five of those articles explicitly focus on outer space (Beery 2012, Collis 2009, Dunnett 2012, Wang 2009, Williams 2010).

Legal & Political Geographies

As discussed further below, legal and political scholarship on outer space outside the field of geography has existed as long as the space age, that is, since the launch of Sputnik. It is therefore not surprising that geopolitical and legal geographical discussions were among the earliest efforts by human geographers to consider the ramifications of human extraterrestrial activities.

Presaging MacDonald by fifteen years (but not cited by him), Martin Glassner wondered why political geographers weren't researching outer space (Glassner 1991). In a review article on "our last spatial frontiers" — the sea, Antarctica, and outer space — he lamented that not enough of the authors discussed were geographers, and that the works would have

benefitted from the application of a geographer's integrative skills; we badly need frontier studies that explain clearly the physical, legal, political, economic and technical aspects of the subjects and the interrelationships among them (437).

In his section on outer space, Glassner's first sentence stated that geographers seemed to find this frontier "preposterous" as a topic of study despite its demonstrable relevance (435). The three works reviewed in this section focused on space law and the regulation of space activities including pollution in orbit and transborder broadcasting satellites. Although the review was published in *Political Geography Quarterly*, none of the authors of the works on outer space were geographers. As a geographer himself, Glassner's intent was not to demonstrate the geographical content of the works under review but rather to indicate ways that the topics they present would be better understood if geographers also participated in the analysis. In particular,

the political and strategic value of Earth orbital space has great interest for both political and legal geographies.

The geostationary orbit (GEO) is that region of space about 36,000 kilometres directly above the Earth's equator. Objects orbiting there move at the same speed as the planet rotates, so they have a fixed position relative to the ground. The technological, scientific, and financial benefits of this location are great, making this region a highly valued and frequently contested limited natural resource. Christy Collis's 2009 essay explains the legal history of the GEO.

[This article] is expository rather than argumentative for one key reason: few humanities and social science scholars are aware of the existence of the GEO itself, let alone its complex cultural history and constitution. Before debates about the GEO can be initiated, and before humanities scholars [which includes cultural geographers, according to Collis] can lend their critical thoughts and insights to the struggle for the GEO, the GEO first needs to be understood and anatomized (50).

From Sputnik's launch in 1957 to the present, the United Nations and individual governments have struggled to determine who should be able to place satellites in the GEO and how that determination should be made. At first the situation was essentially first-come, first-served; only those few states with the technological and economic ability to build and launch satellites had access. Over time, given the increasing vital importance of communication, meteorological, and scientific satellites to all aspects of daily life on the planet, concerns for equity have been raised and attempts have been made to define a legal basis in international law for a more equitable distribution of access rights, with varying degrees of success. The situation remains unstable, with long-time space-faring nations having much greater representation in the GEO and developing nations increasingly reaching the capability of launching their own satellites, with a rapidly dwindling set of options for where to place them. "Creating the legal geography of the GEO both reflects and will shape terrestrial power relations, communication infrastructures, and global economics far into the future" (Collis 2009, 62).

Given current levels of technology, orbital space is also the realm of recently developed plans for space tourism. Explicitly responding to MacDonald's request for new critical responses to outer space, Beery (2012) presents an economic and political analysis of the development of space tourism. His paper adds a geographical framework to the economic analysis presented by sociologists Dickens and Ormrod in their *Cosmic Society* (discussed below). Beery provides detailed examples of the "connections between space activities, states and capitalism" (33) drawn from the establishment of a commercial space industry hoping to profit from "space tourism and other non-military, non-satellite-based activities" (33) as yet to be realised in practice. This structural change, from governance of and access to outer space by the state, here primarily the United States, to a mix of private entities acting alone and in conjunction with government agencies, is a fruitful area for geographical analysis of public-private enterprise, commercial and technological development, and "understanding the terrestrial political economy of space activities" (26).

A large part of the interest and appeal of space tourism and space exploration builds from representations and narratives about space exploration from historical, popular, and literary sources. Financial, technical, and resource implications aside, it is the broad appeal of seeing the Earth from space and the fantasies of exploring the universe in science fiction that prompt public interest in space tourism ventures.

Historical & Literary Geographies

Possibly the best known geographical work relevant to outer space is Denis Cosgrove's *Apollo's Eye* (2001), which traces the history of representations of the whole Earth in western culture. To be able to represent that god's-eye view, one must imagine a vantage point away from the

surface of the planet. However, over the course of the book, Cosgrove's attention remains closely directed towards the history and perceptions of the people who created the maps and images of the Earth, with no discussion of extraterrestrial spaces. The concluding chapter covers the post-Sputnik era and the impact of two NASA photographs of Earth from space, one from Apollo 8, the first image ever taken from sufficient distance to see the planet entire (although at a gibbous phase), surrounded by black, and the other an Apollo 17 colour photograph of the full disk of Earth. These two images are the most reproduced images of any space program (Cosgrove 2001, 257). The fact that these images were taken by astronauts in space craft going to and from the Moon is noted but not interpreted or discussed as such in the book, and outer space is only the black "void" (262) in the photographs, against which the Earth glows brightly and takes all the attention. The focus of Cosgrove's book is to examine the methods and meanings by which western societies defined and constructed their understanding of the world as a single unit and their place(s) in that world, on that globe. By not taking one more step back, to consider the imagined or literal extraterrestrial observation platform on which these views depend, *Apollo's Eye* misses an opportunity to develop a similar examination of the role of Apollo in determining the nature and scope of what his eye captures.

Another context in which the expectation of an examination of outer space is thwarted is found in Kitchen and Kneale's 2002 collection of essays on geographies of science fiction. This collection considers space not so much in terms of outer space explicitly but rather as the theoretical or cognitive spaces created by science fiction's speculation and thought experiments where a wide range of theoretical explorations, including many relevant to geography, may be found. In particular they place the collection in the context of literary geographies concerned with

the politics of representation and a poststructuralist questioning of the idea of mimesis or realism.... It is this suspicion of mimesis which makes science fiction such an interesting set of fictions for geographers (3).

Because science fiction often attempts to portray or describe things and places which are not real and in that sense unknown, and because it plays with notions of plausibility and possibility, readers may need to navigate through the “cognitive estrangement” generated by the text to be able to follow along (Suvin in Kitchin & Kneale 2002, 4). Of course science fiction also portrays things that do exist but are not fully understood by current science and experience (often with an implied and optimistic “yet”), like outer space. However, none of the essays in the collection address outer space as a topic specifically. That it may be the setting of the text being analysed is incidental to the analysis. The closest approach is made by Paul Kingsbury, in a section on ways that scale is distorted in science fiction films, for example where “...the tyranny of distance...is tamed by intergalactic space travel; scale [is] also dissolved when moons are mistaken for space stations...” (Kingsbury 2002, 128).

Oliver Dunnett’s 2011 dissertation examines a historical geography of representations of outer space in the mid-twentieth century, focused on the British Interplanetary Society (BIS) and its role in the conceptualisation of outer space in British popular culture. Dunnett argues “that cultural geography represents a natural academic home for the understanding of human interactions with outer space and their cultural implications” (20). Drawing on archival materials as well as popular culture, the dissertation describes the influence that the BIS had, in part through the activities of individual members who were also active in creating popular media about outer space. In particular, the novels of members Arthur C. Clarke, C.S. Lewis, and Olaf Stapledon as well as “The Sky at Night,” a long-running television show hosted by member Patrick Moore linked the work of the society with the production of representations of outer

space. Dunnett proposes that these representations alone are sufficient for the development of a cultural geography of outer space.

...[H]uman or artificial presence in space is not a pre-requisite for a cultural geography of outer space. Peoples' aspirations, fears and future projections have drawn inspiration from outer space for hundreds of years, whether it is presented as a heavenly cosmos or a blank void, and will continue to do so irrespective of human or artificial presence in outer space (260).

At the same time, he notes that these cultural geographies of outer space also inform and shape at least some of the political, scientific, and technical practices within the contemporary international space industry, and additional research into cultural aspects of extraterrestrial geographies should continue.

While legal and political geographical discussions of extraterrestrial spaces have gravitated, so to speak, around Earth orbit and efforts to grapple with territorial distinctions rendered impossible there, cultural geographies have not (yet?) coalesced around specific points of engagement. At this point, only the broadest summary can be drawn, that the meaningful spaces created through literary, visual, and historical representations are the only way most humans will ever engage with outer space. Dunnett's point about direct human experience in extraterrestrial space not being necessary for meaningful engagement there is perhaps best demonstrated by the long-held obsession humanity has had for Mars.

Mars

Mars is a special case in a discussion of geographical literature about extraterrestrial space. With the possible exception of the Moon, no other place beyond Earth has been as thoroughly imagined, narrated, and analysed, as Mars. In the last one hundred years alone, dozens of fictional creations in text, radio, film, and television have portrayed the planet (and its hypothetical inhabitants). Many scientific projects have observed, visited, and probed it. In the

context of our solar system, it is relatively similar in physical characteristics to the Earth, with approximately the same land surface area, a thin translucent atmosphere, and even a comparable length of day (Mars days are 39 minutes longer). It is the closest extraterrestrial Earth-analogue we have, and some geographers have started to notice it as a space of human activity, particularly through the lens of frontier exploration and colonialism. I have not found any geographical discussion of the Moon, but there is enough scholarship by human geographers about Mars to constitute a sub-sub-specialty in this context.

Through an examination of news coverage of the 1997 Mars Pathfinder mission that placed an interactive rover called Sojourner on the surface of the planet, Dittmer (2007) outlines the process by which Mars was created as a place “perhaps with unique characteristics not found in any Earth-bound place but nevertheless socially constructed” (113). The simulation of Mars through the ability of Sojourner to send photographs back to Earth and be directed to move across and interact with the Martian surface is an example of Baudrillard’s hyperreal — the replacement of reality by virtual or simulated reproductions — and the virtual engagement with Mars first presented to the public in 1997 has continued with later missions and projects such as Google Mars. “[T]he planet has become a virtual appendage of Earthspace, no longer Other but rather a human place where anyone can explore” (115). The anthropomorphization of Sojourner aided this process, allowing people to find something to identify with on the surface of Mars. Dittmer argues that three distinct threads of colonial language became evident through his content analysis: scientific study with particular emphasis on the search for life, toponymy, and comparisons with Earth. Together, these themes construct a “knowable, measurable region with places on a map similar to places on Earth” (127) that is presumed to be at our disposal.

Collis & Graham (2009) analyse the contemporary legal status of Mars as alternatively understood to be accessible to humans as common property, claimable as private property, or of intrinsic value on its own terms and generally not for unlimited human use. Because the arrival of human visitors is, so far, on the horizon but not imminent, Earth-based “[p]olitical spatialities, along with fictional representations and media constructions, constitute Mars’s current cultural geography, its areology” (258). The challenge they encountered when considering the exploration or acquisition of Mars (or any extraterrestrial space) as a colonial act is that existing theories of post-colonialism are so far unwilling to consider “the emergence of an entirely new space of human activity” (249). Instead, they argue, postcolonial scholarship retains assumptions based on European encounters with the rest of the world in the preceding centuries. New interpretations of colonialism are necessary to explain our past, current, and future relationships with Mars.

Lane’s *Geographies of Mars: Seeing and Knowing the Red Planet* is historical geography, a study of the Mars mania of the early twentieth century in the United States and Great Britain, and the coincidental and occasionally intersecting development of both astronomy and geography as established academic and professional entities (Lane 2011) at that time. Using Mars as the focal point, Lane’s work “is about the processes through which geographical knowledge was (and is) produced in specific places at specific times by specific individuals, institutions, and publics” (13). Maps played a central role in the popularisation of Lowell’s theory that the lines he observed on Mars were artificially constructed canals and therefore proof of sentient inhabitants, and other geographical tools and approaches were also employed by scientists and writers to explain and promote discoveries about Mars. Scientific maps in particular helped construct Mars as a geographical place (62); depiction of canals and cities

created the perception of it as an inhabited place, in contrast with maps of other “exotic” locales from the British empire, which were more frequently shown without features, presenting them as blank canvases for colonial powers (62-63).

One repeated theme in the book is the role of distance between observer and observed and the effect that distance has on how each side is perceived by others. Astronomers benefited from the distance between their labs and the object of their study, as it was understood to provide a natural objectivity in their work. In contrast, geographers were sometimes criticised for getting too close, becoming contaminated by their subjects while in the field. Continuing this distinction between imagined Mars and imagined Earthly others, turn of the century Western geographical thought typically aligned “otherness” with “inferiority” but Martians were generally imagined to be simultaneously other and superior in intelligence and technical capability (188).

To a large extent, the turn-of-the-century writing about Martians followed these conventions of Orientalist imaginative geography. Writers typically cast the planet as alien and impenetrable while at the same time familiar and open to a scientific gaze. (189)

The distinction in assumed status between Martians, Europeans (including white North Americans), and colonial subjects reflects the relative distances. Martian others could be admired from a distance, but colonial others were feared at home (211). Lane concludes that

If humans indeed walk on Mars as projected within the next few decades, they will hardly embark on anything “new” but will instead act out a geopolitical vision of human-environment relationships that has been a long century in the making. (216)

Areography is the astronomical term for the study of the physical geography of Mars, and if humanity ever does create permanent settlements there, human areography may well become a new and separate field of study. In that case, my assumption that “geography” as a discipline may be relevant wherever human experience can occur would be called into question. Perhaps a new label and discipline will be created to describe anywhere humans go. And perhaps, also, this hypothetical scenario would raise questions about defining humanity and whether such a

definition of requires grounding on our planet of origin). If areography is developed as a Martian parallel to Earth-based geography, presumably someone would have to propose an extraterrestrial human areography project to look back at Martian imaginings of Earth, among other extramartian (as opposed to extraterrestrial) places. Until that time, there are other related research efforts in the social sciences that attempt to understand how humanity and outer space might be connected.

Related Disciplines

Outer space is an established area of research within legal and political studies, some of which touch on related subdisciplines within geography, as previously outlined. For example, the journal *Space Policy*, which, according to the aims and scope on its website, fosters "discussion and analysis of space activities in their political, economic, industrial, legal, cultural and social contexts," has been in print since 1985. Much of its content has focused on international law, political relations, and occasionally geopolitics related to, expressed in, or affecting primarily orbital space (e.g. Ehrenfreund and Peter 2009, Goh 2009, Pal 1997, Peter 2006).

Other studies of outer space from the humanities and social sciences include a sociological study of the humanization of the cosmos through economic development — an “outer spatial fix” — and popular interest in “pro-space” movements (Dickens & Ormrod 2007); Gorman's archaeological analyses of space-age launch sites and debris, both on Earth and in orbit (2009a, 2009b); and a study of the genre of painting known as astronomical art, which depicts extraterrestrial places and scenes such as a view of Saturn's rings from the surface of that planet (Sage 2008). The photograph of the "Whole Earth" taken by the crew of Apollo 17 has been well documented as having had a significant impact on the growth of the environmental movement in

the United States during the 1970s (Henry & Taylor 2009). A special issue of *Management & Organizational History* on “Organizing the Space Age” (Parker & Bell 2009b) brought together papers examining management and planning issues related to space travel, from the first decades of human activity in outer space in the Cold War to the present:

This includes the micro-organizational detail that is necessary to ensure that rockets go up at all, and the macro-economic forms of managed or market liberal capitalism that have provided (and could provide again) the resources and motivation for such space adventures (228).

With the one exception discussed in the section on Mars above (Collis & Graham), the papers in this issue focused on Earth-based experiences rather than extraterrestrial ones.

Conclusion

The common refrain within this body of scholarship is that outer space is not an esoteric, unrelated, exceptional topic of study for human geographers and other social scientists. Articles frequently include some kind of acknowledgement of an assumption that this topic may be perceived as unusual or inappropriate. However, this body of scholarship has made a strong case that outer space is not simply “out there.” Instead, it is already deeply implicated in a long history of cosmological thought, and more recently integrated with many contemporary geopolitical practices, which we ignore to the detriment of any clear understanding of critical geographical issues. Human activities in outer space — past, present, and future — all intersect with existing cultural, legal, political, economic, and social threads. Legal and geopolitical issues are most frequently explored in the works discussed in this chapter, but cultural geography and the intersection of political, economic, and cultural interests in colonial studies have a strong presence as well. Instead of continuing to introduce their papers with justifications of why outer space is relevant to human geography, I hope geographers will now proceed without appending defensive rationales.

Although there is a slowly increasing body of geographical work considering the human experience of extraterrestrial spaces and places, there is not much discussion of how or whether such concepts — space, place — have the same meaning or function when used to talk about outer space. Of course these terms are not universal human concepts either; as Malpas notes, different human languages align such distinctions differently; English space and place are not the same as French *espace* and *lieu*, for example (Malpas 2012, 233). The next chapter will examine the meaning and application of place in the context of outer space.

Chapter 3. What Kind of Place Is Outer Space?

Introduction

Consideration of the second research question begins with the knowledge that humans have been actively and directly exploring extraterrestrial spaces for several generations: Research about and on behalf of Earth is closely connected with the human experience of extraterrestrial spaces; the opportunity to see the Earth as a single entity requires leaving it (Figure 1 and Figure 2 in Chapter 1). Satellite-based remote sensing and communication technologies have transformed many areas of research, industry, economics, politics, and popular media. Whether through weather reports, cell phone use, or GPS, the majority of humans alive today have some relationship to information and technology directly implicated with extraterrestrial spaces. Outer space is part of human activity on Earth, and as such qualifies for consideration as place. This chapter begins with a discussion of recent geographical approaches to the concept of place. Examples of outer space to be considered as place include astronomical images, a video from the International Space Station, and reference to outer space in two science fiction novels. These different contexts provide an opportunity to engage with theories of place as they can be applied to extraterrestrial spaces.

First: What is place? This question has been answered, discussed, and debated for a long time in Anglophone geography (and elsewhere). For the purposes of this project, I'm interested in some of the more recent definitions and categorizations, those that call into question history, identity, and culture as core components of what makes somewhere a place. These definitions

consider place to be mobile, constructed — always under construction, in fact — contingent, fluid, a simultaneous intermixture of here and there, never just here: always in relation to other places, other wheres (and other whens). Understandings of place built on critical geographies also often emphasize the importance of experience, of bodies, of the individual (whatever that is) interacting and experiencing and constituting space, and creating place (Cresswell 2004, Malpas 2012, Massey 1997, Massey 2005, Pierce et.al 2011).

One result of this view of place is to call into question descriptions or categorizations of other places — others' places — to doubt the colonizer's gaze, the imperial history, and to question and problematize all possible power relations that may structure or influence or inform or create the interrelationships that build a place. But how does this work when a place — outer space — has never been experienced directly by any human being? I should explain that I am here referring to deep space, space beyond our solar system, distances far greater than the tiny hop from here to the moon. The first human-made object that could leave "our" solar system (Voyager 1) is only now entering the wide, fuzzy boundary used to demarcate that border between it and the rest of the universe. Human-generated radio waves have gone farther, 70 light years or so, and that's all. On the one hand, humans have obviously been thinking about space exploration for a long time, but in practice, we've barely begun.

Second, what, and where, is outer space? For a lot of human geography, if it's mentioned at all, it appears as something like a black screen: nothing, darkness, a metaphor for the concept of space-not-yet-constituted, a void without human or natural actors (Malpas 2012). Looking again at Figure 2, which is among the first images taken where we see the planet entire, the image speaks to the reality of the earth as a single entity, diverse in its particulars, but also just one drop in the whole of the universe. Here, the distinction between Earth and outer space is both

stark and ambiguous. For NASA, the UN, international aeronautical societies, outer space begins where air space ends. Different groups place that border in different locations, while the UN outer space treaty avoids defining the boundary. Atmospheric science has a different set of criteria, based on chemical composition and density. It seems clear in the photograph where the Earth ends and space begins, but closer to home, the dividing line is a lot fuzzier. And while there are various economic, legal, and political justifications for attempting to manage and demarcate orbital spaces, it's otherwise something of a moot point: images like this make clear the obvious but easily forgotten perspective in which the entire planet is itself in outer space — we're in it, not separate. Conceiving of Earth as anywhere else but outer space can only be described as a bizarre pre-Copernican throwback where we fervently clutch the belief that we're the center of the universe. Instead, we're a ball of rock and water surrounded by a bubble of air but that's not much of a barrier between us and the universe, in the larger context. We — all the inhabitants of Earth — are in constant motion through the universe, through, in, or, in the terminology of some social-constructionist place theorists, constituting outer space right now. This is one of the reasons I believe outer space is relevant to human geographers: it's where we are.

What Kind of Place is Place?

Place, at a basic level, is space invested with meaning in the context of power. This process of investing space with meaning happens across the globe at all scales and has done throughout human history. It has been one of the central tasks of human geography to make sense of it (Cresswell 2004, 12).

We do not have to stop at the scale of the globe, as Cresswell implies; outer space is as surely invested with meaning in the context of power as any place on Earth. The legal and political geographies discussed in the previous chapter provide several examples. This section will explore in more depth some of the implications of understanding outer space as place.

In his overview of recent geographical theories about place, Cresswell defines three categories of conceptualising place as practiced by human geographers since the mid-twentieth century (2004, 51). Descriptive approaches, although no longer at the cutting edge of geographical thought, continue to be practiced: “the concern here is with the distinctiveness and particularity of places” (51). The social constructionist approach understands the particularity of places as a result or expression of other intersecting social processes and systems such as capitalism, feminism, and post-colonialism. Finally, the phenomenological approach attempts to discern the ways that human existence is predicated on being always already “in place” or “Place” as Cresswell suggests (51). This Place is not any particular region or -production of social forces but rather an essential aspect of any place. Cresswell sees these categories as overlapping but more specifically engaging at different levels, from the surface characteristics to the underlying causes to the ontological core.

Following these levels, it is simple to apply the first two approaches to different aspects of outer space. In descriptive terms, outer space is vast in spatial and temporal metrics. Astronomers do identify regions and objects with discernible traits and distinguishing features. For a human being in outer space, weightlessness may be the most striking detail, along with the extreme harshness of the environment. The lack of heat and air in outer space make it impossible for humans to experience it directly and survive. The human-constructed habitats in space have been lived in by so few humans that basic description of live on board remains a staple of International Space Station press releases. See for example a video made in November 2012 explaining the food options supplied to the one U.S. astronaut and two Russian astronauts currently in residence, in celebration of the U.S. Thanksgiving holiday:

http://www.nasa.gov/multimedia/videogallery/index.html?media_id=155857151

That example is also fruitful for imagining possible social constructionist approaches to understanding outer space as a place. The astronauts are clearly and repeatedly identified by nationality, which simultaneously recognizes and validates these differences while also reinforcing the political boundaries each nation claims, even while in orbit, where the territorial boundaries don't exist. The recognition of a national holiday in international space and the invocation of social and cultural ties through the different kinds of foods make the space station both familiar and very strange (particularly when the astronaut keeps letting go of the microphone, which floats in place next to him). The fact that there are only three people on board can be understood in the context of the elite training expected of astronauts, which in turn is inextricably linked with the complicated interplay among gender, class, education, and technology. No place on earth can be as restrictive to access as outer space, both in terms of the basic procedure of getting from here to there and in terms of being admitted to the club. The nascent industry of space tourism consists of two expensive options: paying for a seat on board the Soyuz shuttle from Earth to the ISS, or brief flights on board an aircraft that flies high enough for passengers to experience weightlessness for a few minutes at a time. In neither case are tourists considered astronauts, and both have very limited openings for passengers with the ability to pay for the trip.

For a phenomenological approach, I believe two different possibilities need to be considered. On the one hand, there is the sense of place in outer space that only those humans who have been there can attest to. Astronauts are the only people who can provide first-hand accounts of the experience of microgravity, of seeing the earth from 500 or 50,000 kilometres away, and of having a view of the universe unobscured by Earth's atmosphere. Those astronauts who have gone outside their craft, whether on the Moon or outside a shuttle or the ISS, are the

only people who can provide the preliminary data about “the essence” of those places. On the other hand, all the rest of us on Earth who have looked up at the sky, read science fiction stories about spaceships, followed news reports and scientific studies about human space travel and remotely operated craft exploring the solar system have surely also developed a different sense of place of outer space. That it is entirely imagined does not necessarily make it invalid. The essential experience of outer space for most people is as nothing, a mystery, an imaginary world. We know it to be cold and lethal. It’s dark and bright. It’s literally all and nothing.

In reference to the varying scales that may be applied to place, Cresswell notes that “Astronauts often commented on how the earth looks like home when it is seen from afar” (2009, 170). Humans are increasingly making ourselves at home far beyond the surface of our planet of origin. Although Tuan (1978) directs his attention down to point out that geographers rarely focus on studies of Earth’s core, he does not then look up to consider human activity in orbit and above. Cresswell’s astronauts are similarly looking “down,” and he says nothing about the place from which they look back. And yet, as Tuan observes, “Home, for the modern person, is a point of departure rather than the locus of permanent loyalty” (1991, 104), and Cresswell also emphasizes the increasing presence of mobility in geographical considerations of place (2009). This threshold of geographical understanding of place, with humanistic and phenomenological positions conceiving of place in terms of “roots” and social-constructionist influenced interpretations understanding place as informed and produced by “routes” (Cresswell 2004), can also mark a transition from Earth-centric focus (humanity’s original home) to considering the larger context of our planet in outer space and human endeavours to imagine, plan, and implement departure from it.

Geographical projects that attempt to understand space that is not place may also be useful for theorizing about outer space as a place. Hardy summarises the philosopher Edward Casey's neologism "placiality" as a concept related to place, comparable to the relation spatiality has to space, and links it with other recent philosophical (and geographical, specifically Lefebvre's) explorations of the meaning and production of place, not in any nostalgic or sentimental return to some romantic ideal but rather with the intent "of going beyond and between the contours of a complex spatiality... exploring a new sense of 'placiality'" (Hardy 2000, 100). Placiality is then a particular or specific expression of place. Alternatively, placelessness may refer to spaces where meaning is erased or undermined through generalisation and repetition, with the classic example from geography being shopping malls and suburban residential developments (Augé 1995, Gregory et al 2009, Relph 1976). With regard to outer space, placelessness can also be invoked through the absence of cultural markers and materiality. Without such markers, outer space is considered to be placeless, no place at all. In describing Donna Haraway's reference to "the god-trick of seeing everything from nowhere" (Haraway in Gregory 1994, 66), Gregory explicitly refers to the 1972 photograph of Earth taken from the Apollo capsule returning from the Moon (Figure 2) and places that craft and its passengers "nowhere". However, I am inclined to think that "nowhere," both this specific nowhere and nowhere generally, is still a kind of place. The negation of any qualities of "where" is an expression of power to define, identify, and exclude that invests that space with meaning in the context of power (Cresswell 2004). Defining something as not a place, as not a where is still defining it, characterizing it as a location without character. Labelling something as nowhere is still identifying it as a place.

Place : Space :: Earth : Outer Space

It seems to me that while geographers have frequently called into question and engaged with the relationships between the first two terms of this analogy, place : space, the second half, Earth : Outer Space, has remained steadfastly unexamined and if it is considered at all, follows the most traditional form of the place : space relationship. In the introduction to *For Space*, Doreen Massey asks “what if we refuse that distinction, all too appealing it seems, between place (as meaningful, lived and everyday) and space (as what? the outside? the abstract? the meaningless?)” (6). My version of this “what if” is to suggest we refuse the distinction between Earth and outer space, where earth is meaningful, lived, and everyday, and outer space is outside, abstract, and so far (metaphorically and literally) from the realm of everyday life as to seem meaningless. For all that recent conversations about space and place attempt to question the emptiness of one and the essentialism of the other, human geography still tends to essentialize the Earth, without question or qualification, as the only space where place may occur, and outer space as, by default, the irrelevant other, that which is not simply because we (who?) are not there. Malpas’s distinction between the void, kenon, and the bounded spaces of topos and chora describe the same separation between known and controlled spaces and the unknown beyond them (Malpas 2012, 234). However, the relationships between the three are more mutually constituted than the opposition of place and space.

Figure 3 is an image from the Hubble Ultra Deep Field, and most of the “stars” here are actually entire galaxies. The telescope was focused on this location of space, a “blank” black spot near the Big Dipper, and after more than 250 hours, this was what the telescope saw. Some of the photons travelled 13 billion years before colliding with the Hubble’s sensors. The universe, outer space, is crammed full of places so numerous and huge we have no way to grasp

their magnitude. There is so much “there” there, so many wheres, so many places. And humans have no foreseeable way of visiting them except through imagination.



Figure 3. Hubble Ultra Deep Field Image Reveals Galaxies Galore
Image credit NASA, ESA, S. Beckwith (STScI) and the HUDF Team
<http://hubblesite.org/newscenter/archive/releases/2004/07/image/a/>

Familiar & Unfamiliar Places in Outer Space

Fredric Jameson notes that "...whatever our immediate narrative interest in this particular SF [sic] plot and its resolutions, we also attend to and derive a readerly gratification from the development of space in SF worlds..." (Jameson 2005, 306). Jameson is here referring to "space" as it is most commonly used by geographers, not as "outer space," but his generalization applies to the specific case of outer space as well as the broader category of space. That particular space which is outer space is what I am interested in exploring through this geographical lens. In order to start to think about outer space, deep space, as a place, I turned to science fiction. Science fiction was one of my earliest entry points for thinking about extraterrestrial spaces, but because humans have not ventured outside the solar system, science fiction is also the only source for accounts of what outer space might be like. Science fiction cannot offer "truth" the way an empirical study might, but if a non-science-fictional literary text may be used as an example of what is possible for an Earth-based geographical argument, I argue the same is true of a science fictional account of what might be possible in outer space (Saunders 2006). Neither of the texts discussed below are "about" outer space at all. I'm using them simply because they have as their setting or as an element of plot being in or traveling through outer space.

The protagonist of Eleanor Arnason's novel *Ring of Swords* is a xenobiologist from Earth who studies intelligence in non-Earth contexts. She is accidentally caught up in the extended political negotiations following first contact between humans and a hostile alien species called the Hwarhath, and ends up traveling with the human negotiation team to the space station where the next round of talks will begin.

The trip went as planned. They made the first transfer, following directions given by the enemy, and arrived in the middle of nowhere. A hwarhath ship met them and gave them a new set of directions. They

moved on. The Hwarhath ship stayed and made sure no one was following. This happened two more times and then, after four transfers, they came to the enemy station.

The singularity it orbited (at a good safe distance) produced no useful light, and the station was visible only as a computer graphic. It turned on a screen in the observation room: a blunt, squat cylinder that looked more than anything else like a can of soup.

As had been agreed, their ship stopped a good safe distance from the can of soup and waited for an alien shuttle to arrive.

...The trip [on the alien shuttle] was nothing special. The engines went on, then off, then back on. The gravity kept changing. There was nothing to see, except the windowless cabin.

...After an hour there was another little jolt. The shuttle had docked. Doors opened, and the team floated out, helped by the aliens, who were not floating. There must be something on the bottom of their sandals that held them to the floor.

It was like arriving at a human station, thought Anna. (Arnason 1993; 133, 135)

In this example, as Anna observes, space travel is pretty much the same as any other form of long-distance mass transit. Starts and stops, not much of a view, destination represented and observed by graphic design as much as direct experience (I'm reminded here of the screens in airplanes that show the plane's progress and trajectory between airports). These places are noted for their similarity and familiarity and recognized as place based on prior experience with other places rather than any long history with this particular place. Outer space as nothing: nothing to see, nothing to do, nothing special. To be endured or ignored. Upon reaching the alien's station, the surprising thing is that there's nothing surprising: "It was like arriving at a human station." Although the setting of the novel in outer space, far from any planet where humans or Hwarhath live, is explicitly required by the backstory leading to the events of the novel, it is otherwise rarely discussed or even relevant to the narrative. Even in a science fiction novel set on a space station, outer space is easily ignored or classified as nothing.

Most science fiction that includes space travel draws on a range of common devices (both mechanical and plot) to address the problem of getting from one place to another when the distance is so great. To a large extent, science fiction is a realist genre in that it requires logical and plausible, if currently impossible scientific solutions. In this context, options for travel across light years include various faster-than-light tech like hyperdrive or warp drive which posit some other kind of space different from the usual space we inhabit.

The negotiators had worked out all the details of a prisoner exchange, and were now discussing ways for the two species to police their borders in the event of a treaty. Not easy, Charlie said. The borders went through too many dimensions, and they were not continuous in a way that was understandable to ordinary people.

How, he asked, does one police something that one cannot visualize or imagine? (337)

In this quote, reference is made indicating that not all travel in outer space is as prosaic as the previous excerpt suggested; it is the first time both humans and hwarhath have encountered people of comparable technology and territorial possessiveness, so neither has a pre-established means of addressing the problem of complicated transdimensional borders. At the same time, like a lot of science fiction and certainly most in the progressive political sub-genre, it's quite clear that the comment about policing obscure and complicated borders speaks as much to contemporary earth-based politics as any imagined interplanetary skirmish.

Outer space is described in science fiction as both normal and boring and as obscure and hard to imagine. It's frequently a backdrop, a medium through which people must move to get from one place to another

"Where do you want to be buried?"

I shrugged. "Ettin, if you're willing. Otherwise, in space." (Arnason, 309)

But here it is something else again, a most directly embodied experience. The Ettin in this quote is a region on the Hwarhath home planet; burial there is presumably the same process as burial on Earth. But what does it mean to be buried in space? The obvious parallel is burial at sea, and it's common to find naval metaphors and terms used in science fiction to describe travel in outer space. As with burial at sea, there is no marker or spot in space where a mourner might return to pay respects to the dead. But the metaphor ends there. What kind of place is outer space, where a corpse might be laid to rest, covered in — what? Cosmic dust? Blackness? Nothing? Where is it "laid" and what kind of rest can be found there? Geographical ideas about bodies in space suggest something very different in this context.

As previously mentioned, the second Arnason quote above points to a common trope in science fiction that involves travel in outer space: Somehow finding a shortcut, a faster route to bypass the vast, inhuman scale of outer space. Hyperdrive, warp drive, StarGate, faster-than-light travel, teleportation; this plot device makes it possible to combine the imagined unimaginable with some degree of scientific realism and then hand-wave a solution for a given narrative to encompass interplanetary, transgalactic scope. It's a way of getting around or through outer space, simultaneously acknowledging its enormity and disregarding it.

My next case study, China Mieville's *Embassytown* — which is primarily about colonialism and its complicated relationships and the challenge of communicating across radically different linguistic and mental terrains — is set in a universe where “immer” space makes travel in outer space possible. The central character is an immerser, one of the few humans with the capacity to stay conscious and to guide a ship through this territory where distance and relationship between planets are entirely different from those in everyday space. What struck me when reading passages about immer and how it “works” was the parallel to recent discussions in geography of space and place as being contingent, multiple, and yet entirely personal: different bodies react differently to the experience of this place; my sense of place is not the same as yours, and while we may all be able to navigate here together, we are not, ultimately and inevitably, in the same place.

On a map it's not so many billions of kilometres from Dagostin or other hubs. But those Euclidean star charts are used only by cosmologists, by some exoterres whose physics we can't work, by religious nomads adrift at excruciating sublux pace. I was scandalised to first see them — maps were discouraged on *Embassytown* — and anyway such charts are irrelevant to travellers like me.

Look instead at a map of the immer. Such a big and tidal quiddity. Pull it up, rotate it, check its projections. Examine that light phantom every way you can, and even allowing that it's a flat or trid rendering of a topos that rebels against our accounting, the situation is visibly different.

The immer's reaches don't correspond at all to the dimensions of the manchmal, this space where we live. The best we can do is say that the immer underlies or overlies, infuses, is a foundation, is langue of which our actuality is a parole, and so on. Here in the everyday, in light-decades and petametres, Dagostin is vastly more distant from Tarsk and Hodgson's than from Arieka. But in the immer, Dagostin to Tarsk is a few hundred hours on a prevailing wind; Hodgson's is in the centre of sedate and crowded deeps; and Arieka is very far from anything.

It's beyond a convulsion where violent streams of immer roll against each other, where there are shallows, dangerous juts and matterbanks of everyday space in the always. It sits alone at the edge of known immer, so far as the immer can be known. Without expertise and bravery, and the skill of the immersers, no one could get to my world. (Mieville 2011, 31)

Outer space in the universe of *Embassytown* is many different things, simultaneously multiple spaces defined by distance and time: it's billions of kilometres, a measurement used by scientists, by some aliens ("exoterres"), and nomads. The "physics we can't work" points to alternative understanding and conceptualization of physical laws of reality, an acknowledgement that parallel knowledge exists but the details of which may be mutually unknowable. That "excruciating sublux pace" is a nod to our actual reality where it takes decades for a human-made probe to escape the solar system. And the immer, Mieville's human method for bypassing those billions of kilometres and hours of travel is yet another valid, non-intersecting and inexplicable space coexisting with the general human sense of a common, or everyday space (albeit one that exists across multiple planets and solar systems and billions of kilometres) and time.

Conclusion

In the realm of science fiction, imagined technological advances mean that weightlessness is not the primary experience of the characters, as it is for actual astronauts today. Similarly, the primary social construction of space travel today, its extreme exclusivity and limited access, is easily overwritten, allowing authors to imagine different social constructions in outer space, for example the manner in which people calculate their age. In *Embassytown*, the sophisticated immer traveller knows to define her age in the standardized (if originally Earth-based) unit of hours. Referring to days or years, which will vary according to the particulars of the person's home planet, is considered to be a marker of ignorance and parochialism. In terms of phenomenological approaches to understanding outer space as a place, the science fiction

examples can have the best of both worlds. The authors of these texts obviously rely on their ability and that of their readers to imagine what the experiences they describe are actually like. At the same time, they can create characters and situations that argue for direct experience as the only valid means to comprehend or know a place.

Bringing this discussion back to home, I will end this exploration of outer space as place with my favorite image of the Earth from space, a view from the surface of Mars where the Earth appears as if a star in the sky: Figure 4, You are here. And here we are on Earth, looking at an image of our planet from the surface of another. Which place is normal, everyday, and which is evidence of the vastness of outer space. Which one can we traverse with ease, with the blink of an eye, and which is overwhelming in its complexity and diversity? The Earth we know as the place we live and the Earth as the star in the Martian sky, exist simultaneously and each informs our understanding of the other.



Figure 4. Earth from the surface of Mars, 8 March 2004; Credit: NASA/JPL/Cornell/Texas A&M
<http://www.flickr.com/photos/gsf/4542423536>

The science fictional examples explored here each include travel with the assumption that movement across (outer) space is a core component of the experience of outer space as a place. In some cases, the travel is the point; the characters need to get from point A to point B. For others, the travel is how they live: fulltime staff on a spaceship, comparable to the experience of staff living aboard a research vessel or cruise ship at sea on Earth. These places are not just predicated by networks but are also literally networks, places that in turn connect other places. The individual's experience on a ship may be presented in terms similar to the descriptive approach of understanding place, providing particulars of that individual's experience of space travel. In these examples, outer space as a place is not categorically different from any place on Earth. These are obviously speculative examples, and if or when humans do establish the means to travel light years from Earth, the actual experience may be quite different. Until then, these imagined far away outer space places are the only way we can experience the universe beyond the threshold of orbit and solar system. However, even if geographers choose to disregard completely imaginary outer spaces, the reality of the human experience in orbit and by proxy by way of remotely controlled devices shot across the solar system provides many more examples and opportunities to expand the scope and application of cultural geographical analysis and recognize outer space as meaningful, lived, and everyday.

Chapter 4. Further Flights of Fancy: Extraterrestrial Cultural Geographies

A cultural and historical geography of space also offers numerous flights of fancy, from questions of astronomical embodiment to the politics of planetary representation. All of this is to say that a geography of outer space should be a broad undertaking....

(MacDonald 2007, 611)

Introduction

In “*Anti-Astropolitik*” MacDonald proposes several possible topics in political and critical geographies that might engage with extraterrestrial spaces in meaningful ways. He then comments that other topics exist for economic, historical, and cultural geographies, but provides no further elaboration or examples. In the time since his article was published, geographers and others have responded, as discussed above in chapter two, but few engagements from cultural geography have been published to date. In this chapter, I will take up where MacDonald left off and outline some research topics out of cultural geography that might fruitfully engage with outer space. This discussion will draw from three primary sources created by astronauts while staying on the International Space Station (ISS): a video interview between ISS and Space Shuttle crew on the ISS with United States President Obama, and a group of school children at the White House (NASA 2009a); a video tour of the ISS by Commander Sunita Williams (NASA 2012a); and social media produced by ISS Commander Chris Hadfield using Twitter and Reddit (Hadfield 2012, 2013). These sources offer a range of contexts and sample situations that may illustrate the proposed research topics. The final section will look at some recent Earth- and extraterrestrial-based projects used to explore and prepare for the possibility of sending humans to Mars.

Bodies in Motion

Geographical considerations on the scale of the individual human body include analyses of self-representation, externally constructed identities, and the politics of embodiment (Johnston 2009, Longhurst 2009, Rose 1997). Expanding the spaces where human (and other) bodies exist to include extraterrestrial spaces allows further exploration of some previously studied phenomena on Earth (for example the ways national identity may be embodied) as well as introducing new forms of embodiment that do not exist where most of us live: weightlessness and the many ways it dramatically alters the individual's experience of having/being a body, both internally (physiologically, subjectively) and externally (logistically, practically).



Figure 5: Screenshot from 24 March 2009 video interview on board the International Space Station Crew of STS-119 and ISS Expedition-18

The video from which Figure 5 was captured presents a conversation between the combined crews of the ISS and the Space Shuttle while in orbit and a group of people at the White House, including President Obama, other adults, and about twenty children from a school in Washington, D.C. As shown in Figure 3, the astronauts are wearing different shirts

and grouped to clearly differentiate the two crews. The clothing is casual but uniform. In addition, patches on their shirts indicate the nations sponsoring each astronaut. The astronauts have hooked their feet under bars set in the ISS floor to stay in place (not visible but explained during the video), but their movements still appear unusual or unnatural; their postures are not quite perpendicular to the bottom of the image, and the long hair of the only woman in the group floats up around her head. In the video, you can see them swaying and moving slightly in ways that would not be common among a group of people standing on Earth. The distinctions are small but readily apparent to the viewer. At the White House, the children stand stiffly and awkwardly behind the president, their relative discomfort in that unlikely and strange-to-them environment mirroring the strangeness of the stiffly held astronaut bodies. The president appears to be the most comfortable person in either space.

This scene presents a wide range of analytical opportunities for cultural geography focusing on embodiment and embodied knowing (Cresswell 2010, Longhurst 2009). The astronauts' clothing and grouping reflects the myriad political forces at play in developing and maintaining an international space station. Other video clips of life on board the ISS reveal more flexibility in clothing choices, suggesting that this particular clip, presented through the White House's YouTube channel, was a more formal occasion. At the same time, although the astronaut bodies are politically identifiable, the national insignia are more subtle than overt: they are differently marked but first and foremost they are all equally different from everyone else on Earth: The most important distinction is of course the astronauts' location on board the ISS, in outer space. The impression and sense of place of that location is one of utility and science; the interior of the ISS is utterly utilitarian in appearance. Around, above, and behind the astronauts are wires, panels, lights, and equipment suggestive

of engineering and scientific research. The ISS has been expanded over its 12 years of occupation; the most recent addition was a windowed viewport (the cupola) that gives a much better view of the planet below than the previous windows afforded. Geographical analysis of the evolution of function, form, and use of ISS spaces could speak to its development as both scientific laboratory, educational platform for space science, and long-term living space for small groups of human residents.

Somatic elements of life on board the ISS include constant noise from equipment and life support systems, shifting from daylight to dark and back every 90 minutes as the ISS orbits the Earth, and most significant of all, weightlessness, which radically changes the way humans can use the space around them. Both Williams's video (NASA 2012a) and Hadfield's reddit.com Q & A transcript (Hadfield 2012) provide detailed explanations of how astronauts relieve themselves on the ISS, clearly responding to one of the most frequently asked questions from the public about life in outer space. The interior of the ISS is peppered with stickers commemorating previous and current missions, images of space heroes including one of the Russian designers of the original module and Yuri Gagarin, the first human in orbit, and Velcro straps for preventing items from floating off. The "orbital outhouse" (9:25), which is officially named the WHC (waste and hygiene compartment) has a sickle moon drawn on one outside wall and its own mission-like sticker featuring a stereotypical outhouse image on the wall above the "throne" (NASA 2012a). Because of the weightlessness, all surfaces in the ISS are equally accessible, and changing orientations between them triggers no sense of being upside-down or in danger of falling. Any wall, floor, or ceiling can instantly become ceiling, floor, or wall. Movement through the station is more often along the plane of direction rather than perpendicular to it, and thus more like flying

over the surface rather than walking across it. There is literally no place on Earth that can fully simulate these experiences.

Internationalisms

As one of the few truly international spaces with links to a small number of primary partners but no permanent location within the boundaries of a single country, like the United Nations building, or juxtaposed in relation to it, like the open oceans, the ISS could offer a range of new approaches to understanding nationality, cultural identity, and ancestral territory. “We’re going into the Russian segment.... You don’t need a passport...” (Sunita Williams in NASA 2012a, 16:45min). Williams’s tour of the ISS points out the American, Japanese, and Russian sections of the ISS, referring to the nation that was the primary sponsor of each module. The different modules have different functions and components, making it necessary for all astronauts to access all parts. Each astronaut has a private sleeping pod but otherwise the ISS is communal space. Astronauts are expected to know at least two languages, one of which must be Russian to be able to communicate with the Russian control centre. The existence of a space station primarily managed by the United States and Russia could be considered an ironic rewriting of the cold war geopolitical landscape that, arguably, made the ISS possible in the first place through the space race it provoked. The continued existence, use, and expansion of the ISS is one of the most successful international projects of the last 15 years. Two hundred and seven Astronauts (including 31 women) from 15 different countries have stayed there since 2000. Both Williams and Hadfield refer to enjoying the food provided to astronauts, which comes from the nations sponsoring the current crew (Hadfield 2012,

NASA 2012a). Observed holidays are determined communally by the astronauts, and time on board follows UTC.

The ISS orbits the Earth in a wave pattern, not following the same great circle with every revolution, which results in an ever changing view of the planet below. Images shared with the public from the ISS frequently either identify a known place on Earth or ask for help identifying the place. During his first two months on board, Hadfield's Twitter feed consisted primarily of posts like this (Hadfield 2013) and seemed something like a continually updated geography quiz. Although effectively positioned in Haraway's God's-eye point of view, by continually sharing that perspective with the community of people on the planet who follow and interact with him through social media, Hadfield challenges that theoretically objective stance (Rose 1997). His comments and images are presented as his own, and his intent is clearly to allow as many people as he can to share in the experience most of them will never have. By naming places to connect with the people who live there and crowd-sourcing for names of places he doesn't recognize, Hadfield allows people on the Earth's surface to imagine being in his position in orbit. From that imaginary location, they can combine the two types of phenomenological conceptualisations presented in chapter 3: identifying with an astronaut who directly shares his experience being in orbit and imagining what the Earth looks like from there.

Communication & Media

In the last few years, NASA and some individual astronauts have increased the use of social media to share their experiences in outer space. It is becoming commonplace for at least one person on board the ISS to post comments and images to Facebook and Twitter (Canadian

Chris Hadfield is currently posting as many as dozens of entries a day on Twitter from the ISS as @Cmdr_Hadfield). Participation varies by astronaut, but in most cases includes both general activity updates, images of Earth inside the ISS, and replies to questions from individuals. This previously impossible access and interaction between people on Earth -- potentially anyone with access to the internet -- and astronauts in orbit extends the reach of global communications to new levels, literally and figuratively, and helps popularize and humanize international space programs. A 3 January 2013 twitter exchange between Hadfield and actor William Shatner, playing off of Shatner's former work on Star Trek, not only demonstrated the way that science fictional representations of outer space intersect with actual experiences, but was also further popularized in multiple media outlets, particularly in Canada. The exchange had been retweeted over 5000 times in three days. (Figure 6).



Figure 6. Twitter exchange between actor William Shatner and astronaut Chris Hadfield
https://twitter.com/Cmdr_Hadfield/status/286948264236945408

Many North American astronauts, including Hadfield (2012), have referred to watching the Apollo moon missions as the event that sparked their personal interest, usually as children, in becoming an astronaut. Reading science fiction is another commonly mentioned catalyst, and

watching the original series of Star Trek, starring Shatner, has been mentioned by some (NASA 2009a). In all of these cases, it was the public representation of the profession in action -- that is, in its place in outer space -- that spurred these children to devote the following decades of their lives to be able to go where these people had gone and become astronauts.

I decided to become an astronaut when I was 9, the day Buzz and Neil walked on the Moon. I have been working towards being one ever since.

My education, my experience, the skills I gained from 9 until 32 all were key in getting me selected. And in the 20 years I have been an astronaut, I have studied and prepared pretty much every day.

Being an astronaut is not really my job. It is more a definition of who I have turned myself into (Hadfield 2012).

Identity Politics: Who Is an Astronaut?

Astronaut is a profession uniquely defined by the location where the work takes place: to be considered an astronaut you have to have been selected and trained, usually by a government agency, to spend some time in orbit or beyond. At this point in human space exploration, everyone who leaves (or is eligible to leave) Earth for outer space is called an astronaut, regardless of the tasks they're assigned on space craft or space station. Not all astronauts actually go to outer space; space agencies routinely train more people than there are openings in space missions. On the one hand, then, there are officially designated astronauts who have not been to outer space. On the other hand, space tourism is poised to allow self-selected and untrained individuals the opportunity to cross the line where previously only astronauts went. At this point in time, space tourism consists primarily of flights just to the limits of orbit, where passengers may experience minutes of weightlessness. Only a few people not trained as astronauts have been allowed to go further, and until there is an orbiting hotel or other tourist space, the scientific and logistic requirements of life on the ISS are likely to restrict many others from visiting. However, once (if) technological and tourist industry advances

reach the point of offering an orbital tourist destination, the definition of who is an astronaut may well change. Or the term may become obsolete, if enough people are able to spend time in orbit that their activity becomes the label for their work rather than the uniqueness of the location of that activity. We will have pilots, engineers, medical staff, project managers, and tourists who go to outer space, but no more astronauts.

Phenomenology & Ethics

To what extent is being human and creating human spaces shaped by being on our planet? What (do we think) happens when we try to live somewhere else? What happens if we meet someone else out there, and what happens if we never do? Consideration of the role(s) place and space play in the development of individual and cultural identities may be expanded or altered if outer space is brought into the equation. While the universe may be considered the most extreme form of wilderness, unlike almost any place on Earth, human beings cannot survive without significant technological support in outer space. Humans in outer space may be considered a type of cyborg, living integrated with technological and software systems that produce and clean the air, recycle water, and provide shelter from the most extreme environmental conditions (Haraway 1985). Communication with others, movement across space, and returning home would all be impossible without the myriad interfaces embedded throughout the space craft. A human in the ISS is essentially in the same situation as a human wearing a space suit; it's just a larger space to move in but otherwise the same range of systems is required to sustain and enhance human life. In fact, ISS Commander Williams refers to the space suits worn for work outside the ISS as space craft. (NASA 2012a, 7:50min). In outer space, then, the functions of clothing and transportation become merged,

and the ways that bodies are covered, protected, sustained, and moved through space blur boundaries between the individual and the technologies used by the individual (Harrison 2008). Similarly, those boundaries continue to blur as we move out from the body to encompass places beyond our home planet.

To what extent, if any, does inhabitability inform accessibility, whether in terms of being technologically capable of accessing extraterrestrial spaces or in terms of having the right to access those spaces? Historical, geopolitical and ethical analyses of human exploration, exploitation, and colonization on Earth offer some insight that could be applicable to contexts beyond the planet. Further work is needed to consider the ethical considerations of exploring extraterrestrial spaces, both the spaces between worlds and other planetary bodies. The UN Outer Space treaty has specified that no individual nation on Earth may claim or annex extraterrestrial space as part of its territory, but there is no discussion of sovereignty of those places over themselves. When there is no human authority or representative with which to communicate, should there be some other process by which humans might determine whether to explore beyond Earth? MacDonald has already encouraged geographers to consider critical astropolitics in the context of legal geographies of the orbit in part because “space is not a flawless frontier” (2007, 607). The questions about frontier politics could be extended beyond this scope as well.

Mars

A significant portion of the research and development done on the ISS is to prepare for future space exploration. Astronauts are as much objects of research as researching subjects, with extensive data collected about many aspects and effects of being in outer space (NASA 2009b). Two astronauts will be spending a full year on board the ISS starting in 2014; most previous stays in orbit have been up to six months only. This extended period will allow further research into physiological and psychological effects of being in space as a precursor to sending humans to Mars. Other public and private groups have attempted to simulate, on Earth, some of the experience of travel to Mars as well as what it might be like for humans to live on Mars. The European Space Agency recently concluded a 500 day project with five astronauts living inside a simulated space capsule as if en route to Mars and back (United Nations 2011). Although there was no way to incorporate the experience of weightlessness in this experiment, they otherwise attempted to reproduce most of the characteristics of spending 500 days on a spacecraft to Mars, including increasing and decreasing the lag time in communication with mission control outside the lab. The non-profit, private Mars Society manages two active sites (one in the Canadian arctic (Devon Island, Nunavut), another in a United States desert (Utah)) with two more planned in Australia and Iceland, where volunteers can apply to be part of a crew living as if on Mars (Mars Society n.d.). Although not affiliated with any official space agencies, the research done by the Mars Society missions is intended to test the supply needs, planning issues, and other logistical complexities of living on Mars. The Mars Society also exists to promote the exploration of Mars to society as a whole, as a means to encourage the international space community to continue to plan to someday send humans to Mars. The society was founded in 1998 and has

managed research missions for more than ten years. From the perspective of cultural geography, these efforts to simulate, represent, and construct Mars on Earth could add to research on other ways that places are deliberately constructed and what it means to pretend to be somewhere you're not (Cresswell 2004, Cresswell 2009, Massey 2005). The geographical research on Mars described in chapter two demonstrates that this conversation has begun.

Human exploration of outer space is mostly done by way of objects we send out there without humans there in body. Mars research that is actually conducted on or in orbit around that planet provides an opportunity for cultural geographers to draw on actor-network theory to understand the relationships between the humans and the machines that have been sent there (Jóhannesson & Baerenholdt 2009). Mars rovers are given names and personae: Spirit and Odyssey had their own unofficial blogs and were described as if they were teenaged sisters; Curiosity is presented by NASA as an adventure tourist/photographer, taking pictures of itself that are posted to its (official) twitter account (NASA 2012b). People have written fanfiction about the rovers as sentient, independent beings. They are frequently gendered as female in these contexts. As with the relationship between humans and the suits and ships that keep them alive while in orbit, the extension of the human experience across outer space to guide, drive, and interact with machines on Mars (or elsewhere in the solar system) could be discussed as another aspect of cyborg identity where humans modify what it might mean to be human, through technology. The boundary between living on Earth and living on Mars is blurred in some cases where the Earth-based staff that drive and manage the rovers' activities work in shifts dictated according to the Martian day.

As discussed in chapter two, some human geographers have begun to research Mars as a site understood through the lens of colonization (Collis & Graham 2009, Dittmer 2007, Lane 2011). Humans have already made many marks on Mars; the environmentalist motto “Leave No Trace” has not been practiced there. What are the environmental or ethical obligations when exploring an apparently uninhabited and possibly lifeless place? Do appropriation, trespassing, or contamination matter (or even make sense) when there is no “other” to suffer the results? MacDonald also pointed to such environmental concerns, focusing in particular on the “high speed midden” of orbiting space junk (2007, 611) but the impact of human activity beyond Earth is already evident on the Moon, on Mars, and elsewhere in the solar system.

Conclusion

“[Cultural geography] suggests, above all, a concern with meaning and its material production at individual and shared levels” (Cresswell 2010, 173). The places and experiences discussed in this chapter, meant to illustrate potential starting points for further research on outer space by cultural geographers, provide ample opportunity for considering meaning and its production and the sites of its production at scales ranging from person to universe. Given current technological advances and limitations, outer space remains a venue accessible directly by very few individuals and even for them always mediated by technology that is required for survival: space suits, artificial environments, massive transportation infrastructure, extremely limited disaster mitigation resources. Some of those individuals, like Commander Hadfield, act as informal (but professionally mandated) liaisons, sharing their experiences in space through formal interviews and presentations and increasingly

through social media like Twitter and YouTube. The rest of the universe is accessible to humans either through imagination or by proxy, using probes, rovers, satellites, and other spacecraft piloted remotely from the Earth's surface.

The common approach taken by human geographers to outer space as being comparable to an old place/space dichotomy — place : space :: Earth : outer space — suggests instead we remember that everyone on Earth, indeed the planet itself, is already in outer space, part of that space. In other words, quite literally, “there is no such thing as a boundary. All spaces are porous to a greater or lesser degree” (Thrift 2006, 140), as much at the scale of the atom or biological cell as for the planet and the universe. Thrift's devaluation of arbitrary distinctions made to capture or limit our attention to particular spaces, like Earth, is in contrast to Malpas's recasting of the distinction between place and space to the more specific concepts of void, *kenon*, *topos*, and *chora*. For Malpas, the relationships between these models of how space is defined and used as place require some notion of difference that is a kind of boundary. However, these boundaries are also mutually constitutive; that is, the perception of a boundary is tied to the perception of what lies outside that boundary (2012, 234). In both cases, one goal of the analysis is to challenge limited models that assume a simplistic relationship between space and place and offer more nuanced reflections of the complexities underlying the way we conceptualize and understand the world. The purpose of this project is to challenge what I perceive to be a limited model of where cultural geography may be applied, and to argue first that it has ignored a significant area of human cultural activity, that is outer space, and second that the boundary between Earth and outer space not only no longer separates human activity and cultural production from extraterrestrial spaces but was never really there in the first place.

Chapter 5. For Outer Space (with apologies to Doreen Massey)

...I have become convinced both that the implicit assumptions we make about [outer] space are important and that, maybe, it could be productive to think about [outer] space differently.

(Massey 2005, 1, paraphrased)

[Cultural geography] raises questions about how we live in, experience, and shape a particular environment, about what living in and reshaping that environment means to us, about how that environment (and thus our relationship to it) is changing in various ways.

(Oakes & Price 2008, 1)

This project considered three questions as starting points for describing the current status of the relationship between human geography and outer space: 1. What has Anglophone human geography said about outer space? 2. What kind of place is outer space? 3. Following MacDonald's proposal for additional work by human geographers on topics related to outer space, how else might cultural geography in particular consider outer space, to benefit our understanding of both outer space and geography? Following the first question, reality and ubiquitous presence of outer space is generally ignored in human geographical research generally and in cultural geography specifically. However, some human geographers and researchers in related subject areas have considered outer space from a geographical perspective, and that work has increased slightly since MacDonald's 2007 paper. Although they frequently begin or conclude with slightly defensive remarks about the oddity of their topic, this research makes a strong case against the notion that outer space is irrelevant to daily life for humans and others on Earth. Outer space has historical and contemporary relevance in a wide range of geopolitical practices touching on legal, political, economic, and environmental issues, and cultural

geographical meanings inform the ways that extraterrestrial spaces are understood in other areas of human geographical thought.

Considering the second question, what kind of place is outer space, I began with a brief summary of recent theories of place in order to understand what it might mean to view outer space as a place [utilising the already existing geographical conceptualizations?]. The understandings of place that is most challenging to apply in an extraterrestrial context are those that rely on direct personal, physical experience as a key component of what makes a space into a place. The fact that so few humans have gone there, in conjunction with extreme severity of the environment, mean that almost no one in Earth knows outer space in that direct personal way. In addition, the distance those few humans have gone is essentially not even measurable on the scale of the universe. We have no direct human experience beyond the orbit of the Moon, let alone beyond the solar system or farther. What we have instead are many human-controlled probes, ships, and other machines that go where humans can't. In some cases, as with the drivers of the Mars rovers, humans on Earth follow the solar day and calendar of the location where the object they control is or is going. Mars rover drivers live on "Mars Time". This chapter also considered fictional representations of humans in outer space by looking at how those places are described and presented in a small selection of science fiction novels. The imaginative representation in fiction allows the possibility of considering human experiences of outer space in the context of metaphors and descriptions drawn from Earth experiences, rendering the unfamiliar in familiar terms. It also allows speculative consideration of how we might understand places and spaces currently inaccessible to us, using the thought experiment in science fiction as the basis for a thought experiment in cultural geography: what if we could travel light years across outer space?

The fourth chapter, responding to the third research question, most closely follows the conclusion of MacDonald's 2007 call for research and is intended to propose a few topics for further study in cultural geography. Embodiment, international relations, and communications are discussed in some length as existing areas of geographical study, which would find rich material to consider in the context of the International Space Station and its inhabitants. A video interview and social media created by astronauts on the ISS, as well as some efforts to prepare for a human expedition to Mars, present a examples of aspects of the human experience in outer space and ways that humans on Earth attempt to connect, simulate, or research extraterrestrial spaces from a terrestrial position.

Referring to two of Massey's larger points — that space has been largely unexamined in geography, and that globalisation is a complicated, uneven process which intersects with the ways we implicitly and explicitly understand space — I want to extend the reach of her discussion and consider the implications of these ideas for extraterrestrial spaces. It would be productive to think about outer space differently in the sense that most geographers don't seem to think about it at all. There are practical questions and implications to this non-engagement; orbital space, space travel, and satellite-based technologies play an increasingly pervasive role in geopolitics, environmental analysis, and global communications, and ignoring those places because they're not on Earth can only exacerbate serious problems. Massey's "global flows" increasingly pass through orbit, sometimes multiple times, between their origin and end points. On the one hand, the undeniable inaccessibility of outer space for most humans means that our experience of it cannot be discussed as being parallel to our experiences of place and space on Earth. On the other hand, the ever increasing ubiquity of the influence of outer space on Earthly human lives means that it cannot be ignored any longer without leaving out a key component of

our experiences on this planet. Does globalisation mean something else from the perspective of orbit, the moon, Mars, elsewhere? We are inundated, desensitised to images of the whole planet that have been taken by remote controlled space craft or been stitched together by software from hundreds or thousands of images taken from much closer up. No human has physically travelled far enough away to see the whole planet since 1972. We forget we haven't been there ourselves, or that it requires going where no one has gone before to really see what we're so used to seeing when we visualise Earth to ourselves. Astronaut narratives reflecting on the experience of being in outer space and seeing the earth from there consistently refer to a feeling of responsibility for the well-being of the planet as a whole. The view from extraterrestrial space generates a sense of globalisation based on the overall shared experience humanity has living on this planet and awe for the reality that we have it at all. “[Seeing the Earth from my first spacewalk...] really showed me our planet as a ball going around a star, just another planet, but an immensely beautiful one. Made me love our Earth even more.” (Hadfield 2012)

Finally, I would like to consider as cultural landscapes the Lunar Reconnaissance Orbiter (LRO) image of Apollo 17 landing and exploration site (Figure 7) and the European Space Agency's mock-up of a topographical map of Mars in the familiar style of many national topographic map designs, titled “the first hiking map of Mars” (Figure 8). The first image is from the past, historical, “real” time in the sense of depicting traces of activity that actually happened. However, we can only see it now from a relatively recent photograph because the LRO was sent to the Moon within the last decade. Furthermore, the traces left by astronauts over thirty years ago are still visible because of the lack of atmospheric or hydrologic erosion on the Moon. The image we see of this landscape represents then both present and past; it could not exist without modern technology that was able to peer back in undisturbed time to find the evidence left then.

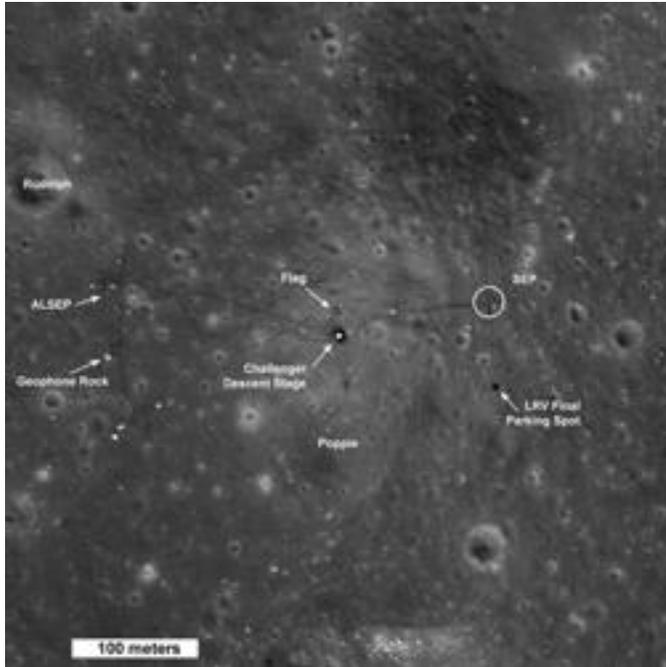


Figure 7: Apollo 17 landing site, photographed by the Lunar Reconnaissance Orbiter Camera, fall 2009. Credit: NASA/GSFC/Arizona State University.

<http://iroc.sese.asu.edu/news/index.php?/archives/137-Exploring-the-Apollo-17-Site.htm>



Figure 8: “First hiking map of Mars”: Topographic Image Map Mars 1:200 000

Credits: Map Compilation: Technische Universität Berlin, 2006; Image Data: ESA/DLR/FU Berlin (G. Neukum)

http://www.esa.int/SPECIALS/Mars_Express/SEMOI5O2UXE_1.html

The second image is based on data collected by similar craft orbiting Mars, using the same methods to create comparable contemporary topographic maps for Earth, but it is imaginary in

the sense that there is no audience or user who would employ the map the way topographical maps have been used on Earth. It implies a possible future Mars experience, perhaps recreational, for eventual human settlers there. Its creators did not embellish the data, for example adding imaginary highways – it's not the first road map of Mars. But it still humanises data collected about the surface of Mars in a way that makes it more accessible than the photograph of astronaut traces on the Moon's surface. Although the question of air to breathe and water to drink, let alone transportation to get to the trailhead, are left out of the frame, it is still easier to imagine going for a hike, even on Mars, than to be an astronaut. In both images, the human-made lines we see, one set artefacts of footprints and vehicles on the moon, the other gridlines superimposed in an imaginary system of identification, are networks and former or potential flows, of people, information, and connections. That the locations of these networks are not on Earth should not put them outside the interest of human geography. That the hiking on Mars has not happened and may never happen should not put it outside the interest of human geography any more than historical places and events would be put aside. They are connected to us, and we to them, and choosing an arbitrary boundary based on gravity or atmosphere doesn't alter the long-term value of expanding our geographical perspectives to look up.

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