

STUDIES IN HISTORICAL GEOGRAPHY



The Geography of the Ocean

Knowing the ocean as a space

Anne-Flore Laloë



The Geography of the Ocean

Despite the fact that the vast majority of the earth's surface is made up of oceans, there has been surprisingly little work by geographers which critically examines the ocean-space and our knowledge and perceptions of it. This book employs a broad conceptual and methodological framework to analyse specific events that have contributed to the production of geographical knowledge about the ocean. These include, but are not limited to, Christopher Columbus' first transatlantic journey, the mapping of nonexistent islands, the establishment of transoceanic trade routes, the discovery of large-scale water movements, the HMS Challenger expedition, the search for the elusive Terra Australis Incognita, the formulation of the theory of continental drift and the mapping of the seabed.

Using a combination of original, empirical (archival, material and cartographic), and theoretical sources, this book uniquely brings together fascinating narratives throughout history to produce a representation and mapping of geographical oceanic knowledge. It questions how we know what we know about the oceans and how this knowledge is represented and mapped. The book then uses this representation and mapping as a way to coherently trace the evolution of oceanic spatial awareness.

In recent years, particularly in historical geography, discovering and knowing the ocean-space has been a completely separate enterprise from discovering and colonising the lands beyond it. There has been such focus on studying colonised lands, yet the oceans between them have been neglected. This book gives the geographical ocean a voice to be acknowledged as a space where history, geography and indeed historical geography took place.

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Studies in Historical Geography

Series Editor: Professor Robert Mayhew

University of Bristol, United Kingdom

Historical geography has consistently been at the cutting edge of scholarship and research in human geography for the last fifty years. The first generation of its practitioners, led by Clifford Darby, Carl Sauer, and Vidal de la Blache, presented diligent archival studies of patterns of agriculture, industry, and the region through time and space.

Drawing on this work, but transcending it in terms of theoretical scope and substantive concerns, historical geography has long since developed into a highly interdisciplinary field seeking to fuse the study of space and time. In doing so, it provides new perspectives and insights into fundamental issues across both the humanities and social sciences.

Having radically altered and expanded its conception of the theoretical underpinnings, data sources, and styles of writing through which it can practice its craft over the past twenty years, historical geography is now a pluralistic, vibrant, and interdisciplinary field of scholarship. In particular, two important trends can be discerned. First, there has been a major “cultural turn” in historical geography that has led to a concern with representation as driving historical-geographical consciousness, leading scholars to a concern with text, interpretation, and discourse rather than the more materialist concerns of their predecessors. Second, there has been a development of interdisciplinary scholarship, leading to fruitful dialogues with historians of science, art historians, and literary scholars in particular, which has revitalized the history of geographical thought as a realm of inquiry in historical geography.

Studies in historical geography aim to provide a forum for the publication of scholarly work, which encapsulates and furthers these developments. Aiming to attract an interdisciplinary and international authorship and audience, *Studies in Historical Geography* will publish theoretical, historiographical, and substantive contributions meshing time, space, and society.

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First published 2016
by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

and by Routledge
711 Third Avenue, New York, NY 10017

Routledge is an imprint of the Taylor & Francis Group, an informa business

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British Library Cataloguing in Publication Data

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

Library of Congress Cataloging in Publication Data

Names: Laloë, Anne-Flore, author.

Title: The geography of the ocean : knowing the ocean as a space /
by Anne-Flore Laloë.

Description: Farnham, Surrey, UK ; Burlington, VT : Ashgate, 2016. |
Series: Studies in historical geography | Includes bibliographical
references and index.

Identifiers: LCCN 2015041448 (print) | LCCN 2015046650 (ebook) |
ISBN 9781409421436 (hardback : alk. paper) | ISBN 9781409421443
(ebook) | ISBN 9781472400857 (epub)

Subjects: LCSH: Ocean—History. | Ocean and civilization. |
Historical geography. | Discoveries in geography—History.

Classification: LCC GC29 .L35 2016 (print) | LCC GC29 (ebook) |
DDC910.9162—dc23

LC record available at <http://lcn.loc.gov/2015041448>

ISBN: 978-1-4094-2143-6 (hbk)

ISBN: 978-1-315-55774-8 (ebk)

Typeset in Times New Roman
by Apex CoVantage, LLC

Contents

<i>List of figures</i>	vi
1 Introduction	1
2 Intellectual setting	5
3 1492 and the discoveries of America	65
4 The Enlightenment and the ocean-space	89
5 In-depth knowledge: the deep ocean-space	122
6 Conclusion	140
<i>Bibliography</i>	147
<i>Index</i>	159

Figures

2.1	Looking westward from the Isles of Scilly—November 2007.	6
2.2	Stormy weather closing in on the Baie de Quiberon, France—Easter 2008.	7
2.3	Winter wave breaking over the island of Rockall, 11 March 1943.	54
3.1	Waldseemüller’s Conical Map of the World, c. 1507.	79
3.2	Waldseemüller’s “Globe Gores” (Globular Map of the World), c. 1507.	80
3.3	De la Cosa’s 1500 <i>World Map</i> .	82
3.4	Map of the line of demarcation according to the Treaty of Tordesillas.	86
4.1	Franklin’s chart of the Gulph Stream, c. 1770.	106
4.2	Halley’s chart showing the variations of the compass in the Western and Southern Oceans, c. 1701.	116
5.1	Maury’s “Vertical Section—North Atlantic”, c. 1855.	124
5.2	Maury’s “Basin of the North Atlantic Ocean”, c. 1855.	131
5.3	Drawing of <i>Bathybius haeckelii</i> by Haeckel, c. 1870.	136

1 Introduction

Human geographers have, overall, an ambiguous relationship with the ocean. At times, they ignore it, thereby reducing their study to the earth's land surfaces; their geographical perspective thus finds itself incomplete and ignorant of what it might be missing. In other instances, coastlines are considered and their inherent liminality explored, both as regards what is found along it and on either side of it, though the ocean itself is not fully engaged with. In these cases, the ocean helps define the land or coast by opposition, saying what it is not. Finally, when thought is given to the ocean beyond its coasts, it is usually limited to specific discourses on environmental history, the plundering of oceanic resources or complex issues regarding territorial waters and, again, resources. In these instances, the ocean is considered primarily for what it contains or potentially contains, not as a space in itself. This materialistic approach divorces the ocean as a container of resources from the ocean as a space. The ocean itself, therefore, with its physical attributes, wavering surface, tidal rhythms and unbounded connectivity, and what these characteristics mean for human and nonhuman interrelations with it, are rarely at the center of human geographers' oceanic engagement. Studies might capitalize on one of these aspects, either directly or metaphorically, but, on the whole, this means that the understanding of the geographical ocean generally falls short of engaging with the ocean as a geographical space. This book will address this issue and demonstrate that a wholly geographical study of the ocean is both possible and fruitful. Furthermore, it will show that such an approach enables geographers to engage critically with traditional geographical concerns such as mobility, governance, and cartography in novel ways that fully comprehend the specific mobilities, spatialities, and materialities of the ocean. This will reveal an ocean that can fully be a part of geographical discourse, rather than sitting at its fringes, and will crucially move toward a truly global sense of geography. This geographical ocean is what will be called the ocean-space.

The term ocean-space was defined by Philip Steinberg (1999b, 367–368) as one “that is intended to capture both the specificity of the world ocean and the fluidity between the study of landward and seaward domains, as both are socially and physically linked through linked dynamics.” In previous work, I used it to put emphasis on the physically geographical space of the ocean as opposed to the word *ocean*, which, I posited, referred to as the culturally constructed oceanic

2 Introduction

space that focuses on coastal zones and human interactions (Laloë 2009). In this latter sense, the notion captured by *ocean-space* moves away from an understanding of the ocean as a two-dimensional surface and instead focuses attention on the ocean as a space with three- and four-dimensional physical characteristics and puts these at the core of our geographical engagement with it. In other words, the term ocean-space assumes, rather than makes apologies for, the fact that the ocean's physical characteristics and their spatial aspects are not fixed and that these movements are inseparable from the ocean's geography. Ocean-space therefore encapsulates a physical and spatial ocean, which certainly allows us to go beyond traditional understandings of geographical sites as fixed and acted upon; instead, ocean-space focuses on the ocean's physical characteristics that both define and allow for its specific human geographies.

It thus becomes clear, also, that the ocean-space is different from the unhyphenated ocean space, which is typically used in the context of maritime governance relating to policy making or fisheries (see Pirtle 2000; Vallega 2001; Hoagland et al. 2003). Within these contexts, the ocean space can be said to in fact refer to oceanic space, which is the ocean's surface or resources upon which to implement rules and regulations. This ocean space is construed as an extension of terrestrial space, and its treatment is redolent of notions of governance and statehood. This is an important differentiation, since it brings to the fore the ocean-space's emphasis on its own physical characteristics as opposed to the ocean space's subjection to terrestrial protocols of measuring and distributing surfaces. Most significantly, my focus on ocean-space rather than ocean space reemphasizes the fact that I will not be considering the ocean as simply a stage upon which some human events take place, but rather move the ocean-space to the foreground and consider its place in shaping our knowledge about it.

As a whole, then, this book is about knowing the ocean as a geographical space, or indeed knowing the ocean-space. Throughout these pages, I will examine how knowledge about the ocean-space has been and is being produced in terms of scientific and cultural paradigms that are at the core of geography today. Through discussing how knowledge about the ocean-space was acquired and produced, this book will investigate the geography of the ocean-space from the bottom upward, considering the succession of ontological steps that come together as the body of knowledge that we have about the earth's ocean.

The methodology of this book will be threefold. Foremost, it will be driven by archival and historical material, including charts, survey documents, and sailing directions. Together, these will be taken to be representative of a particular type of knowledge about the ocean and as a specific way of knowing the earth. This follows Thrower (1981, 1) who argues that "as a branch of human endeavor, cartography has a long and interesting history that well reflects the state of cultural activity, as well as the perception of the world, in different periods." Accompanying this archival study will be a study of knowledge in its widest sense. This will allow me to engage with and challenge historical notions of knowledge and concepts of knowledge production as regards the understanding of the ocean-space. Certainly, the representation of knowledge about the earth is contingent

on evolving paradigms of knowledge and representations of knowledge; archival material must therefore be examined in light of this. The third aspect of this study will be concerned with technological developments. The exploration of the ocean-space has always been and will inevitably remain heavily reliant on technology; any study of the ocean-space must therefore consider the role of technology. Specific technologies, such as sounding devices, ships, or measuring buoys will be studied in light of how they both enabled and limited exploration of the ocean-space. By considering cartographical representations alongside cultural and technological settings, this book will therefore offer a comprehensive study of the geography of the ocean-space.

The time frame for this study seeks to cover humankind's main large-scale interactions with the ocean, meaning that the primary focus will be oceans, rather than seas, though these will not be excluded. Therefore, over four chronological chapters, I will be considering, in turn, notions of ocean-space between 1492 and the beginning of the Scientific Revolution, the ocean-space and the Enlightenment, the birth of oceanographic science, and the ocean-space in the twentieth century and beyond. Each of these divisions will be justified in due course, but the emphasis here is on this book's wide-angle view. This is to reflect the ocean-space's own timeless characteristics and its unbounded nature. This approach also distinguishes this book from existing literature in the fields of both maritime history and historical geography, which have a tendency to focus on single historical events or at least much shorter timescales, such as the lifetime of a person, a ship, or a technology (e.g., Lavery 1989; Allen 2002; Collingwood 2003; Corfield 2003).

Similarly, this book does not focus on a single ocean or sea; its approach instead seeks to be relevant to all of the earth's traditional oceans. This is a logical consequence of the use of the term ocean-space, since there is indeed no natural way of dividing the ocean-space based on physical characteristics. The intellectual background to this approach is discussed in Chapter 2. Since the ocean-space is deeply concerned with the materialities and spatialities, this signifies that this book is on the whole concerned with the so-called World Ocean, rather than any specific ocean, such as the Indian Ocean or the Arctic Ocean. However, the documents examined will heavily influence the areas discussed, and this explains the Atlantic Ocean bias, which itself follows from a Eurocentric outlook. Nonetheless, these discussions should not be taken as specific but instead as representative of a more general ocean-space. This global perspective further distinguishes this book from existing literature, which has typically centered studies on oceanic basins or trade routes.

Existing literature on the subject of oceans and history is vast, but its general focus is on the human interactions on and around the world's oceans. The historical subdiscipline of maritime history, for instance, is primarily concerned with how humans explored, exploited, governed, militarized, and navigated the ocean. These histories typically portray the ocean as a site for thematic history that frames a discussion. In other words, while considering transoceanic trade, colonization, exploitation, and migrations, and thinking about how these shaped the nations and cultures situated along their coasts, maritime history does not fully engage with

4 *Introduction*

the way in which the ocean's physical characteristics actively shape humanity's interaction with it. The focus of maritime history is to discuss the ocean and the ocean space, not the ocean-space as defined here. As a consequence, I posit that it is limited by the ocean rather than enabled by the ocean-space, reflecting humans' own limitations when interacting with the ocean-space.

By moving beyond this anthropocentric approach and placing the ocean-space at the center of this study, the ocean-space can therefore become known for its own characteristics, rather than in spite of them. This will reveal that these materialities shaped and drove human interactions with the ocean-space and that these are richer than humans' movements on the ocean's surface or their plundering of resources. By the end of this book, the ocean-space will have emerged as a space that, while also having a history, has an established human geography.

2 Intellectual setting

The earth's oceanic space is a physical environment, constituted of interconnecting oceans that can be constructed as facts and figures. As such, the Atlantic Ocean, for example, can be numerically asserted as spreading 93.7 million square kilometers, covering 18.4 percent of the earth's entire surface, and almost 25.9 percent of the area of the World Ocean (Sverdrup et al. 2003, 50).¹ This makes it the world's second largest ocean after the Pacific Ocean, which covers 165.25 million square kilometers and covers just under half of the area of the World Ocean and a third of the entire surface of the earth. The entire volume of water held in the Atlantic Ocean is 312.2 million cubic kilometers, which is approximately 23 percent of the volume of the earth's entire oceanic waters (Sverdrup et al. 2003, 50).²

The World Ocean's constituent parts, notably the Pacific, Atlantic, Indian, Arctic, and Southern Oceans, each have specific physical characteristics that, to an extent, differentiate them, but have also been formally delineated by the International Hydrographic Organization (IHO), which set geographical coordinates that are then ratified by the IHO's member states as an ocean's official limits. The oceans' shapes and boundaries are, however, mobile, thanks to plate tectonics: thus the Mid-Atlantic Ridge, which separates tectonic plates—the North American plate from the Eurasian plate in the North Atlantic and the South American plate from the African plate in the South Atlantic—is active and pushing the plates apart at a speed of one to ten centimeters per year (Mayhew 1997, 330).³ Thus, the Atlantic Ocean is expanding. Consequently, the Pacific Ocean is shrinking.

The waters of the world's oceans are moved by a number of major currents, which are part of a complex system of thermohaline circulation (Wijffels et al. 1992). These elaborately interact, carrying hot and cold waters across vast distances. Among these currents is the Gulf Stream, which warms Northern Europe and which was first mapped by Benjamin Franklin in 1785 (Franklin 1806, Figure 173). The Gulf Stream flows between 30 Sv and 150 Sv, where one Sverdrup (Sv) is equivalent to the flow of 10^6 cubic meters of water per second (Johns et al. 1995, 817).⁴

The average depth of the World Ocean is 3,682 meters, and its deepest point is in the Mariana Trench, located in the Western Pacific Ocean, and reaches a depth of 10,911 meters (Charette and Smith 2010, 113).

6 *Intellectual setting*

Such figures as these about the World Ocean construct it according to a Euclidian geometry that is concerned with objectivity and specified as immutable. Understanding space in this way perceives it as a homogenous surface upon which actions are performed. It is the “necessary representation” that “supplies the basis for external phenomena” (Kant 2003, 24). This is the ocean that is charted in official hydrographic documents and is apparently removed from cultural influences.

In parallel to this outlook, the ocean can also be read as a space that is experienced personally and which is perceptually formulated and culturally influenced. In this context, Friedrich Nietzsche and José Ortega y Gasset both argue that “there are as many different spaces as there are points of view” (Kern 2001, 132). For example, the photographs that follow are representative of the space that I have experienced and perceive of as the Atlantic Ocean. They are illustrative of *my* Atlantic Ocean, largely detached from the figures presented earlier.

These two ways of viewing the oceans depict very different ways of understanding space, respectively, representative of space viewed as either absolute or relative. Yet between these two apparently exclusive oceans lies the ocean as a geographical ocean-space, which has, to a large extent, been ignored. The term “ocean-space” is here used to put emphasis on the geographical space of the ocean, both absolute and relative, standing opposed to simply the term “ocean,” which can be construed as denoting a culturally constructed space that is weighted toward the ocean-space’s coastal areas where humans have interacted with it.



Figure 2.1 Looking westward from the Isles of Scilly—November 2007.



Figure 2.2 Stormy weather closing in on the Baie de Quiberon, France—Easter 2008.

It is the ocean-space, which is at the center of this book, through examining knowledge production from a historical perspective and focusing on the circulation of knowledge on, across, and around the ocean-space, and considering ways in which geographical knowledge about space is produced. By exploring, from a historical perspective, how the ocean-space is as a geographical space, this book highlights that processes of knowledge production are intrinsically linked to a variety of cultural, scientific, and technical influences, which invariably shape knowledge outputs. Following the trend that emerged in the 1980s in the history of science, this study builds on the idea that science “is a practical activity, located in the routines of everyday life” or, following Donna Haraway, that science is “situated knowledge” (Secord 2004, 657; Haraway in Secord 2004, 658). Knowledge can thus be seen as a cultural variable that has to be negotiated as such, while bearing in mind certain immutable facts. At the same time, geographical knowledge of the ocean-space is characterized by particular physical characteristics that dramatically shape both the ocean-space itself and how it can be known geographically. One example of this is the fact that human exploration of the ocean-space is heavily reliant on technology whose limitations, in turn, place boundaries on exploration. As technological advances are made, human ability to explore the ocean-space also changes. Thus different periods have perceived, been able to perceive, and produced knowledge about the ocean-space in diverging but characteristic ways.

8 *Intellectual setting*

This book adopts a broad historical outlook in order to acquire a diachronic perspective that allows us to apprehend the ocean-space both as an absolute and a relative space, but also as the geographical entity that lies in between. By taking a wide position, this thesis diverges from the “small stories” approach that is at present popular within the field of historical geography and instead investigates big stories and large-scale questions that contribute to geographical knowledge production about the ocean-space (Lorimer 2003). Whereas small-scale, in-depth contextualizations are useful and important to understand specific and perhaps key moments of history or geography, these stories can rarely be projected onto larger scales, be they regional, national, continental, or global. As Secord argues, exclusively following such a method signifies that “we end up with a rich array of research that somehow adds up to less than the sum of its parts” (Secord 2004, 660). Conversely, by choosing to focus on the narrative of scientific knowledge production over four centuries with regard to a large geographical surface area, a number of small stories are connected within a historical narrative. The historical geography of the ocean-space put forward here examines archival material through a wide-angle lens and presents a diachronic (though not comparative) understanding of the ocean-space as a geographical space that was in turn discovered, mapped and measured, sounded, and dredged. This approach allows me to fathom, from the bottom up, the process of scientific knowledge production of a specific geographical space as a single narrative while also acknowledging the importance of small stories.

As a whole, this book weaves together sociocultural, scientific, religious, and technological stances that were fundamental in creating the ocean-space as the geographical space that it is known as today. Through considering these elements as linked within the enterprise that turned the ocean from an unknown non-space to a located, geographical entity, this work is situated within the historiography of science, focusing on the places of geographical knowledge.⁵

Throughout this “intellectual setting” chapter, I consider how space can be known from a historical perspective. Examining the historical geographies of space and the way that these are understood in the present will highlight mechanisms of knowledge making from a historical perspective. This will specifically consider how geographical knowledge is historically produced and, with particular regard to information about distant places, what scientific and social mechanisms were initiated in order to safeguard information. The question of “how far [information] could be trusted” was instrumental in the establishment of networks of trust that would be central to the scientific method (Driver 2004b, 73). I further discuss issues of trust between those who collected scientific samples, such as fauna, flora, or sediment, and those who analyzed them, and question how this trust was made. This is what Withers (1999, 498) calls the “historical geography of trust” and what Mayhew (2005, 75) examines as the “construction of credibility in early modern scientific practice.” Considering how human relationships affected the production of knowledge is central to understanding the twice-removed connection between the Atlantic ocean-space and the scientists studying it, especially in considering how the different locales of geography, from the ship to the field

to the laboratory, have to be negotiated so as to comprehend the ocean-space as not simply a site, but a space. This, in turn, applies the debates introduced in this current chapter to the ocean-space generally and the Atlantic Ocean particularly. This will discuss the idea of the Atlantic Ocean as a historical and geographical space. Klein and Mackenthun (Denning 2004, 13) argue that “the ocean has often been read as an empty space, a cultural and historical void, constantly traversed, circumnavigated and fought over, but rarely inscribed other than symbolically by the self-proclaimed agents of civilization.” I will argue against this approach from a wider perspective and highlight instances in which the Atlantic Ocean has, instead, been imbued with meaning. Instead, the idea of the Atlantic Ocean as “a European invention,” both historically and geographically (Armitage 2002, 12) will be debated.

Together, the remaining chapters will view the debates raised here in relation to historical and archival documents. These chapters are organized chronologically and thematically. Chapter 3 studies the period from 1492 to the beginning of the Enlightenment, covering the period during which the Atlantic Ocean became known geographically. Chapter 4 focuses on the Enlightenment and describes measuring and geographical pinpointing of the Atlantic ocean-space. Chapter 5 considers deep ocean exploration during the nineteenth century as the depths of the Atlantic Ocean were studied. This study ends with the twentieth century.

Ultimately, this book locates the ocean-space as locales of geography. By considering the Atlantic Ocean in terms of historical geography, this book positions the ocean-space at the center of geographical understandings of space, where space is both absolute and relative. As the circulations of knowledge are highlighted, it is also situated within cultural and scientific contexts to construct a complex picture, which reconciles a factual ocean-space and a known ocean.

2.1 Knowing space historically

There are many ways in which space can be thought of and constructed historically in light of theoretical, cultural, and scientific outputs. By examining the place of networks in the collection of information and the making of scientific spaces, this section will consider geographical knowledge production about distant places.

Knowing space, whether physically, through human-environment interactions; culturally; or theoretically is, broadly, the subject of geography. Through the study of specific areas of the earth and its characteristics, facts are acquired and knowledge produced about particular features of space. In the case of the ocean, lists of facts such as the aforementioned come to constitute knowledge about the space itself. Within geography, historical geography is concerned with geographies of the past and the way in which these relate to the present. Indeed, “the geographical processes which have shaped the modern world and the ways in which the past is understood and culturally represented in the present are central concerns within historical geography” (Nash 2000, 15). Methods of historical geography include the reconstructions of past geographies and mapping their changes over time, and

considering specific geographical zones in a comparative manner so as to get a historically coherent overview of an area. Through focusing on localities, telling personal stories, or examining company histories, space is studied historically in relation to specific cultural or societal elements.⁶ This manner of knowing space historically, as Driver (1988, 504) notes, “is no luxury; on the contrary, it is an essential part of doing human geography” and seeks to offer a dynamic picture of the past through discourses that are invariably mediated by the present.

With regard to this book, such a historical approach to the geography of the ocean includes considering the different ways of interpreting the World Ocean through the variety of cultures whose histories are linked to it. These interpretations, however, can reflect an academic cultural context as much as they do the ocean’s history itself, meaning that wider contexts are important to understand spaces. Here I will show how this is the case, considering particular historical geographies of faraway spaces and historical geographies of science. Analyzing how faraway spaces and spaces of science have been examined within the framework of historical geography will enable me to draw useful parallels and extract strands that are helpful when thinking about the ocean-space historically and geographically. Together, these themes will outline the ways that are most useful to understand the ocean-space as historical and geographical spaces. These specific methods will help construct a wider methodological framework through which to consider the historical geography of the ocean-space, and which will be applied to archival and cartographic material in the following chapters.

2.1.1 Historical geographies of space

Space can indubitably be understood in a variety of ways. From the perspective of historical geography, recent studies have focused on the mechanisms by which faraway spaces became known. For instance, Driver and Martins discussed space in terms of tropical vision and “tropicality” (Martins 1998 and 2000; Driver and Martins 2002, 2005a, 2005b, and 2006). Ogborn (2000, 2002, and 2004) has studied the ways in which distant spaces became connected in the advent of globalization and through networks of communication. Ryan (1997) has engaged with the representation of imperial space through the medium of photography. Withers and Livingstone examined the geographical element of the Enlightenment and considered the role of science in producing knowledge at a distance (Livingstone and Withers 1999a; Livingstone 2003; Withers 2007). These works are representative of a specific way of doing historical geography, which considers one particular perspective and applies it in-depth to a discrete place or a certain kind of space. Together, these various ways of thematically considering the historical geography of space offer a varied and stimulating picture of the past, while the body of literature that they build is helpful both in highlighting specific trends and in bringing forth a set of methods that enables us to think about geography in specific historic ways. This literature creates a lens through which to understand space historically and, here, to perceive the ocean-space within a wider geographical context.

However, these works are intrinsically limited both by their focused methodology and because they usually concentrate on specific geographical locales. This book seeks to go beyond thematic perspectives by instead replacing space at the center of my discussion. Considering how the ocean-space has been understood in relation to a variety of factors over four centuries will foreground that knowledge about space is the result of the complex interplay between a multitude of influences, offering a more comprehensive understanding of the processes at play in making knowledge.

This chapter examines specific historical geographies of space with an emphasis on faraway locations and especially the geographical imagination of distant, uncharted lands with a focus on the tropics and the idea of “tropicality” (Driver and Martins 2005b, 3). This leads on to a discussion of what Withers (1999, 498) calls the “historical geography of trust” and the question of the transmission of knowledge across the earth and, specifically, the question of networks of knowledge and the relationship between faraway places and what Miller (in Driver 2004b, 82) dubs the “centers of calculation.” This then allows us to consider attempts made to homogenize the making of knowledge about these places and, in particular, scientific efforts to achieve homogenization through the publication of guidelines and standardization. This focuses on the historical geographies of science in the eighteenth and nineteenth centuries. Finally, I consider the space of the ship, which is central to much knowledge production about the ocean-space, in relation to the geographies of science arguing that the ship is both a “scientific instrument” and a laboratory (Sorrenson 1996, 221). These ways and methodologies of making knowledge about space will then be applied to the ocean-space in later chapters.

Geographical imaginations of tropical spaces

The knowledge that we have about places, whether we have visited them or not, is amalgamated in a multilayered manner, “constructed in a variety of ways, through experience, learning, memory, and imagination” (Driver and Martins 2005b, 3). This multifaceted way of making knowledge about space is especially central to the production of knowledge about tropical spaces, to which, between 1500 and 1900, few went but many imagined. In this respect, the tropics and the ocean-space are similar: the geographies of both spaces were reliant on little information, but many representations and imaginings seeped into cultural consciousness nonetheless. Following Driver and Martins (2005b, 3), who focus on the “ways in which tropical places are encountered and experienced, the significance of travel for the process of making knowledge about these places, and the relationship between geographical difference and generalized notions of ‘tropicality,’” this section will formulate an understanding of how knowledge about the ocean-space can be constructed, presenting the literature of the historical geography of faraway, unknown places and emphasizing how their discourse might be useful later in this chapter in the analysis of the historical geography of ocean-space.