The Geography of Exploration: A Study in the Process of Physical Exploration and Geographical Discovery

Joseph St. Onge
Utah State University

Follow this and additional works at: https://digitalcommons.usu.edu/etd
Part of the Geography Commons

Recommended Citation
https://digitalcommons.usu.edu/etd/6581

This Thesis is brought to you for free and open access by the Graduate Studies at DigitalCommons@USU. It has been accepted for inclusion in All Graduate Theses and Dissertations by an authorized administrator of DigitalCommons@USU. For more information, please contact dylan.burns@usu.edu.
THE GEOGRAPHY OF EXPLORATION: A STUDY IN THE PROCESS OF PHYSICAL EXPLORATION AND GEOGRAPHICAL DISCOVERY

by

Joseph C. St. Onge

A thesis submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE in Geography

Approved:

UTAH STATE UNIVERSITY
Logan, Utah
2000
ABSTRACT

The Geography of Exploration: A Study in the
Process of Physical Exploration and
Geographical Discovery

by

Joseph St. Onge, Master of Science
Utah State University, 2000

Major Professor: Dr. Cliff B. Craig
Department: Geography

Exploration has been a common literary topic throughout the history of humans. However, much of this historical tradition has possessed a fairly narrow focus, emphasizing the drama and heroics of an individual explorer or concentrating on a description of a particular exploration. There has been little attempt at understanding the process of exploration and placing this important process in context with the historic and geographic phenomena that both affect and are affected by it. In this thesis, the author has broken the process of exploration down into a theoretical structure that is presented in a holistic model. This model has then been applied to the history of 15th century Portuguese exploration to test its applicability and usefulness.

(111 pages)
ACKNOWLEDGMENTS

I would like to thank Derrick Thom and Chris Conte for their assistance as committee members in reading and commenting on this thesis. I would especially like to thank Cliff Craig for his support and encouragement of my unconventional scholarly aspirations. Of particular help throughout this process were the comments and ideas generated by my family and I would like to thank them all.

Joe St. Onge
# CONTENTS

<table>
<thead>
<tr>
<th>ABSTRACT</th>
<th>Page (\text{iii})</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>iv</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>vi</td>
</tr>
</tbody>
</table>

## CHAPTER

1. INTRODUCTION ............................................... 1
2. LITERATURE REVIEW ......................................... 8
3. GEOGRAPHY OF EXPLORATION .............................. 24
4. GEOGRAPHY OF 15TH CENTURY PORTUGUESE EXPLORATION | 44                  |
5. CONCLUSION ................................................ 98

NOTES .............................................................. 102

REFERENCES ...................................................... 106
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1.</td>
<td>Allen's model of the exploratory process</td>
<td>16</td>
</tr>
<tr>
<td>2-2.</td>
<td>Overton's model of the process of exploration</td>
<td>18</td>
</tr>
<tr>
<td>3-1.</td>
<td>Morphology of exploration</td>
<td>30</td>
</tr>
<tr>
<td>3-2.</td>
<td>Components of exploration</td>
<td>34</td>
</tr>
<tr>
<td>3-3.</td>
<td>Motives for exploration</td>
<td>37</td>
</tr>
<tr>
<td>3-4.</td>
<td>Geography of exploration</td>
<td>41</td>
</tr>
<tr>
<td>4-1.</td>
<td>Western Europe</td>
<td>47</td>
</tr>
<tr>
<td>4-2.</td>
<td>Simplified map of European sea-trade routes</td>
<td>50</td>
</tr>
<tr>
<td>4-3.</td>
<td>January pressure and dominant winds</td>
<td>74</td>
</tr>
<tr>
<td>4-4.</td>
<td>July pressure and dominant winds</td>
<td>75</td>
</tr>
<tr>
<td>4-5.</td>
<td>Temporal progression of Portuguese explorations</td>
<td>77</td>
</tr>
<tr>
<td>4-6.</td>
<td>Exploratory voyage of Diogo Cao 1482-84</td>
<td>79</td>
</tr>
<tr>
<td>4-7.</td>
<td>Exploratory voyage of Bartholomeu Dias 1487-88</td>
<td>81</td>
</tr>
<tr>
<td>4-8.</td>
<td>Exploratory voyage of Vasco DeGama 1497-98</td>
<td>82</td>
</tr>
<tr>
<td>4-9.</td>
<td>Three major communication networks</td>
<td>89</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

Historical exploration, with the conflicts, the movements of peoples and the economic changes which it engendered, has had an incalculable impact on world history; The charting of a strait or the crossing of a mountain range cannot be isolated from its consequences, any more than the invention of the steam engine or the discovery of penicillin can be treated as technical matters without consequences for the human race... without an understanding of the process of exploration, the world we now inhabit, its peoples, its economies and its conflicts is barely comprehensible (Whitfield 1998: VIII).

Exploration is a fundamental human activity that has received prolific attention from scholars throughout the literary history of humans. But much of this attention has been directed toward a narrow interpretation of this important human activity. As Whitfield suggested, it is vital to understand the process of exploration in order to understand the myriad of changes it has engendered (Whitfield 1998). From a scholarly perspective, it is not adequate to simply know that in 1492 Columbus set sail west on the Atlantic Ocean. An informed interpretation of this exploration must take into account the preconditions, drives, methods, and results of the exploration. Such an interpretation will begin to place the process of exploration within its proper context.

This thesis creates a perspective from which exploration may be more adequately interpreted. The underlying thesis is: exploration is a human process that is motivated and affected by geographic conditions and often results in the restructuring of spatial interactions. The problem is that exploration has yet to be
adequately defined or recognized as a human process with distinct geographic
causes and effects. This thesis enlarges upon the traditional view of exploration and
opens new perspectives and discussions on the importance of its study. Exploration
is examined as a process with distinct components, preconditions, and results and is
modeled graphically to facilitate interpretation. The purpose is to define
exploration as a fundamental instrument in the making of human history and to
create a means to systematically and holistically interpret it.

The process of exploration is evidenced throughout human history. One
may identify an exploratory process in the prehistoric movement of early humans
around the globe, as well as in the current voyages within our own solar system.
Consider this excerpt from a letter written by Christopher Columbus in 1493 upon
return from his first Atlantic crossing:

I write this to you, from which you will learn how in
thirty three days, I passed from the Canary Islands to
the Indies... And there I found very many islands filled
with people innumerable, and of them all I have taken
possession. -Christopher Columbus (Jane 1967: 2)

In 1492 Christopher Columbus set sail from the port of Palos on one of the
most memorable and important explorations in the recent history of humans. The
"discovery" of the Americas by Columbus and his small group of ships greatly
enlarged the perceived size and content of the world in the minds of 15th century
Europeans. The ramifications of this "discovery" were monumental. While the
above quotation may be analyzed to reveal a number of interesting avenues of
discussion, whether in relation to Columbus's mistaken geographic thought or his
presumptuous claims to the new land and its inhabitants, it is important to draw attention to a much more fundamental observation. When Columbus landed in the “New World” he found an archipelago inhabited by “people innumerable.” It was not some far off wilderness unseen by human eyes, but rather a home inhabited and worked by human hands for millennia. But people did not always inhabit these islands. In fact, it took a concerted effort, requiring the use of boats and the transport of a sustainable number of people to settle and develop these islands into the Caribbean culture that Columbus stumbled upon. The above quotation is an observation made by a 15th century explorer, but it draws attention to the fact that the current inhabitants had explored these lands previously.

The great age of European exploration from the 15th century onwards is filled with such quotations. It was rare that an explorer would come across a landfall that was not already inhabited by people. While explorers rarely commented on the peculiarity of this observation, it should be striking to modern explorers, scholars, and scientists.

In academia, it is accepted that human beings (homo sapien sapiens) were not divinely created and cast down to their current locations. Recent and ongoing studies in the fields of human evolution, genetics, archeology, and biogeography have reasonably estimated that the cradle of modern humans was in the region of East Africa beginning some 7 million years ago (Diamond 1998). The dispersal or diaspora of humans from this cradle to almost every habitable nook on the planet is one of the most fascinating and often overlooked phenomena in the history of the
world. Human beings have a nearly universal distribution across the earth’s surface, exceeding the geographic range of any other mammal (Gamble 1994). This distribution, when addressed, has usually been described in terms of migration, dispersal, colonization, adaptive radiation, or exaptive radiation (Gamble 1994). While all of these terms signify valuable insights into the process of the human diaspora, they are missing a key ingredient: exploration.

Exploration is a process that results in discovery. Exploration is resolute travel with the purpose of uncovering an unknown or incompletely known objective. But exploration does not necessarily require purpose; it may be accidental, resulting in discovery and thus constituting exploration. Whether resolute or accidental, exploration is the first step in discovering new lands. Exploration, when seen in this light, is therefore a necessary precondition to migration or colonization. If migration is directed toward a known target, then it has been explored. If migration is directed toward an unknown target, then it is exploratory by nature. When applied to the diaspora of early humans, the concept of exploration becomes important. The first human beings to cross the Bering Straits from Siberia to North America, or the first humans to cross the Straits of Florida from continental North America to the islands of Cuba, Haiti, or Puerto Rico were the explorers. Those that followed in their wake with some knowledge of their destination were the migrants, colonists, or travelers. The most apparent transformative aspect between being a migrant or being an explorer is the diffusion of geographic knowledge. Such a distinction reflects a gradation of geographic
knowledge, between known and unknown, and is vital to a proper understanding of exploration. However, attempting to assign migration or exploration distinctions among prehistoric travelers may be difficult, if not futile. Instead, it is important to draw attention to the fact that areas now inhabited or frequented by humans have necessarily gone through a process of human exploration.

Exploration is also the first step in creating cross-regional interaction. A distant region must be explored, in some regard, before a relationship of interaction can be established. Consider the transformative interaction between the New and the Old Worlds after the 15th century. This interaction began with the exploratory journey of Columbus and was continued by a myriad of other explorations including Cabot, Hudson, Humboldt, and even Lewis and Clark. These explorations effectively closed the "seams of Pangea," reuniting the ancient continents (Crosby 1986: 10). Or consider the religious exchanges that occurred between the ancient civilizations of India and China, two cultures that were in close proximity to one another, but divided by significant physical barriers. The exploratory journeys of Fu-Hsien (AD 399-414) and Hsuan-Tsang (AD 629-645) brought the enduring legacy of Buddhism to the Chinese heartland, effecting cultural transformation (Edmonds 1997). Exploration fundamentally alters the significance of space, creating bridges between historically isolated or separated regions. The act of exploration transforms spatial barriers into such bridges.

Exploration should be examined with sensitivity to the fundamental importance it has played in effecting human history. While the specific history and
effects of all exploratory journeys are too numerous to list, perhaps it is possible to identify a pattern that is consistent among them. Such a pattern should ideally highlight an inherent structure to exploration that is found in most, if not all examples providing us with a model or template from which to view this activity. Such a model should bring attention to the preconditions for exploration in an attempt to answer why it occurs in a certain place or at a certain time. This model should incorporate how exploratory journeys are made possible, stressing the methods utilized, and it should also emphasize the results or effects of an exploratory journey.

The goal of this thesis is to create such a model. The first chapter is designed to answer the question: why study exploration? Chapter 2 answers the question: what has been done in the study of historical exploration? It looks briefly at the massive collection of literary works concerned with historical explorations and draws attention to their strengths and weaknesses. Chapter 2 focuses more on the academic approaches to the study of exploration than on the popular histories. In chapter 3, the predominate question is: what needs to be done in the study of exploration? This chapter may be seen as the theoretical basis for this thesis. A structure of exploration is presented within a series of theoretical models that will help to place the process of exploration into a broader historic and geographic context. Chapter 4 applies these theoretical models to 15th century Portuguese exploration. Fifteenth century Portuguese exploration was chosen because it is a well-documented historical period that provides several potential avenues for
inquiry. The purpose of this chapter is to apply the model and thesis to a familiar example in order to test its applicability. The advantage of this approach is that it allows the thesis to be compared to an established historic benchmark and assessed for its usefulness. In short, the overall goal of this thesis is to broaden the perspective utilized in the study of exploration.

As J.K. Wright stated in his 1940 address to the Eighth American Scientific Congress:

In sum, it would appear that much virgin soil is still open for cultivation in that alluring part of the domain where history and geography meet, the history of geographical discovery (Wright 1966: 32).

Indeed, scholarship in the history of exploration and geographical discovery has yet to be fully exhausted. It is hoped that this thesis will broaden the perspectives used to evaluate and understand this vastly important and fascinating human activity.
CHAPTER 2

LITERATURE REVIEW

Exploration has long held the fascination of both scholars and laymen alike, and has thus resulted in a literature collection that is as vast as it is ancient. A recent literature search regarding the history of exploration resulted in over 10,000 sources. Some of the earliest literary evidence of exploration dates from over 4,000 years ago and may be found on the walls of mortuary temples and tombs in ancient Egypt. Even today, there are numerous books published every year that address, describe, and recount the history of exploration. It is fair to assess that the recorded history of exploration is present throughout the literary history of humans.

However, much of this vast literary tradition has had a fairly narrow focus. The majority of exploration literature has emphasized the drama, exploits, and heroic role of individual explorers. It may be possible to trace this often-used approach to mythological roots. A myth is a traditional or legendary story that typically involves a hero who confronts some challenge (Agnes 1996). Exploration, by its very nature, involves such challenges and requires the explorer to confront, and if successful, overcome those challenges. Take, for example, Homer’s epic tale of exploration found in the Odyssey. Homer’s poem describes an accidental exploration initiated by chance, or more precisely, the will of the gods. It is a story of an individual, Odysseus, who sets off on a journey into the unknown and must face many trials in exotic lands before he is eventually able to return home and relate the account of his explorations. The voyages of Odysseus placed such areas as Thrace, Lotophagi (land
of the Lotus-eaters), the island of Aeolus, and the clashing rocks of Symplegades as features in the geographic imagination of the ancient Greeks. The geographic reality of these features has remained a matter of scholarly debate since the time of Eratosthenes until today. But the long history of this story provides some evidence of its broad appeal and effective style. It is a fantastic tale of adventure, hardship, and individual perseverance. Indeed, the word “odyssey” itself has become almost synonymous with exploration. It is the classic hero epic and the classic chronicle of exploration.

Thousands of volumes in the literary history of exploration present a similar approach. The style is a narrative, primarily describing the drama of the journey, while the focus is on the individual, heralding the attributes, or lack of, of the explorer/hero. Take, for example, the “discovery” of the Americas, which has traditionally been told through the drama of Columbus, or consider the literature on early explorations of Antarctica, which primarily focus on the heroics of individuals like Scott, Amundsen, Shackleton, or Byrd. Likewise, the great European Age of Discovery has been predominately told with an emphasis on the personalities of Prince Henry the Navigator, Vasco DeGama, or Amerigo Vespucci. These are, for the most part, descriptive approaches focused on narrating the drama of the exploration. This approach may be best summarized as the “mythological approach” to the study of exploration, one that emphasizes the individual heroics and dramatic story of exploration.
It is not difficult to understand why the descriptive/narrative or mythological approach to chronicling the history of exploration has been dominant. Stories of exploration have long had broad public appeal. These stories provide real heroes to the public, and possess an element of adventure that is lacking in many peoples’ lives. These stories also describe far off and exotic lands that appeal to a sense of romance in the average layman. However, this popularity has had both positive and negative impacts on the literature of exploration; on the positive side, the popularity of exploration has resulted in a profusion of written accounts. The sheer number of stories about exploration, fictional or factual, is staggering. The disadvantage of this popularity is that it has established an all too common template from which accounts of exploration usually follow. This template emphasizes the narrative and focuses on the individual adventurer and the drama of exploration. There has been little deviation from this long-standing template when chronicling exploration.

Academic approaches to the study of exploration have, for the most part, followed the traditional literary template. The majority of academic works focused on exploration are found in the fields of history and geography (Overton 1981). As history is concerned with description and interpretation of past events, the history of exploration has formed an important cornerstone to this discipline. Consider the significance of the journeys of Columbus, DeGama, or Polo to the history of Europe or the greater world. Each of these exploratory efforts resulted in important historical events and has become a mainstay of historical analyses. But, for the most part, the historical treatment of these exploratory ventures has followed the traditional
paradigm, using academic research to further describe the personalities, routes, or immediate issues relevant to a particular exploration.

Exploration has long been a central theme in geography because it is the primary methodological process by which new geographic areas and information are uncovered. Ancient geographers like Ptolemy, Strabo, or Pliny often interviewed travelers and explorers to gain a more accurate picture of the world (Beazley 1949). But while the ancient relationship between geography and exploration has been fundamental, it has been passive. For the most part, geographers were content to gather and broadcast geographical information from the safety of their cloisters or studies (Overton 1981). There were few geographers that actually initiated or partook in exploration. However, the historical role of geography and exploration was transformed significantly with the creation of the first geographical society, the Royal Geographical Society (RGS) of England, in the summer of 1830 (Cameron 1980).

One of the primary goals of the RGS was to both sponsor and record exploratory efforts around the globe. The RGS shifted the traditional role of geography from a passive information bank to an active exploratory force. It was said that the history of the RGS was "nothing less than the history of 19th and 20th century British exploration" (Cameron 1980: 13). But the primary style of the RGS, and geography as a whole, has been descriptive, utilizing maps and narratives to describe the course of explorations and the nature of the regions explored. As with history, there has been a dominant focus on the individual explorer and the drama of the exploration. The volumes of the *Journal of the Royal Geographical Society* are
filled with epic tales of European explorers penetrating the wilds of Africa, Asia, and the Polar Regions. But by the mid 20th century, most of the world had been explored and there was little to be gained from the historically strong ties between geography and exploration. Attention given to exploration in 20th century geography was mainly directed toward the chronicling of any remaining explorations or more commonly, the creation of anthologies of historic explorations (Baker 1937; Cameron 1980; Sykes 1949). While the RGS style of recording exploration has set the standard for the geographical approach for the last 150 years, there have been some notable exceptions.

John Kirkland Wright, an American geographer who specialized in the history of geography and historical geography, worked as a librarian, research associate, and director of the American Geographical Society from the 1920's until the late 1960's. Among his many interests, Wright had a special fascination for the history of exploration. In various essays, books, and public addresses, Wright returned to the subject of the history of exploration and discovery and repeatedly stressed the general inadequacy of its study. In a 1925 essay Wright stated:

Adequately interpreted, the history of exploration should be more than a dry catalogue of dates and names and routes, or a romantic but unsubstantiated chronicle of adventures. It should involve some examination of the complex factors that lie back of exploration in any given region, and, in turn, it should throw some light on the effects of the expansion of regional knowledge upon economic, political, social, spiritual, and intellectual conditions. The progress of exploration is meaningless unless viewed against a wider historical setting (Wright 1966: 18).
Wright acknowledged the work of historians and geographers with regard to past explorations and emphasized their similarity of techniques and research. He observed that the dominant approach in both fields had "been made more often from the point of view of human interest, or of political or economic or literary history, than from geography as such" (Wright 1966: 27). Wright called for a new approach to the study of historical exploration, one that stressed the importance of geographical information:

Briefly, in a geographical approach to the history of discovery one might seek to interpret, first, the influence of earlier geographical knowledge and belief upon the course of exploration; second, the actual relations between the course of exploration and the nature of the regions explored; third, the contributions made by exploration to subsequent geographical knowledge (Wright 1966: 27).

The above quotations exemplify the two different avenues of geographical research that Wright identified as missing in the study of the history of exploration. In the first quotation, Wright clearly states that the majority of study involving historical exploration has focused too heavily on narrating the drama and adventure of exploration. It has also focused primarily on cataloguing names, routes, and temporal progressions of exploration. This approach to the study of exploration emphasizes the proximate factors of particular explorations and does little to place the act or significance of exploration into a broader historical and geographical context. What is necessary, is to view exploration as a process which has links with other human and physical phenomena across both space and time.
this light, exploration can be seen as "a major form of human activity" (Wright 1961) that is important to both the study of history and geography.

The second quotation is an example of what Wright identified as a plausible framework in which to view the history of exploration from a geographic perspective. Wright’s geographic approach to the history of discovery focuses on the impact of geographic knowledge. He has precisely identified the important role that geographic knowledge has played in the development of exploration. When exploration is conducted as an intentional activity (as opposed to accidental) there is a direct relationship between the explorers’ motivation, route, and subsequent action and the nature of geographic knowledge that they possess. Furthermore, a result of any exploration is the addition of new geographic knowledge, be it correct or incorrect. There is a relationship between knowledge, motivation, action, and result in regard to exploration and that relationship may form a reasonable line of geographic inquiry in regard to the history of exploration. But in many ways, this approach also seems narrow in its perspective and fails to place the act of exploration into its widest context, as Wright called for in his earlier essays.

Other geographers inspired by Wright’s ideas continued the interest in historical explorations about which he wrote so prolifically. In 1972 John Allen published an article in *The Geographical Review* entitled: “An Analysis of the Exploratory Process: The Lewis and Clark Expedition of 1804-1806” (Allen 1972). In this paper, Allen acknowledged the important work of Wright and attempted to further his concepts of the geographic approach to the history of discovery. Allen
observed that exploration is indeed a process, not an event, and is directly affected by the nature of geographic knowledge. Where explorations occur and how the explorers go about getting there are a direct result of the quality and use of knowledge that they possess. Allen further distinguishes between "real knowledge" that represents geographic reality and is gained through first hand experience, and "perceived knowledge," which may or may not represent reality. Allen points out that, in most cases, explorers think they know more than they do. In other words, their perceived knowledge is greater than their real knowledge. According to Allen, this dichotomy between real and perceived knowledge will necessarily result in a continuous reappraisal of knowledge and subsequent decisions as the journey progresses. Allen also suggested that the success of an expedition is often the result of an explorer’s ability to recognize the discrepancies between the real and perceived knowledge and then act accordingly. Allen has created a series of graphic models that represent the influence of real and perceived knowledge on the exploratory process (Figure 2-1). Allen's work is helpful in its identification of exploration as a process with distinct components. His focus on the types of geographic knowledge and their impact on the exploratory process highlight one of the key components of exploration, information. One of the most important cargoes on any exploratory venture is the information gained and is, therefore, an important focus of study in the history of exploration. In doing so, Allen has substantially enlarged upon the concepts first introduced by Wright, thus adding an important element in the geographic approach to the history of exploration. Regardless of his contribution,
Figure 2-1. Allen’s model of the exploratory process.
Source: Allen 1972: 15.
Allen's approach still seems quite narrow and does not place the act of exploration into its broadest context. We must look elsewhere for a more holistic approach to a geographic understanding of the history of exploration.

In 1981, J.D. Overton published an article in *The Journal of Historical Geography* entitled “A Theory of Exploration” (Overton 1981). Overton, like Allen, was influenced by the writings of Wright and sought to further develop the geographic approach to the history of exploration. Overton began his paper with an appraisal of the narrow approaches used in the study of the history of exploration. He “suggests a more holistic perspective, stressing the links between different facets of the exploration process and placing exploration in its broader economic and societal context” (Overton 1981: 60). In order to accomplish this, Overton observed that “patterns should be recognized and explained and a greater emphasis should be placed on the causes and effects of exploration. There should be a movement away from description towards explanation” (Overton 1981: 56).

As part of his exploration theory, Overton developed a theoretical model in which he attempted to graphically illustrate the elements of exploration (Figure 2-2). Overton identifies six primary elements in the exploratory process:

Firstly, demand factors must exist to encourage an extension of geographical knowledge into unexplored or partly explored areas... The second element concerns the choice of the area to be explored... The next element, the journey of exploration, involves travel and assessment by explorers. It is this stage that has received, almost exclusively, the attention of writers on exploration. Fourthly, the report of the explorer is a vital component of the process.... Next, the process of
Figure 2-2. Overton's model of the process of exploration.
exploration involves the evaluation of the explorer’s report by decision-makers. (Overton 1981: 57-58).

The theory of exploration outlined in Overton’s paper provided an important step toward developing a geographic perspective on the process of exploration. He has broadened the view of exploration to encompass the impact factors involved in the exploratory process. By incorporating impact factors into a graphic model, Overton further aided scholars involved in the history of exploration by providing a framework in which to view particular journeys. But the theory outlined by Overton may still possess an overly narrow perspective, not yet “viewed against a wider historical setting” as Wright had called for in his 1925 essay.

Overton began his theory with a holistic approach to the demand factors involved in exploration. By categorizing demand factors into the areas of land shortage, isolation, shortage of resources, restricted fields of trade, and scientific and religious motivations, Overton has recognized the geographic phenomena involved. All of these factors are made significant because of their spatial variations. Exploration occurs, at least in part, because of variations in space. One travels to move across space, and exploration may be seen as resolute travel or travel with a direct purpose. If that purpose is to gain more agricultural land, acquire gold, open new trade markets, or spread a religious imperative that only exists across the horizon, then it exists in another space, and thus requires exploration to satisfy. So in recognizing these different demand factors, Overton has distinguished an important geographic element, spatial variation. But Overton falls short of explaining these factors within their broader context.
The exploration theory that Overton has developed emphasizes the proximate factors involved in an exploratory journey. The demand factors, such as land shortage or restricted fields of trade, are the immediate motivation for exploration. But perhaps the geographic perspective should be expanded and raise the question of ultimate cause: why do these demand factors exist and why do they form an exploratory imperative for that particular culture or group? Such questions are difficult to answer, but they may be explained with a geographic perspective, one that emphasizes long-term comparisons between regions. This approach to the history of exploration may “lead, inevitably to greater use of generalizations and theoretical abstractions” (Overton 1981: 56) as Overton has pointed out in his paper. Yet, such an approach may yield long-term insights into how exploration develops in certain cultures at certain times and how that exploratory process affects other historical phenomena. If exploration is indeed “a major form of human activity” (Wright 1961) as Wright pointed out, then it would be important to understand its relationship to the greater history of humans and the geography of the earth.

There have been some interesting approaches in the field of history that may yield insight into a more holistic study of the process of exploration. French historians have long understood the close relationship between geography and history and have developed an approach to the study of historical phenomena that emphasizes this close relationship. Fernand Braudel has written extensively on the history of Europe and utilizes geographic concepts and space as the basis for much of his work. According to Braudel: “Geographical space as a source of explanation affects all
historical realities, all spatially defined phenomena: states, societies, cultures and economies" (Braudel 1992: 21). Perhaps we can enlarge upon Braudel's "spatially defined phenomena" to include exploration, and therefore, judge the significance of geographical space on exploration.

Braudel also recognized that "time may be divided into different time-scales and thus made more manageable. One can look at the long or very long term; the various rates of medium term change; and the rapid movement of very short term developments—the shortest usually being the easiest to detect" (Braudel 1992: 15). When we look at the dominant works on the history of exploration we find that the vast majority of them are focused on medium to short-term time scales. This is not surprising because, as Braudel states, the significance of the shortest-term developments is the easiest to detect. But if we could enlarge our perspective on the history of exploration to include the long term, we might begin to see patterns emerge from this prominent human activity. The danger in taking this long-term historical approach is that it inevitably requires brevity and simplification (Diamond 1998; Braudel 1992). But the benefit is that it might yield insights that cannot be gained from short-term studies of individual explorations.

Finally, we may gain additional insight into the history of exploration by looking at recent advances in the field of world history. Once again, we may turn to Braudel, who stated: "I am convinced that history would benefit immeasurably from comparisons made on the only valid scale—that of the world" (Braudel 1992: 18). Exploration, as a historical phenomena, would benefit greatly from such world
comparisons. Indeed, exploration by its very nature involves different world regions and both affects and is affected by regional variations. To truly understand the significance of exploration, we must examine it in its greatest geographic sense, that of the world.

Marshall Hodgson, another notable world historian, stated:

Events may be dealt with in their relation to the total constellation of historical forces of which they are a part—a method not limited to world history, but perhaps likely to be especially appropriate in this case. This means that we are to consider how events reflect interdependent interregional developments. Then we are to trace these developments as they affect one another and their common geographical, cultural, and economic setting in the world as a whole (Hodgson 1954: 717).

Hodgson’s remark draws attention to the spatial emphasis of world history. It is important to consider historical events in relation to the greater climate of the world at any moment in time. This approach is especially valid when considering the history of exploration. Because exploration involves interaction between regions across space, it is vital that one considers how the differing regions influenced one another, both before and after the examined exploration. Without such an interregional approach to the history of exploration we are left with only a narrow view of the event and probably miss many of the underlying causes and effects of the exploration.

In summary, the history of exploration has largely been told from a very narrow perspective. The dominant approach has focused on an individual explorer and emphasized the drama of the exploration. While this approach to the history of exploration produced many fine works of historical, educational, cultural, and
entertainment value, much has been left unexplained. Geographers like Wright, Allen, and Overton have recognized these shortcomings in the history of exploration and have sought methods to remedy them. Most importantly, they have identified exploration as process, rather than an event, and have sought to analyze it as such. The geographic perspective has largely focused on the impact of knowledge on the exploratory process, and while this is a valuable insight, it is not necessarily complete. What is necessary is to develop a perspective on exploration that recognizes its broadest historic and geographic significance. We may find some support in this approach by looking toward world historians who have bridged the gap between history and geography. The world history methods epitomized in the works of Braudel and Hodgson draw our attention to the value of interpreting history over the long term and interregionally. Such an approach, while certainly not unique in the field of geography, has not been adequately utilized in interpreting the history of exploration. By combining the geographic and historical approaches outlined above to the history of exploration, we may be better able to identify and describe the true historic and geographic importance of exploration.
CHAPTER 3

GEOGRAPHY OF EXPLORATION

There are many perspectives from which to view the history of exploration. One may examine the economic drives and results of exploratory endeavors. One may look at the temporal progression of exploration and place specific journeys into a historical framework. One may also examine the individual motives and stories, thus focusing on the drama of exploration. But exploration, at its most basic level, involves movement across space. Therefore, exploration, like migration, is a spatial and, consequently, a geographic phenomenon.

Geographers study the locations and distributions of phenomena (human as well as physical) on the earth’s surface. They investigate the reasons or causes behind these distributions, and in their research they try to predict how and why change will take place. The geographic perspective, therefore, is a spatial viewpoint. Just as historians focus on time and chronology, geographers concentrate on space and place. –Harm deBlij (deBlij and Muller 1992: 1)

There are many potential advantages to examining exploration from a geographic perspective. As the above quotation indicates, geography is the study of spatial relationships. Geography, at its most fundamental level, seeks to interpret spatial patterns amongst physical and human phenomena, and exploration occurs because of spatial variations in both of these phenomena. The geographic perspective allows one to examine how spatial conditions and variations affect exploration. By examining the spatial characteristics involved, one may address some of the most fundamental aspects of exploration. This geographic perspective may be one of the
more holistic vantage points in which to evaluate exploration. It can be used to examine the disciplines of economics, politics, religion, geology, climate, history, and sociology as they vary over space. It is interdisciplinary by nature, but possesses a unique geographic aspect in its spatial perspective.

This spatial/geographic perspective of the history of exploration will be identified as the *geography of exploration*. The fundamental thesis is: exploration is a human process that is motivated and affected by geographic conditions and often results in the restructuring of spatial interactions. The problem is that exploration has yet to be adequately defined or recognized as a human process with distinct geographic causes and effects. In order to do so, perhaps it is necessary to clarify some definitions.

The word *process* has many differing connotations and must be clearly defined as it is used in this thesis. In geographic terms, a process is "a causal force that shapes spatial pattern or structure as it unfolds over time" (deBlij and Muller 1992: 609). This definition of process recognizes the cause-and-effect relationship found in an exploratory journey while also emphasizing both the spatial and temporal aspects involved. When exploration is examined as a process (as defined above), the holistic potential of its study becomes apparent. But the concept of process may be further defined to aid in this thesis:

A process is an abstraction, an analytical device, by which synthetic, totalized history is organized for the purpose of analysis, and structural conditions are uncovered... The researcher utilizes process...to denote, or make into a thing that which is analyzed. We speak of the "process of change," the "process of
modernization,” or the “process of urbanization,” and we recognize that these are abstractions. None the less, they are legitimate abstractions if we wish to convey history as pseudo-organic phases in order to provide a basis for communication. We cannot convey totality, but we can convey pseudo-totality through the concept of process (Kobayashi and Mackenzie 1989: 174).

The totality referred to in the above quotation is synonymous with the holistic perspective that was called for in the study of historical exploration by scholars like Wright, Allen, and Overton. By identifying exploration as a process, its history may be placed into a more holistic context and viewed “in a wider historical setting” (Wright 1966) as Wright had called for in his essay.

If exploration can be defined as a process, then conceivably an underlying structure to the process of exploration can be determined. The previous chapter described some attempts by geographers to define the structure of exploration. The work done by Wright, Allen, and Overton provided some important insights into the structure of the exploratory process, but they are not complete. Perhaps these scholars missed some of the more basic elements in the exploratory process.

Levels of Exploration

Exploration may occur on a number of different levels that are subject to how geographic knowledge is gained and transmitted and there are obvious distinctions between these various levels in the history of exploration. It is possible to categorize the different subjective levels of exploration into at least four distinct categories: personal, group, global, and particular. Personal exploration occurs whenever an individual travels to a new location. This location may have already been explored
by others but remains fresh for the said individual, and thus results in personal "discovery." Any traveler conducts personal exploration when traveling to a new destination.

**Group** exploration refers to any exploration where the knowledge of the "discovery" is transmitted to a group of individuals that had no previous knowledge or experience of that discovered area. Take, for example, the history of explorations along the East Coast of Africa. The East Coast of Africa has been "explored" numerous times throughout history. It was first explored by different groups of Africans (Bantu, Swahili, etc.) and was later explored by Egyptians and Arabs from SW Asia, who brought knowledge of this region back to their particular groups (Edmonds 1997). The Chinese also explored the East Coast of Africa as early as the 1st century AD (Needham 1995) and wrote about this strange and exotic land. Finally, in the 16th century, Europeans began to explore the East Coast of Africa. A particular group from a particular geographic region and at a particular time conducted each of these "explorations." However, because there was no sharing of information between these groups, each of the explorations of the East Coast of Africa resulted in a discovery. But after the 16th century, one can begin to discern a distinct change in the levels of exploration.

The voyages of the European explorers, in many ways, began a process of global exploration. Wherever the Europeans explored, their "discoveries" were recorded and transmitted inter-regionally. This may be partially attributed to the invention of the printing press in the 15th century, which allowed for the rapid and
wide spread dissemination of geographic information. On the other hand, this may also be attributed to the "global" empires that the European nations began to establish around this time, allowing for the more extensive sharing of information. Regardless of cause, the global level of exploration is relatively late in coming on the stage of historical exploration.

Finally, there is particular exploration. Particular exploration occurs whenever the explorer is looking for a specific "thing," whether or not it is in known or unknown territory. Mineral exploration is such an example, which frequently occurs in well-known areas. These areas may still be explored for a particular element and result in discovery.

While it is helpful to make distinctions between the levels of exploration, the above mentioned levels of exploration are not necessarily exclusive. A specific exploration will often possess one or more of these different levels. Take, for example, the Portuguese explorations during the latter half of the 15th century (a topic to be examined in more detail later). Individual explorers, whether captains or seamen, were engaging in personal exploration as they sailed along the coast of Africa. They were also exploring for a certain group, the nation of Portugal, and thus were engaged on the group level. The knowledge of these explorations was, furthermore, transferred throughout the region of Europe and later the world, thus constituting global exploration. It may also be noted that these explorers were looking for particular elements on their explorations (such as Guinea gold, slaves, spices, and a sea route to the Indies), thus conducting particular exploration.
Morphology of Exploration

There is a distinct morphology to an exploration. Because exploration involves travel from one location to another, it has particular spatial elements that may be categorized according to their physical locations (Figure 3-1). An exploratory journey must begin at a source. This source could be a town, nation or region depending on which level of spatial analysis the researcher is focussing on. From this source, the explorer must travel on a route. The route may be direct, circuitous, or even a dead end subject to the particular exploration in question. Furthermore, most exploration has a target. The target is the goal of the expedition and may constitute a geographic reality (such as a city, country or region), a geographic fallacy (like El Dorado, the NW Passage or The Fountain of Youth) or even just an idea (like riches or religious purpose). It is reasonable to assume that some explorations have occurred that had no direct target. But because exploration requires concerted effort and potential risk, such explorations were probably accidental or were forced by some prominent "push" factors. The fourth and final spatial element of the exploratory process is the return. The return may follow the same geographic path as the original route, or it may follow a distinctly different path. But, for an exploration to pass the personal subjective level and constitute group, global, or particular exploration, there must be a return. The return allows for transmission of the geographic knowledge gained during an exploration. In the modern era of mass communication, an actual physical return is perhaps no longer necessary to transmit knowledge. But throughout most of history, the return was a crucial element in the exploratory process.
Figure 3-1. Morphology of exploration.
However, not all explorations have possessed the return element. Usually such explorations have been lost from the historical record because the participants never returned to tell of them. 8

By breaking down an exploratory venture into these spatial parts, it may be possible to analyze each part separately and thus gain greater insight into the process. One should consider the amount of knowledge possessed for each of the constituent parts. In most cases, the source will be well known. Knowledge of the route may be variable and typically becomes more unknown the further the explorer travels away from the source (Allen 1972). Knowledge of the target may vary anywhere between known and unknown. The voyage of Vasco DeGama in 1497-98 was conducted on a partially known route and was directed toward a known target, India (Jayne 1970). Conversely, much of the early Polynesian exploration of the south Pacific is currently thought to have been conducted on unknown routes and directed toward unknown or very little known islands or targets (Irwin 1992). Therefore, the exploratory aspect (the discovery) of a particular expedition may be directed toward the target or the route. The return may also vary anywhere between known and unknown. The Norse explorations in the North Atlantic, which resulted in the “discovery” of Iceland, Greenland, and Vinland, largely followed the original exploratory routes on the return, thus constituting the known (Sykes 1949). Early Portuguese explorations along the West Coast of Africa, on the other hand, were forced to return via a slightly different route (due to the global atmospheric and oceanic circulation patterns) and resulted in new discoveries, or rediscoveries, like the Azores Islands (Chaunu 1979).
By classifying explorations according to their spatial parts, it may be possible to compare and contrast them to gain greater insight into the underlying process.

Most importantly, one should consider the geographic influence on each of the constituent parts of this spatial morphology. As previously defined, a geographer is someone who studies the locations and distributions of phenomena (human as well as physical) on the earth's surface (deBlij and Muller 1992). The phenomena referred to above are geographic factors, which have been traditionally defined in human or physical terms. Human geographic phenomena or factors are most commonly defined in terms of economics, politics, religion, culture, or demographics. Physical geographic phenomena are typically defined in terms of the atmosphere, biosphere, lithosphere, and hydrosphere. However, the two sets of geographic phenomena are not exclusive and should be considered in relation to one another. A geographic perspective is one that considers how human and physical phenomena interact together over space. If the space in question is the morphology of an exploration with its four distinct components, then it is necessary to evaluate the human and physical affects on each of the components to create a truly geographic perspective.

The concept of "relative location" is an important aspect of the geographic perspective. Relative location refers to where a place or thing is located in relation to another place or thing (deBlij and Muller 1992). It differs from absolute location, which refers to the real world/physical location of a place as defined by latitude and longitude. The relative location of a place is qualified by the specific terms in which one is examining that place. For example, a specific point on a river may be
identified by its absolute location with a latitude and longitude designation or it may be identified by its relative location in relation to the rest of the river by designating its up or downstream location. The concept of relative location places the observed phenomena in context with other phenomena. By utilizing the concept of relative location, one may begin to evaluate the relationship between exploration and the myriad of geographic phenomena that influence it.

Components of Exploration

The process of exploration may be further analyzed within the framework of three distinct components: motives, methods, and impact (Rotberg 1970) (Figure 3-2). When considering the motives for an exploration, one should ask the simple question: why explore? Unless exploration results from an accident, it must have some form of motivation to occur. Likewise, for exploration to occur there must be some method of exploring. The method could be as simple as walking toward an unknown horizon or as complicated as sailing around the world. The researcher should ask the question: what tools, techniques, and knowledge were necessary for the particular exploration and how did the explorers gain these requisite items and concepts? Finally, the researcher should ask the question: what were the impacts of this exploration? By categorizing the process of exploration into these three components (motives, methods, and impacts), the researcher will be better able to focus on the different aspects of exploration and thus gain greater insight into the process.
Figure 3-2. Components of exploration.
Motives for Exploration

When considering the motives for any human activity, the researcher may tread on thin ice. There remains a constant debate among the various academic fields of geography, sociology, anthropology, and psychology as to how human action is motivated. Some academics have pointed toward a deterministic cause for human action that is conditioned by environmental factors (Semple 1911). Other academics have moderated the deterministic approach to human action to a level of possibilism, which suggests that human action is influenced, but not determined, by environmental conditions (Vidal de la Blanche 1899). Still other academics lean more toward the free will and ability of humans regardless of environmental conditions.

Perhaps we can gain some insight from the work conducted by the notable psychologist, Abraham Maslow, who outlined a theory of human motivation that may be accepted by most areas of academic thought. Maslow identified a hierarchy of human motivation that is based on the physiological needs necessary for survival and progresses through more relative needs until the individual realizes self-actualization (Maslow 1954). It is possible to borrow the structure of Maslow’s theory and apply it to the motivation for exploration.

In simple terms, the motivation for exploration may be broken down into four levels (Figure 3-3). The primary motivation for exploration is in response to primal or physiological needs, such as food, shelter or reproduction. If these primal needs are not satisfied then exploration may result. The secondary motivation may become prominent when the primary needs are satisfied and secondary resources (like gold,
spices, exotic animals, oil, etc.) are desired and require exploration to provide. Secondary motivations tend to be economic in nature. The tertiary level of motivation may become important after the primary and secondary needs are satisfied and less tangible goals (intellectual, religious, political, scientific, etc.) are desired and require exploration to meet. Finally, the quaternary level of motivation refers to a quest for adventure or some form of self-actualization that become important and results in an exploratory drive. Quaternary motives will most likely occur only when the primary and secondary needs are met. The tertiary needs may or may not be completely satisfied when the quaternary motives are active. However, the different levels of motivation are not necessarily exclusive, and may work in concert together to provide the motivation for exploration. Although, the primary level of motivation will most often supersede any later levels of motivation. This theory of motivation for exploration may be applied to an individual, but is perhaps most useful if applied to the source of exploration, whether that is a group, nation, or region.

The Geography of Exploration

The geographic perspective of historical exploration seeks to understand the spatial relationships found in an exploratory journey. This may be accomplished by examining the morphology of an exploration and trying to determine how geographic factors (human and physical) influenced each of the elements. It may also be accomplished by examining the components or stages of an exploration in terms of motives, methods, and impact. The key to creating a geographic perspective is to
Figure 3-3. Motives for exploration.
Adapted from: Maslow 1954.
portray each of the components as a part of an interacting whole that interacts over space and is influenced by geographic phenomena, both human and physical.

For example, the basic motivation for any exploratory venture may be reduced to factors that follow a "push-pull" model. Explorers are pushed by some lack or adverse conditions (human or physical: such as overpopulation, poverty, political, and religious conditions, lack of natural resources, or restricted fields of trade) at the source and are pulled to a target area by seemingly favorable conditions. The basis for this theory lies in the perceived difference in space. The variable is the type or combination of geographic factors (human and physical) that create the push and pull phenomena. The geographic perspective should identify these factors.

The methods of an exploratory journey are also directly influenced by geographic conditions. Physical geography, such as climate and topography, has obvious effects on an expedition. The physical characteristics of the space being crossed or explored determine the methods necessary to be successful. The "discovery" of the Americas by the Vikings, or Columbus, required adequate boats and naval technology because of the ocean. Whereas, prehistoric human exploration of the Americas in the region of Beringia may have only required techniques and tools for cold weather survival and subsistence due to the sub-arctic tundra nature of the Bering land bridge. Likewise, there are human geographic conditions that must also be taken into account. Human geographic phenomena, such as political and religious boundaries, may be necessarily crossed or avoided and thus have a distinct effect on an expedition. Economic conditions may also have a particular effect on an
exploration, factors of distance decay being especially acute. Finally, the geographic perspective should attempt to identify how those methods were created or acquired. Geographers have long understood that technology and ideas may be developed in isolation through innovation or may be acquired from other areas or cultures through diffusion. The geographic perspective should identify what these methods were and how they were acquired.

The impact of an exploration may be profound or superficial. Exploration often results in a change of spatial relationships between regions. This change most commonly occurs in a human context. Resulting, for example, in new economic, political or religious relationships. But exploration may also result in physical changes. The biological exchanges that occurred after the 15-16th century explorations by the European voyages of discovery produced significant physical transformations around much of the world. The introduction of European plants and animals to island ecosystems, such as Australia or New Zealand, has been well studied and affected massive changes in the biotic environments of these areas (Crosby 1994).

A geographic perspective of the history of exploration should attempt to describe and analyze the seemingly disparate elements that influence exploration and portray them as a holistic entity. But the problem is how one can portray the interactions within such an integrated and complex system. Perhaps some insight may be gained from "general systems theory" (GST) as introduced by Ludwig von Bertalanffy in the 1950's (von Bertalanffy 1950). GST was developed as a
framework for a science of wholeness, which makes theoretical generalizations about the properties of a system in an attempt to study the whole. The goal of GST is to identify basic principles that govern the whole and portray them in such a way that the subject can be analyzed to provide a source of ideas from which hypotheses can be generated (Johnston 1983). Geographers have often used GST to display complex spatial systems and processes such as rural-urban migration (Mabogunje 1970) and urban growth (Pred 1977). GST is especially relevant to the geographic perspective of exploration because it allows for the graphic modeling of the spatial and temporal elements inherent in exploratory process.

Utilizing the GST approach, a geographic perspective on the history of exploration may be displayed graphically in order to highlight the many spatial and temporal relationships that occur within the process of exploration. Figure 3-4 displays the complex interactions that occur in the process of exploration. This geography of exploration is a holistic view that utilizes generalizations to portray exploration as a single entity with various impact factors. Around the edge of the model are impact factors listed under two sub-headings: physical and human. These impact factors may influence all aspects of the exploratory process, whether in relation to the morphology (source, route, target, return) or the components (motives, methods, impact). The geographic perspective should seek to identify at what level(s) these impact factors influence exploration and how. The perimeter of the model portrays the morphology of exploration. As stated earlier, all explorations possess at least the first three parts of this morphology and are directly affected by the human
**Human Impact Factors**
Politics, Religion, Economics, Demography, Personal

**Physical Impact Factors**
Atmosphere, Hydrosphere, Lithosphere, Biosphere

*Figure 3-4. Geography of exploration.*
and physical impact factors. The center of this model is comprised of the different components of the exploratory process: motives, methods, and impacts. The various components may also be affected by the different impact factors and often result in influencing change in the impact factors themselves. In this sense, the model represents a possible inverse relationship between the components and the impactors. It may also be noted that the components of exploration are displayed as a looped feedback system. In other words, the impact of a specific exploration will often influence the motives or methods of a future exploration.

This model may serve as a mode of inquiry for the researcher on historical exploration. It allows the researcher to formulate a holistic approach to the history of a specific exploration. For example, this model should lead the researcher to ask questions like: how did the political atmosphere at the time influence the motives or methods of a specific exploration? Or, how did the political atmosphere affect the choice of routes on both the journey out and the return? By drawing a parallel between the different impact factors and a specific part of this model, the researcher should be able to formulate a question that will guide them to a more holistic analysis of the exploratory process. The model is designed to highlight the basic structure and relationships that occur in the exploration process, and more specifically, to provide a framework for formulating questions and hypotheses in regard to historical exploration. In other words, the model is designed more as a tool for inquiry than for explanation. But, it is hoped that this model may yield important insights and
explanations when applied to the immensely complicated and important human activity of exploration.
CHAPTER 4

GEOGRAPHY OF 15TH CENTURY PORTUGUESE EXPLORATION

The 15th century was a monumental era in the history of the world and signified the dawn of the "Age of Exploration" in Europe, a time when the Iberian State of Portugal began to probe the world's great oceans. The voyages of the Iberian caravels launched a process of globalization, effectively bridging many geographic barriers that had divided the world up until this point. The ramifications of this era have had a substantial and long-lasting impact on the shape and content of the modern world.

There are various perspectives from which to view this important era of history. The story of Portuguese exploration and expansion may be told from an economic, political, religious or environmental perspective. All of these aspects drove the Portuguese explorers and should be recognized in historical accounts of this period. However, this chapter will interpret the history of Portuguese exploration in the 15th century from a geographic perspective. As geographers study the locations and distributions of phenomena (both human and physical) on the earth's surface, a geographic perspective should illuminate the many interactions that were occurring across a spatial realm. Fifteenth century Portugal did not exist in isolation. The motivations, methods, and impacts of the exploratory journeys of this era were largely a result of the spatial interactions occurring in the medieval world. A geographic perspective should also illuminate the uniqueness of location and place. Portugal and
its exploratory targets were unique places, both physically and culturally, and their peculiarities of physical geography and relative location were substantially responsible for their roles in history.

The author has designed and structured this chapter in a format that applies the Geography of Exploration model presented in the previous chapter. All of the major aspects of that model will be incorporated by first, examining the human and physical geography of Portugal as the source and then considering the history of 15th century Portuguese exploration in five sections: motivations, targets, methods, routes, and impacts. Each of these sections will illustrate how the exploratory process was affected by both the physical and human geographic phenomena listed in the model.

The goal of this chapter is to portray the many individual explorations conducted by the Portuguese in the 15th century as a single and progressive process. Therefore, there will be less focus on specific explorations and more focus on the process of exploration during the 15th century. Portuguese explorations continued after the close of the 15th century, but this chapter will highlight the initial phases and most important exploratory steps that were largely completed by the end of this century.

This chapter is not meant to be an absolute nor definitive history of this era. Instead, it is designed to highlight how the Geography of Exploration model can be applied to illuminate the ways in which physical location and spatial interaction affected the exploratory process in Portugal.
The Source: A Brief Geography of Portugal

At the dawn of the 15th century, Portugal was neither a wealthy nor an influential state within the European region. The nearly one million inhabitants of Portugal were primarily landless peasants who worked for a small elite class of nobles (Newitt 1986). Land, especially arable land, was in short supply. The economy was stunted and resources were limited (Parry 1974). It seems odd that this small mountainous kingdom on the periphery of Europe was able to develop into a world power in a period of less than one hundred years. But perhaps it is not so odd if one were to consider the location of Portugal in relation to the rest of Europe and the world.

Portugal is situated on the Atlantic coast of the Iberian Peninsula, and is the westernmost nation in continental Europe (Figure 4-1). Two distinct regions characterize the physical geography of Portugal. The north of Portugal is mountainous and maritime in climate. An eastern sweep of the warm Gulf Stream current creates a temperate climate and year round precipitation in the north. While the south of Portugal is composed of low-lying plains and plateaus and is dominated by a mediterranean climate, producing hot, dry summers and winter rains.

Portugal has never been an especially fertile country. Northern Portugal is composed of rugged, stony mountains better suited to pasture than agriculture. The long Christian occupation of the north favored the development of small-holdings and tenures that were periodically subdivided among families, which created a situation of land shortage and overpopulation (Newitt 1986). In the south, the river
valleys, coasts, and plains stand in contrast to the agricultural limits of the north and have formed the heartland of Portuguese agriculture. The southern regions were acquired later by the Portuguese in their *reconquest* efforts, and yielded a different form of land ownership centered on elite control of large tracts of land. It is in these southern areas that a plantation economy developed around the valuable production of wine, cork, and olives (Newitt 1986). But the country, as a whole, has rarely been self-sufficient in the production of its basic needs and has often been reliant upon the importation of grains to feed its peoples (Parry 1974).

Portugal’s most enduring geographical asset is its coastal location on the Atlantic Ocean. The Atlantic coast of Portugal has always dominated its existence. There has long been a small but important inshore fishery that has sustained the coastal populations (Braudel 1992; Parry 1974). Many of Portugal’s agricultural areas are located on the coastal plains, overlooking the vast Atlantic Ocean. Furthermore, all the major rivers of Portugal flow into the Atlantic, and the connection of Portugal to the rest of Europe has mainly been conducted along its Atlantic coast. It is toward the Atlantic that Portugal is oriented and it is the Atlantic that provided the avenue for Portugal’s rise to world prominence.

The coast of Portugal is exposed to the full force of the Atlantic’s swells and winds and there are few good natural harbors (Parry 1974). The ports of Lisbon and Setubal are an exception, providing safe and sheltered anchorages on this inhospitable coast. The importance of these harbors grew significantly with the development of the Atlantic trade that connected the Mediterranean world with the northern European
and Baltic world during the 13th century (Fernandez-Armesto 1987). Italian and
German merchant houses dominated this trade, but required the use of the Portuguese
coast, harbors, and ships to be successful. The natural outcome of the burgeoning
Atlantic trade was the incorporation of Portugal into the greater European economic
network (Figure 4-2). This coastal trade allowed for the limited trade of Portugal’s
agricultural products, but more importantly, required the development of a maritime
economy in Portugal to provide support for the coastal shipping.

The maturation of the Atlantic trade shifted the relative location of Portugal in
the European world, from a peripheral state to a central state (Braudel 1992). J.H.
Parry, in his book Discovery of the Sea, refers to Portugal in the late medieval period
as the “Street Corner of Europe” (Parry 1974: 93). Portugal stood between the
economic social worlds of the Mediterranean and northern Europe, feeling the pull of
each. Portugal also stood on the fringe between the Christian European world and the
Islamic North African world. Certainly, 15th century Portugal was well entrenched in
its Christian heritage, but some of its closest neighbors were Islamic Moors located in
Granada and across a thin watery divide in North Africa. Portugal was furthermore
situated on the margin of the known and the unknown. To the north, east, and south
lay the known worlds of Europe and the Maghreb, to the west and southwest lay the
unknown, the geography of the imagination. The prevailing northeasterly winds that
drive down the coast of Portugal point toward the unknown, beckoning ships to the
south and southwest. The southwest ultimately proved the direction of Portugal’s
success, but there required a motivation before Portugal was willing to sail into the unknown.

The Motives

The generally agreed upon date for the beginning of Portuguese expansion was 1415 (Chaunu 1979; Edmonds 1997; Whitfield 1998). This date refers to the invasion of the North African port of Ceuta by a conglomeration of Christian forces led by the young Prince Henry of Portugal. The initial motivation for this invasion was religious and grew out of a long history of conflict between the Christian Europeans and the Islamic Arabs and Berbers. The medieval period was a time of religious and political flux on the southwestern and southeastern margins of Europe. In the Eighth century, the Arab/Berber Moors crossed the Straits of Gibraltar and began their long occupation of the Iberian Peninsula. On the eastern margin of Europe, the rise of the Seljuk and later Ottoman Turks in the Anatolian Peninsula threatened the long-standing Byzantine Empire. The rise and geographic expansion of Islam over the following six hundred years threatened the Christian European world. This was the age of the crusades, a time when the Christian European states organized a number of military expeditions against the Islamic foe. The medieval crusades took two forms: one in the expeditions to the Islamic-held lands of the Levant and the other in the reconquest of the Iberian Peninsula. Between the 11th and 13th centuries there were a series of four major crusades that marched, sailed, and limped into the Islamic-held Holy Lands of the east. While the crusades in the Levant were short lived, they had the unexpected result of enhancing a European
taste for oriental goods, and reinforced the desire to trade with these mythical lands. At the same time, in the west, the reconquest of the Iberian Peninsula began in the 10th century and was to last until the final conquest of Granada in the 15th century.

Portugal was created out of the reconquest efforts in the Iberian Peninsula. In the 12th century, Afonso Henriques petitioned the Pope for the title of King, and created the independent kingdom of Portugal. But the creation of the Christian kingdom of Portugal did little to quell the crusading spirit in the Iberian Peninsula. There were frequent battles between the Iberian Christian kingdoms and the Islamic kingdoms in Granada and the Maghreb. Such battles were a means to win honor, property, and prestige for the participants, especially those of the noble class. There was great religious, economic, and political motivation to engage the Muslims in these battles. These factors, as most historians agree, were the motivating forces behind the Portuguese invasion of the Islamic city of Ceuta (Boxer 1968; Parry 1974).

Once in possession of Ceuta, Portugal began to realize the geographic and economic significance of this port (Guelke and Kay 1996). Ceuta was one of the terminal ports of the great trans-Saharan trade, an ancient trade network that connected the West African kingdoms to the Islamic world. From across the desolate and sandy horizon came caravans of camels laden with spices, salt, slaves, and most notably, gold. There also came information. Medieval Europeans were quite oblivious to what lay to the south in this vast “dark continent.” The barrier of the Sahara Desert and the barrier of Islamic culture effectively sealed off Africa from the
medieval Europeans. But with the conquest of Ceuta, the Portuguese began to receive first-hand reports of the kingdoms and the riches that lay across the desert to the south. However, with the Christian control of Ceuta, the trade connections between Ceuta and West Africa were quickly dissolved and redirected to other Islamic ports by the Muslim traders. This left the Portuguese with knowledge of this great trade network and the potential for European development but with no easy way to penetrate it via the land. As a result, the Portuguese turned toward the coast.

Soon after the conquest of Ceuta, Prince Henry began to sponsor a series of maritime expeditions along the African coast. According to traditional histories, the goal of these expeditions was two-fold (Chaunu 1979; Edmonds 1997; Parry 1974; Sykes 1949). Prince Henry hoped to establish a direct trading connection with the West African empires, thereby eliminating the trans-Saharan trade and its Muslim control. Henry also hoped to spread the Christian faith and locate the mythical kingdom of Prestor John. Prestor John was thought to be the ruler of a powerful non-European Christian empire. The location of this empire was never known, but the prospect of locating it and establishing an alliance against the growing empires of Islam was a constant fascination of the medieval Christian world (Chaunu 1979).

Other historical interpretations point toward a less noble motivation for the first forays down the coast of Africa (Newitt 1986). The political atmosphere of 15th century Portugal was largely divided between the royalty, the nobles, the merchants, and the peasants. The church penetrated all aspects of the political sphere and was commonly used as a justification for political acts. The peasants possessed little to
no power, while the merchant class was beginning to grow more powerful due to the burgeoning Atlantic trade. With the growing merchant class, the nobles began to feel the insecurity of their position, which spread to the royalty that was sustained by these nobles. The invasion of Ceuta and the initial African campaigns of “discovery” may have been a result of Portugal’s attempts at placating the nobles in these changing times. By invading and raiding African cities and countryside, the nobles were able to maintain their leadership status, continue their crusading missions, and acquire new lands and plunder. It has been suggested that many of the initial “explorations” along the north coast of Africa were, in fact, voyages of piracy, plunder, and slave raiding conducted by individual noble families under the support of the state (Newitt 1986). This perspective suggests that any “discovery” happened more by chance than by concerted exploratory zeal. Regardless of the “true” reasons for the initial voyages south, the Portuguese did embark on a campaign of systemic exploration shortly thereafter.

The European age of expansion began when the Portuguese captured Ceuta. With the capture of Ceuta, the crusading movement passed from the medieval to the modern phase; from a war against Islam in the Mediterranean to a movement to carry the Christian faith and European commerce around the world (Levenson 1967). The invasion of Ceuta opened a new door to Portuguese ambitions with the realization of the economic potential that lay to the south. Once the motivation was supplied, there was little that could halt the progress of European exploration of the world’s oceans.
The Targets

The geography and motivations of Portugal described in the previous sections represent only half of the story behind the motives for Portuguese explorations in the 15th century. Both the geography and motivations of Portugal may be seen as the "push" factors that drove exploration. But there were also significant "pull" factors that drew Portugal toward its desired targets. Some of the most dominant "pull" factors that affected Portuguese explorations were economic in nature.

The exploratory motivations of the 15th century Portuguese were directed toward both specific and nonspecific targets. With the capture of Ceuta, Portugal became keenly aware of the riches that lay to the south in the kingdoms of West Africa. These kingdoms, and the trade potential that they possessed, were a target of Portuguese ambitions and explorations. The Portuguese explorations along the West African coast also had the somewhat unexpected result of both discovering and rediscovering a series of island chains in the eastern Atlantic. Some of these islands were known to exist, such as the Canaries and possibly the Madeiras and the Azores, while the Cape Verde Islands were probably a true discovery for the Portuguese (Crosby 1986). Portugal had also a more nonspecific target in its search for the kingdom of Prestor John. Because the exact location of this mythical kingdom was unknown, Portugal sent out a number of exploratory expeditions in the assumed direction of its location. Later, toward the end of the 15th century and at the dawn of the 16th century, the geographic scope of Portuguese exploratory ambitions grew to encompass the Indian Ocean world, China, and the great economic prosperity that
these regions represented. With these growing ambitions, Portugal pushed further south along the coast of West Africa and eventually rounded the Cape of Good Hope to enter the Indian Ocean.

Portugal originally sailed south on the first exploratory expeditions in an attempt to make direct contact with the gold-rich centers of West Africa. The goal of these expeditions was to tap into the rich West African trade that was predominately composed of gold, wax, ivory, Senegal gum, slaves, and maluguetta (African pepper) (Braudel 1992). These items represented great economic potential for the burgeoning Portuguese economy. Why West Africa possessed these items for trade is a result of both West Africa’s physical and human geography.

The coastal hills of West Africa are composed of old shield rock that is rich in gold deposits. There are a few major rivers that cut through these coastal hills and were the primary suppliers of gold dust. Knowledge of the great gold wealth of this area was known throughout the Mediterranean world and was perhaps best illustrated by the numerous stories of Mansa Musa. Mansa Musa was a powerful 14th century Mandingo king who made a pilgrimage to Mecca in 1324. According to legend, Mansa Musa traveled to Mecca with a caravan of one hundred camels laden with over three hundred pounds of gold each in addition to over five hundred slaves burdened with gold bars. Along his pilgrimage, Mansa Musa made numerous and generous gifts of gold throughout the Maghreb and SW Asia, and as a result, significantly dropped the market price of gold throughout the Islamic world (Aryeetey-Attoh 1997;
Bovill 1958). Stories of this famous pilgrimage were widespread throughout the Islamic and Mediterranean regions (Wilks 1982).

By the 15th century, gold had become an important base for the European economy. It is thought that from the eighth century until the discovery of the Americas that West Africa was the chief supplier of gold in the western world (Wilks 1982). Furthermore, as early as the mid 13th century, the southern European economic centers of Venice, Genoa, and Florence began minting gold coins as a form of hard currency, signifying the central importance of gold to the growing European economy (Braudel 1992). The Italian focus on gold redirected much of the European gold supplies to the Eastern trade, creating a significant shortage of bullion throughout western Europe (Newitt 1986; Wilks 1982). Portugal did not possess significant quantities of gold and therefore had to obtain it elsewhere to keep pace with the growing gold-based European economy. West Africa, because of its geologic endowments, did possess large quantities of gold and thus formed a logical target for Portugal’s gold hungry aspirations.

The same may be said for all of the above mentioned items that Portugal desired in West Africa. Ivory, for instance, may only be found in areas where ivory-producing animals exist, such as whales and walruses in oceanic regions, or elephants in more tropical regions. Continental Europe possesses no ivory-producing animals, making ivory a rare and prized commodity. The majority of ivory obtained in Europe during the early 15th century and before came from India and East Africa via Muslim and Italian merchants. The ivory-rich regions of West Africa were a unique avenue
for the Portuguese to obtain this product directly (Birmingham 1999). Malaguetta, also known as African pepper, is endemic to Africa. Malaguetta was most often viewed as inferior to Indian pepper, but served as a welcome spice to the spice-poor regions of northern Europe, especially after the hindered Indies trade in the 14th century (Braudel 1992). In contrast, slaves were not endemic to Africa. But, because of the long practiced cultural traditions of slavery throughout West Africa, it was well endowed with an infrastructure and culture that both allowed for and encouraged slavery (Birmingham 1999; Braudel 1992; Thornton 1998). It is estimated that before the coming of the Portuguese approximately five million slaves were exported from West Africa to the north along the trans Saharan trade routes (Barraclough 1998). Portugal was able to easily tap into this human trade and supply its own faltering labor supplies in the wake of the Black Death. Birmingham states that by the 16th century some 10% of the population of southern Portugal was comprised of black slaves, which points toward the labor demand in this region (Birmingham 1999).

These items, both animate and inanimate, were either unique to West Africa, or were most easily obtained in West Africa and served as the “pull” factors that drew the Portuguese explorers south.

The Atlantic Islands also had unique geographic attributes that attracted the Portuguese in their explorations. Most notably, the Atlantic Islands represented arable land that was in short supply in Portugal, and with the exception of the Canaries, were uninhabited. However, there were little native resources of value to the Portuguese when they began to visit these islands, other than water to replenish
ship supplies on long voyages and slaves captured from the Canaries. But with a little manipulation the Atlantic Islands became very important to the growing Portuguese economy. Because of their cool climate, the islands of the Azores became a productive cattle, sheep, and wheat-producing arm of the Portuguese economy (Crosby 1986; Parry 1963). The Azores were also an important stopover point for ships returning to the ports of Portugal on their voyages from West Africa and the Canaries. The Canaries and the Madeiras became a much more profitable holding for the Portuguese due to their more southerly latitude. These two island groups became an experimental station for the production of sugar cane, a highly prized and rare commodity in western and northern Europe. Within a few years after the introduction of sugar cane, these islands became the primary producers of the sugar consumed in the western and northern European spheres (Newitt 1986). In short, the Atlantic Islands provided arable land that was in a different climatic zone than Portugal and thus allowed for the production of crops that were difficult, if not impossible to produce in the mother country. The development and exploitation of the Atlantic Islands was the first experiment in European overseas plantation production, heralding the future of European expansion in both Asia and the Americas (Birmingham 1999).

The draw of the Indian Ocean world and the Far East has attracted Europeans for millennia. It is only in these regions that valuable production of certain spices, silks, and exotic woods are found. In the 15th century, many of these natural resources were endemic to the Indian Ocean and the Far East, requiring Europeans to
obtain them, directly or indirectly, from those areas. The powerful city-state of Venice had long held a monopoly on this lucrative India trade with Europe, especially during the Pax-Mongolia of the 13th century (Braudel 1992). But, with the break-up of the Mongol Empire and the rise of the Ottoman Empire in the 14th century, these trade connections between Europe and the East became increasingly weak. The dream of finding an alternative route, outside of the grasp of the Islamic world, was a constant fascination among European merchants (Boorstin 1983). The exploratory voyage of Bartholomew Dias in 1487-88 rounded the southern cape of Africa and signified the first European all-sea contact with the Indian Ocean. Curiously, it took an additional ten years before Portugal sent out the expedition of Vasco DeGama and realized this long held dream of direct trade with India and the Far East.

The economic attributes (gold, slaves, spices, etc.) of the target areas lured the Portuguese south on their voyages of exploration. But this exploratory effort did not begin with the direct goal of sailing to the Indian Ocean (Thornton 1998). Instead, it began with the more modest target of North Africa (Chaunu 1979; Newitt 1986). However, the systematic explorations of the Portuguese enabled them to expand their target horizon from the relatively close North African port cities and the Atlantic Islands far to the south and east, eventually encompassing much of Africa, the Indian Ocean, SE Asia, and China.

The Methods

A combination of religious zeal and economic desire created the motivation for exploration in 15th century Portugal and it was only a matter of time before the
methods were created to meet those motivations. As the French historian Pierre Chaunu stated: "Needs create the means to satisfy them. Even where there are no means, strong enough motives will in the end create their own tools" (Chaunu 1979: 231). This was the case in 15th century Portugal.

Portuguese exploration required the development of four primary means to satisfy its goals. First, there had to be an improvement of the tools required for high seas voyaging. The ship designs of medieval Europe were inadequate for open ocean navigation, and the improvement on this fundamental tool was crucial to the progress of exploration. Second, there had to be an improvement on the navigational techniques of medieval Europe. Until the mid-15th century, the primary navigational technique was coastal sailing, a technique that was unfit for the next stage in exploration, which would require sailing into the open ocean. Third, there had to be an improvement in the power sources used to propel these exploratory voyages. The common practice of rowing in the face of contrary winds and currents would not do; only the utilization of wind power could propel these boats on their extensive voyaging. The discovery of global wind patterns proved the solution to this dilemma by providing a navigational template that the Portuguese navigators could follow across the world's oceans. And fourth, the barrier of the European geographic imagination had to be overcome. The popular geographic thought in Europe at the beginning of the 15th century was full of myths and fallacies (Kimble 1938; Whitfield 1998). These myths created a significant mental barrier to the would-be explorers, requiring the Portuguese to sail into the impossible of the
Let us first look at the development of ship technology in the early stages of Portuguese exploration. The traditional ships of medieval Europe were primarily designed as cargo ships. The barcas, cogs, and galleys of the European world were heavy ships designed to sail with the wind and be rowed when the wind was contrary (Chaunu 1979; Law 1987). Such ships functioned well for their intended purpose, coastal navigation and trade, but were not well designed for exploration. What was necessary for exploration was a ship that could sail with and against the wind. An exploratory voyage was useless if it did not return, and sailing down the coast of Africa with a following wind required sailing back up the coast in a contrary wind to be effective. Another primary difference in the focus of ship design for exploration was cargo space. The traditional European ships were designed to maximize cargo space at the expense of other design features. In an exploratory ship, the most important cargo was information (Boorstin 1983). There could be, therefore, a compromise in cargo space for the optimization of other design requirements. The answer to these design requirements was the caravel.

The caravel was a unique design in shipbuilding that evolved on the Atlantic coast of the Iberian Peninsula, where the ship designs of the northern European, Mediterranean, and Islamic worlds came together (Parker 1972). The stout, round-sided ships of the Baltic world were combined with the long, streamlined galleys of the Mediterranean to create the caravel’s long, streamlined, and yet shallow hull.
The sail design of the caravel also signified a melding of technological styles from different geographic and cultural traditions (Law 1987). The square sail of European heritage was combined with the lateen sail of the Islamic/Indian Ocean world to create a sail design that used both the power of a square sail and the maneuverability of the lateen sail (Chaunu 1979). The caravel was the first ship of its kind designed specifically for exploration. The caravel supplied the need for a ship that could sail against the wind, a crucial development for return voyaging, as well as carry a moderate sized crew and all of their supplies and maintain a relatively shallow draft that enabled exploration of inshore waters. The melding of these different cultural/geographic traditions in the development of the caravel created the necessary tool for global exploration. The caravel was, in a sense, the product of Portugal’s unique geographic position between the northern and mediterranean European trade networks and between the Islamic and Christian worlds.

The improvement of navigational techniques was the next necessary step in the progress of exploration in Portugal. Until this point, advances in navigational techniques had been piecemeal, developed by individual adventurers and commercial enterprises with little attempt to consolidate the information acquired (Kimble 1938; Law 1987). Prince Henry recognized this weakness and established the Academy, or School of Sagres, to create an atmosphere of collaboration in regard to the development of navigation. The Academy in Sagres attracted sailors, scholars, scientists, and cartographers from across the medieval world. Unfortunately, little of the work from Sagres has survived to this day (Kimble 1938). To further compound
the historical problem, much of the work conducted at Sagres was hidden behind a veil of secrecy, which leaves much to speculation (Chaunu 1979). But it is known that the Academy in Sagres brought together the navigational techniques, astronomical learning, and cartographic methods from across the medieval world to help the progress of explorations down the African coast.

One of the major problems of exploring south into the equatorial regions of Africa was the complication of determining latitude. European navigators had long determined latitude in the temperate regions by measuring the height of the Pole star. This technique was both effective and relatively simple. But as the Portuguese sailors approached the equatorial regions, the Pole star sank below the horizon and it was no longer possible to gain an accurate measurement. The problem was further aggravated when the sailors actually crossed the equator and the Pole star disappeared from the horizon completely. A Jewish astronomer, Abraham Zacuto, solved this problem. Zacuto was a member of the small but prominent Jewish astronomical community centered in Spain and the island of Majorca. Persecution of Jews in 15th century Spain led to a mass migration of Jews to Portugal (Boorstin 1983). It was in Portugal that Zacuto’s assistant, Jose Vizinho, compiled a series of tables, which relayed the sun’s altitude at noon as a measurement of latitude (Kimble 1938; Law 1987). This revolutionary method of establishing latitudinal position enabled the Portuguese explorers to push further south with the confidence of determining their position at sea. If sailors could determine their latitude at sea and knew the latitude of their destination, then they could simply follow a parallel to
their goal. This navigational leap was largely the product of Portugal’s unique position as a cultural bridge in the medieval world (Landes 1998). The desire of Portuguese exploration was combined with the knowledge of the Jewish astronomical community to create the methods for equatorial exploration.

The true key to exploration of the world’s great oceans lay in the discernment of the global wind patterns, for it was these winds that could drive or halt the Portuguese caravels. These explorations along the coasts of Africa were as much of a discovery of the global wind patterns, as they were the discovery of land (Crosby 1986). The discovery of these wind patterns cannot be attributed to a single sailor, but were rather the result of trial, error, and chance on the part of many ships that entered the great Atlantic. What was finally discovered by the end of the 15th century was a pattern of two great voltas in the Atlantic. The term volta is Portuguese for wide-circle and refers to the two great wind wheels that circulate in the Atlantic. North of the equator, the winds of the Atlantic blow in a clockwise direction around a global high-pressure area, and conversely blow counterclockwise around a similar high-pressure zone south of the equator (a phenomenon that will be examined in more detail later). Realization of these great voltas, in combination with the ability to determine latitude, allowed the late-medieval sailors to set a course out into the seemingly endless oceans with the confidence of finding the right winds.

Portugal was in a unique geographic position to recognize the utility of these winds. The Atlantic coast of Portugal is located at around 40 degrees north latitude.
It is in this latitudinal region that the northern Atlantic volta makes it sweep from the prevailing westerlies to the northeastern trades. From the coast of Portugal, an observant sailor could discern this change in wind direction and be privy to a corner of the greater global wind pattern. The discovery of global wind patterns was a fundamental step in the European discovery of a new type of world geography, a geography based on reality beyond the scope of the narrow medieval European worldview.

The process of discovering the global wind patterns was indicative of an even greater process occurring in medieval Christian world, that of overcoming barriers of the geographic imagination. The imaginative geography of the medieval Christian world posed many barriers to the would-be explorers of the time. Images of an uninhabitable torrid-zone in the equatorial latitudes and a great southern continent connecting Africa to the poles had to be overcome before a sailor could sanely head south along the African coast. Such conceptions made any journey south seem futile if not suicidal.

The myths and fallacies of the Christian geographic imagination were stripped away slowly as their faults were recognized. Christian Europe's interactions with the Islamic world in the later Middle Ages did much to further the development of a new real world geography (Beazley 1949). The "Dark Ages" of Europe saw a strengthening of the Christian Church and a loss of many of the texts and learnings of the ancient scholars. This was a time when the powers of theology surpassed those of science (Whitfield 1994). During the same period, the Islamic
world underwent a renaissance of sorts, discovering and developing on the scientific and geographic foundations laid down by the ancient Greeks. The works of the great Greek and Roman geographers, Ptolemy and Strabo, were reinterpreted in the Islamic world and put to direct use in this expanding social and trade network. The world map of Al-Idrisi (1154), a great Islamic geographer, clearly reflects the work of Ptolemy and includes much of the known Islamic and Christian worlds (Whitfield 1998). At the same period in the Christian world, one may find maps that portray a flat earth and a very limited scope of the world.\textsuperscript{12} The Christian crusades in the Levant and Iberia brought the geographic learning of the ancient Greek and Islamic scholars back to the Christian world. This was the beginning of the Renaissance in Europe, a time of reawakening in the arts and sciences, especially in geography.

Another important aspect of the development of this new geography was the impact of first-hand knowledge. The story of Marco Polo’s journey to the Far East did much to readjust the geographic imagination of the European world (Beazley 1949, Whitfield 1998). Marco Polo’s story put China back on the map of the European geographic imagination, and provided a much sought-after goal for exploration. The Portuguese experience in Ceuta had a similar influence on the Portuguese geographic imagination. Once in possession of Ceuta, the local Arabs and Africans shared first-hand knowledge of the “true” physical geography of Africa. According to these reports, people did indeed live in the “uninhabitable” Torrid Zone and beyond. The wealthy Mali and Songhai kingdoms south of the Sahara and the gold rich hills of the Gambia could, in fact, be reached via the sea
(Guelke and Kay 1996). These reports spurred the Portuguese south on their first forays, which, in turn, created more information. The first-hand knowledge did much to transform the Christian geographic imagination that had handicapped the medieval European world up until this point. The "Age of Exploration" was as much a mental journey into the geography of the imagination as it was an actual journey into the geography of the world.

The developments of these crucial methods for Portuguese exploration were geographic in nature. All of these methods were created out of a desire to traverse geographic barriers and ironically, the methods were supplied through the interaction of different geographic areas and peoples. Many of these methods were developed through the diffusion of both knowledge and technology. The geographic learning of the ancient Greek and Roman scholars passed through Islamic culture on its way to the Portuguese imagination. The ship designs of the Mediterranean, the Baltic, and the Indian Ocean diffused through the greater European economic networks to arrive on the Atlantic coast of Portugal, only to be melded and transformed into a new style of ship building. The scientific learning of the Jewish astronomical community spread to the Portuguese exploratory efforts, providing important tools for the progress of oceanic exploration. Even the discovery of global wind patterns owes much to the scientific thought of Aristotle and Ptolemy, and to the collective knowledge of sailors from across the medieval world. Had Portugal existed in isolation, an island in the middle of the Atlantic or landlocked in the middle of the continent, it is doubtful it would have been able to follow the same historical path.
It was the unique location of Portugal and the great variety and mix of cultures from across the medieval world that enabled the Portuguese to develop rapidly into a world exploratory power.

**The Routes**

The various routes of Portuguese exploration during the 15th century generally followed a similar and progressive path. With the exception of the exploratory expedition of Covilhão and Pavia (1487-89), who traveled east through the Mediterranean and Indian Ocean along established Islamic trade routes, the brunt of Portuguese exploratory efforts was directed south along the coast of West Africa.13 This exploratory path was initiated after the Portuguese invaded Ceuta in 1415 and was continued for almost one hundred years. The result was the establishment of well-traveled routes between Portugal, the west and east coasts of Africa, the Indian Ocean, the Far East, and even the coasts of South America.

There were certain human geographic phenomena that influenced the Portuguese decisions to pursue this exploratory route and direction. The Portuguese were limited in their ability to pursue expansionary ambitions to the north or east. To the north lay northern Europe and the islands of the North Atlantic. These regions were already under the political and economic control of powerful European states and were not open to Portuguese expansion. Portugal was able to begin trade relations with the states of northern Europe as early as the end of the 13th century, but was unable to muscle in on these regions in an expansionary sense (Braudel 1992).

There was a similar situation to the east of Portugal. Immediately to the east lay the
powerful kingdoms of Castile and Aragon, which were a constant threat to Portuguese security (Newitt 1986). Further east lay the long lived and powerful states of the Mediterranean, an arena of states that had been well established by the dawn of the 15th century and proposed little to no hope for expansion. Even economic ties with the eastern Mediterranean were difficult to establish due to both the barriers of Islam and the Venetian’s powerful monopoly on this region’s trade. But to the south and west, there were more open opportunities for Portuguese to pursue expansionary ambitions.

Immediately south of Portugal, across the thin Straits of Gibraltar, lay the Islamic lands of North Africa. This region had long been held by powerful and seemingly secure Islamic rule, but presented opportunity to the crusading zeal of 15th century Portugal because of religious differences. A potential invasion of Castile was both foolhardy and unwise in a political and religious sense to the 15th century Portuguese. Whereas, an invasion of the Islamic port city of Ceuta would be tolerated if not commended by the European community at the time because of the deep religious divide that separated these neighbors. As the Portuguese moved further south on their expeditions of both conquest and trade, they encountered little resistance from their European neighbors. The major exception to this trend was in regard to Portuguese attempts at settling and developing the Canary Islands, which met with fierce resistance from both the Spanish and the indigenous Guanches. But, the lands of West Africa were sufficiently detached or unknown in the European world that Portugal was able to find a niche for exploration and expansion that met
with little outside resistance. This is not to say that there was no resistance from the Africans themselves. But much of this resistance was either quelled by superior force or overcome by providing seemingly advantageous trade with the Africans (Wilkes 1982).

The Portuguese system of using a combination of trade and force to push their explorations through inhabited territory proved successful along the entire west coast of Africa (Blake 1967). Indeed, the same tactics were used along the east coast of Africa and in the Indian Ocean with a fair bit of success (Braudel 1992). The primary human barriers that shaped the direction of Portuguese exploration were found in the northern European and Mediterranean world. The powerful European states and the more unified and powerful Islamic states of the eastern Mediterranean formed human barriers to Portuguese exploration and trade ambitions, whereas the less unified and powerful states of coastal West Africa did not form such a formidable barrier. One would think that the powerful and ancient states of the Indian Ocean and the Far East would have formed a barrier to Portuguese explorations. But by the time the Portuguese had entered this region, they had enough experience in their tactics to overcome these barriers (Chaudhuri 1995).

There were also significant physical geographic features that shaped the direction and style of the Portuguese exploratory routes. The potential for overland exploration and expansion was severely limited for the Portuguese. Any overland exploration in North Africa required crossing the formidable Sahara Desert. The Sahara is an inhospitable region that presents many physical and logistical difficulties
to the would-be explorer. The Sahara was also home to nomadic tribes of Muslims known for their ferocity that jealously guarded the lucrative trans-Saharan trade routes. The Portuguese lack of experience in this desert environment combined with the many obstacles that it presented made any exploration and expansion via this route unlikely.

The Atlantic Ocean provided a more likely opportunity for Portuguese exploration. The maritime skill of the Portuguese combined with the open boundary of the Atlantic provided this opportunity. But there were significant geographic factors that influenced the routes of the explorers. The primary physical feature that affected the choice and direction of exploratory routes was the ocean wind patterns. As previously mentioned, the Portuguese ships were wind propelled and required a favorable wind to sail in the desired direction. It was the discovery of the Atlantic wind patterns that proved a fundamental key to Portuguese exploration.

Atlantic wind patterns are directly affected by global atmospheric circulation. Due to the spherical shape of the earth, the equator receives significantly more solar radiation than do the poles. This differential heating of the surface of the earth creates zones of rising and falling air around the globe. In equatorial regions, the intense solar radiation results in a massive upwelling of air, due to convection, creating a global region of low pressure commonly referred to as the “Inter-Tropical Convergence Zone” or ITCZ. This rising air flows both north and south of the equator at which point it cools and drops back down to the surface of the earth to create global areas of high pressure, which are located roughly between 20–40
degrees of latitude. Because of the rotation of the earth on its axis, this rising and falling air is deflected into a spinning motion, commonly referred to as the "Coriolis Effect." The Coriolis Effect results in the clockwise spin of air in areas of high pressure that are north of the equator, and the counterclockwise spin of air in high pressure areas south of the equator. The final result is two great wind wheels that spin on either side of the equator and create global wind patterns that fluctuate to the north and south with the summer and winter seasons (Figures 4-3 and 4-4). It was these wind patterns that largely determined where and when the Portuguese explorers sailed.

Early Portuguese explorations along the northwest coast of Africa were propelled by favorable northeast trade winds that blow south along the coast of Portugal. These winds are the eastern edge of the northern high-pressure zone and blow fairly consistently until one reaches roughly the 20th degree of latitude, or the area around the Senegal and Gambia Rivers. Because of the reliability of these winds, it is likely that other sailors (Roman, Italian, Islamic) also sailed as far south as the Senegal River before the Portuguese (Newitt 1986). But as mentioned previously, exploration requires return, and sailing forward with a favorable wind requires sailing back against a head wind. This posed a problem to the Portuguese explorers. There were three ways to overcome this problem. The first was to row in the face of contrary winds. This technique required substantial human power and was difficult to sustain along the arid and desolated coast of North Africa and as a result, it limited the range of early Portuguese explorations. The second method was to catch
Figure 4-3. January pressure and dominant winds in the Atlantic and Indian Oceans.
Figure 4-4. July pressure and dominant winds in the Atlantic and Indian Oceans.
favorable land breezes caused by the diurnal heating and cooling of the African continent. This method was certainly used by the early explorers, but required considerable down time when the favorable land breezes were not blowing (Law 1987). The third, and latest technique for return voyaging was to make a long westward tack into the open ocean using the northeast trades until a favorable westerly wind was encountered somewhere in the vicinity of 40 degrees north latitude. Such a move was both bold and risky, because it required sailing far from the security of land and seemingly in the wrong direction. But this technique proved the most efficient and resulted in the discovery or rediscovery of the Azores Islands located around 38 degrees north latitude between the years of 1427-1439 (Chaunu 1979). As a result, the Azores became an important stopover for ships returning from the coast of Africa to the mainland of Europe on such a tack.

The first stage of Portuguese exploration was primarily directed toward the desert coasts of North Africa and began in 1415 with the invasion of Ceuta and continued until 1434 when Gil Eanes rounded Cape Bojador (Figure 4-5). After this pivotal journey, the Portuguese explorations began to accelerate down the West Coast of Africa reaching Cape Verde by 1444. The use of a great ocean-ward tack proved vital for continuing explorations along the African coast. Between the years of 1444-1475 Portuguese explorers pushed as far south as the Congo River Delta, succeeding in crossing the equator and the boundaries of the contrary winds. This achievement required a fundamental knowledge of Atlantic wind patterns for it traversed out of the zone of northeasterly trade winds and through the doldrums of the equator into the
Figure 4-5. Temporal progression of Portuguese explorations along the coasts of Africa. Adapted from: Edmonds 1997 and Chaunu 1979.
zone of southeasterly trade winds. Sailing through these variable wind regions required diligence, expertise, and a bit of good fortune. It was also discovered that the voyage south of the northeasterly trade winds into the equatorial regions could only be accomplished between the months of November and March and a return during the northern summer (Chaunu 1979). It is during the period of November to March that the northern high pressure zone pushes further south, effectively extending the reach of the northeasterly trade winds. This pressure fluctuation allowed sailors to penetrate the equatorial regions before catching the favorable continental breezes of the narrow West African monsoon. This complex weather pattern placed seasonal restrictions on the exploratory routes of the Portuguese.

The final phase of Portuguese explorations along the West Coast of Africa was initiated by voyage of Diogo Cao in 1482, who pushed south to Cape Santa Maria in the region of present day Angola (Figure 4-6). This voyage required considerable tacking against the contrary southeasterly trades on the expedition south, but was instrumental in establishing a wide tack to the northwest on the return voyage. Cao’s expedition set the stage for the exploration of Bartholomew Dias and Vasco DeGama, which were probably the most influential Portuguese explorations of the 15th century. Cao’s expedition reinforced the Portuguese vision of two great wind wheels that blow to the north and south of the equator. Dias used this knowledge, somewhat imperfectly, to set his course around the southern cape of Africa in 1487-88 (Figure 4-7). The voyage of Dias attempted, like Cao, to beat against the contrary southeasterly trades on the outward journey, before sailing west to catch the
Figure 4-6. Exploratory voyage of Diego Cao 1482-84. Adapted from Edmonds 1997.
prevailing westerlies around 40 degrees south latitude. Once Dias harnessed these westerlies, he was able to sail around the Cape of Good Hope and establish the first European all-sea contact with the Indian Ocean. But it took ten years before Vasco DeGama, in a seemingly brilliant feat of seamanship, put all of the pieces of the Portuguese sailing experience together and made his monumental voyage to India (Figure 4-8). DeGama sailed to the Gulf of Guinea on the northeast trades at which point he set a southwesterly course, keeping the southeasterly trades abeam, until he was able to pick up the prevailing westerlies in the 40 degree south latitude region. Once in the “roaring forties” he was able to sail around the southern cape of Africa. The route that DeGama took is still the preferred sailing route for ships from Europe bound for the Indian Ocean today.

Once in the Indian Ocean, DeGama faced a new and foreign wind pattern. The seasonal heating and cooling of the massive Asiatic landmass creates seasonal monsoons that affect the entire Indian Ocean. This monsoonal system is relatively simple and easy to predict but is very different from the winds of the Atlantic. Fortunately for the Portuguese, DeGama was able to obtain a famous Gujarati pilot in Malindi by the name of Ahmad Ibn Majid who guided the Portuguese to the Indian subcontinent (Crosby 1986). But apparently, either Majid did not relate the intricacies of the Indian monsoons to his Portuguese guests, or DeGama did not heed his advice, for DeGama set sail west back across the Indian Ocean to East Africa in the contrary winds of the southwestern monsoon. This lapse in judgment cost DeGama 95 days in the crossing as well as many men who died from scurvy, thirst,
Figure 4-7. Exploratory Voyage of Bartholomeu Dias 1487-88. Adapted from: Edmonds 1997.
Figure 4-8. Exploratory voyage of Vasco da Gama 1497-98. Adapted from: Edmonds 1997 and Chaunu 1979.
and starvation (Crosby 1986). Once DeGama rounded the southern cape of Africa, he followed the return route pioneered by Cao and closed the loop on a massive figure “8” that circled the Atlantic and traced the future trade routes between Europe and the Indian Ocean for the following centuries.

The exploratory route of DeGama was based upon the trial and error of almost 80 years of Portuguese explorations in the Atlantic. The immediate direction of Portuguese exploratory routes was largely determined by human geographic factors, such as politics, economics, and religion, while the intricacies of establishing routes down the coast of Africa and to the Indian Ocean were largely determined by the physical geographic features of the oceans and their winds.

The Impacts

The voyages of the Iberian Caravels initiated a process of globalization (Thornton 1998). To use Alfred Crosby’s provocative phrase, these voyages closed the “seams of Pangea” (Crosby 1986: 10). What took millions of years of continental drift and divergent evolutionary paths to create was swiftly readjusted by the voyages of the Iberian caravels. No longer were the world’s great oceans a significant barrier that isolated the opposite shores. The development of ocean navigation and exploration turned these geographic barriers into highways that connected the shores of the world. The establishment of this interregional connection led to a vast array of physical and human impacts in all of the regions involved.

From a physical perspective, the most important and long-lasting impacts of the Portuguese explorations were biological in nature. The Portuguese ships served
as bridges allowing for the transfer of biological entities between previously isolated or separated regions of the world (Thornton 1998). The most significant of these exchanges occurred between the Old and New Worlds, which began at the close of the 15th century and continued for centuries thereafter. There have been numerous studies on the effects of this phenomenon (Crosby 1986, 1994; Diamond 1998) and we will only touch upon some of the more salient points.

Upon their arrival in the Americas, the Portuguese and Spanish explorers found people actively engaged in the domestication of agricultural crops unknown in the Old World. The cultivation of maize, potatoes, cassava, pineapple, many types of beans, and tobacco (to name only a few) was transferred from the Americas to the Old World (including Europe, Africa, and Asia). The introduction of these food crops greatly altered the economic and social structures in many of these regions, permitting food production in greater quantities and in more marginal areas than previously possible (Birmingham 1999; Crosby 1986). This exchange was two-way, also greatly affecting the food production and social systems in the Americas with the introduction of Old World plants and animals.

Agricultural products were not the only biological items exchanged between these previously separated regions. There was also a significant human migration, which occurred mostly from the Old World to the New Worlds. Some of this migration was voluntary and consisted of European colonists, while much of this migration was forced and took the form of slavery. Slaves were captured or purchased by European imperialists along the west coast of Africa and transferred to
the Americas to work on the newly established plantations. It is estimated that over 10 million black Africans were transported to the New World as slaves by the end of the 18th century (Braudel 1992; Crosby 1994). This mass migration of humans from the Old to New Worlds had massive biological and human consequences. From a biological perspective, with the Africans came African diseases that had developed over millennia in the tropical regions of the continent and had been largely endemic to those areas. Diseases like yellow fever, malaria, and amoebic dysentery were introduced to tropical America and had a massive impact on the human inhabitants of these regions—native, European, and African combined (Crosby 1994). This is not to say that the only diseases introduced to the Americas were of African origin. Smallpox came with the first European explorers and is now known to have had a wide-ranging and disastrous impact on native populations around the world (Crosby 1986; Diamond 1998). But the unique and virulent suite of diseases found in tropical Africa had a compensating benefit of keeping the Europeans from settling in tropical Africa on any significant scale.

The 15th century was the age of European exploration along the west coast of Africa, but this exploration was predominately limited to the coastal areas and rarely involved any large colonies or settlements. The primary reason for this pattern of exploration and trade without serious colonization was due to the inhospitable nature of the tropical climate and its diseases (Birmingham 1999; Crosby 1994, 1986). Because the Portuguese did not develop large colonies or settlements, they had little long-term impact on cultural transformation in western Africa (Birmingham 1999). A
relatively small portion of the African population adopted Portuguese culture or language and even religious conversion was not widespread (Birmingham 1999). Instead, the Portuguese explorations along the west coast of Africa had a more fundamental but indirect influence on the political transformation of this region.

The primary effect may be found in the fall of the long-standing interior kingdoms and the rise of the coastal kingdoms. The arrival of the Portuguese on the coast and their exhaustive efforts at penetrating the west African trade undermined the old agricultural kingdoms of central and west Africa (Birmingham 1999).

Previous to the Portuguese arrival on the coast, the interior kingdoms of the Mali and Songhai had been built upon the control of the trans-Saharan trade. In simple terms, there was a demand for the gold, slaves, and salt of West Africa in the north (Maghreb and Mediterranean) and these kingdoms served as the intermediaries in obtaining and transferring these goods to the northern markets. The arrival of the Portuguese along the coast redirected much of this trade to the south, weakening the strong economic ties that sustained the interior kingdoms (Braudel 1992). This shift in trade, combined with possible climatic change, is thought to have been largely responsible for the decline of the great interior kingdoms (Aryeetey-Attoh 1997).

With the decline of the interior kingdoms came the rise of the coastal and forest kingdoms. These kingdoms (Dahomey, Benin, Ashanti, Oyo, and Kongo) developed wealth and power in response to the economic stimulus presented by the Portuguese arrival. The coastal and forest kingdoms operated as intermediaries between the Portuguese and the interior of Africa much like the older kingdoms of the Mali and
Songhai had acted as intermediaries between the Maghreb and interior Africa (Braudel 1992). But the new coastal and forest kingdoms were less agriculturally based than the older interior kingdoms and were largely modeled after a warrior/trader model that was supported by Portuguese weapons and trade treaties (Birmingham 1999).

The slave trade played an important role in the development of these new coastal and forest kingdoms. While slaves were by no means the only commodities exchanged in the trade relations between the Portuguese and the African kingdoms, they were the most enduring economic and social legacy of this trade (Birmingham 1999; Thornton 1998). The early Portuguese contact and trade with the west coast of Africa involved the tapping of a long-held institution of slavery in this region. According to Thornton: "The institution of slavery was widespread in Africa and accepted in all of the exporting regions, and the capture, purchase, transport, and sale of slaves was a regular feature of African society" (Thornton 1998: 97). The Portuguese and later the French, Dutch, Spanish, and British all became closely involved in increasing the demand for slaves to supply labor to first the European mainland, second the islands of the eastern Atlantic, and finally the Americas. It is difficult to address the myriad effects of this trade in this chapter, but it must be noted that the massive export of humans from Africa had significant impacts on the social, political, demographic, and economic structures of African societies (Aryeetey-Attoh 1997; Birmingham 1999; Braudel 1992; Thornton 1998).
From a spatial perspective, this Afro-European trade resulted in a shift of power in West Africa: from the interior to the coast. Also from a spatial perspective, the explorations conducted by the Portuguese in the 15th century had significant impacts on the future economic and political structure of the world (Thornton 1998).

Let us first look at the medieval Old World, which encompassed the continents of Europe, Asia, and Africa. Left out of this worldview are the regions of North and South America, Australia, New Zealand, and the islands of the Pacific. These regions, while possessing unique human histories, were separated by significant geographic barriers and were not yet connected to the Old World in a meaningful manner (Abu-Lughod 1989; Thornton 1998).

The medieval Old World may be characterized by three great communication networks that bridged and dominated a multitude of smaller ones (Figure 4-9). There was the communication network of the Christian European world, which encompassed continental Europe, the Mediterranean Basin, and the islands of the North Atlantic. There was the communication network of the Far-Eastern world, a network that was centered on the civilization of China and stretched into the steppes of Central Asia, throughout the South and East China Seas, and at times, as far as the Indian Peninsula. Finally, there was the communication network of the Islamic World, a vast region that was centered on the Arabian Peninsula and stretched as far west as the Iberian Peninsula and West Africa and as far east as the Islands of Southeast Asia (Abu-Lughod 1989).
Figure 4-9. Three major communication networks of the medieval Old World: I European, II Far Eastern, III Islamic. Adapted from: Abu Lughold 1989.
The three major communication networks were not mutually exclusive and there was significant overlap and exchange between these different medieval worlds. The Mediterranean coast of Southwest Asia and North Africa was a meeting place of the European and Islamic worlds. The islands of Southeast Asia were another meeting point between Islam and China. The Mongol invasions of eastern Europe in the 13th century created an important, although short, interface between the Chinese and European medieval worlds. Other than the brief interface between the European and Chinese worlds created by the Mongol invasions, the Islamic world effectively isolated and often bridged the communication spheres of the medieval world. Any interaction or trade between Europe and West Africa or Europe and the Far East was conducted through Islamic middlemen.

The Age of Exploration transformed the communication networks of the medieval Old World (Thronton 1998). The voyages of the Portuguese caravels established a direct communication and commercial network with the African, Indian, Southwest Asian, and Chinese worlds. By sailing down the West African coast and rounding the Cape of Good Hope, Portugal was able to end-run the Islamic control of the important interface between Europe and the rest of the Old World. In essence, these voyages of exploration restructured the Old World economy from an Indian Ocean hub to an Atlantic hub (Braudel 1992; Chaudhuri 1995).

However, at the dawn of the 15th century, the Portuguese were not the only people poised for global exploration. In fact, the Portuguese may have seemed an unlikely candidate at that time. The early 15th century saw the Muslim sailors
continuing their long dominion over the Indian Ocean and much of the Mediterranean. For centuries, Islamic sailors had been traversing thousands of miles of the Indian Ocean following the seasonal monsoons. This was a maritime culture, one that had been focussed on the arts of the navigation and the sea for a long time. This was a religiously zealous culture, one that expended much energy in the geographic spread of their faith (Fernandez-Armesto 1995). The Muslims were also a commercial culture, forming the center of an Old World trade network. So, then, why did the Muslim sailors not sail around the Cape of Good Hope or to the Americas?

The answer to this question may partly be explained in geographical terms. The Islamic maritime culture was centered on the Indian Ocean. Navigation on the Indian Ocean was predominately dependent on the monsoonal winds. The monsoonal winds are seasonal winds that blow from the northeast in the winter and the southwest in the summer, making for a predictable and reliable power source. Unlike the winds of the Atlantic, the flow of the monsoons is readily evident from the land, which is affected by them every year. This led to an early understanding and utilization of the monsoonal winds by Indian Ocean sailors. The ease of navigation in the Indian Ocean was further aided by its location, surrounded on three sides by land. Such a geographic arrangement made it possible to put in a boat on the coast of Oman or East Africa in July and be almost guaranteed to make landfall in India a few weeks later. The reverse was also possible in January. The navigational techniques the Indian Ocean fostered were only imperfectly applicable elsewhere, which may have limited the scope of the Islamic boats (Crosby 1986).
There is also the question of motivation. Did the Islamic sailors in the Indian Ocean or the Mediterranean have a reason to sail down the west coast of Africa or across the Atlantic? The Islamic sailors were already in control of a vast trade network that stretched across most of the known world. The kingdoms of West Africa were connected to Dar es Salaam through the trans-Saharan trade, so there was little motivation to sail down the west coast. The riches of India, Southeast Asia, and China were within the grasp of Islamic traders and required no additional exploration to maintain. The medieval Islamic world may have had the ability for world exploration, but it had little motivation to pursue it.

Whereas the Europeans had the motivation. Medieval Europeans were aware of the Islamic control of the Old World economy, but were vastly limited in their ability to enter it. The gold of the Sudan and West Africa lured the Portuguese south. The spices and wealth of the East Indian trade further propelled the Portuguese around the Cape of Good Hope. It was the same lure of the East Indian trade that tempted Columbus to sail west on his monumental voyage, whereupon he stumbled into an entirely new world full of potential for European exploitation.

A comparison of the exploratory potential in the medieval Old World must also take into account China. Fifteenth century China was on the eve of global expansion, possessing the world’s largest oceangoing fleet, a high level of technological innovation, and a wealthy state to fund and support exploratory expeditions (Levathes 1994). China began the exploratory process when the voyages of Cheng Ho (1405-1433) reached the East Coast of Africa, India, and even Mecca.
These were massive expeditions sent out with the explicit goal of establishing contact with the greater world. But in 1433, these expeditions were suddenly recalled and were never to be resumed.

The Chinese exploratory efforts were suspended because of a change in political rule. The new government of China identified the exploratory fleets with the corruption of the former emperor and forbade all oceangoing shipping, and even dismantled the extensive network of shipyards that created these fleets (Levathes 1994). In a matter of a few years, China went from the fore of world exploration to an isolated state of the Far East. The geographic and political unification of China allowed for the decision of one despot to end all exploration (Diamond 1998). This did not, and most likely could not, happen in Europe.

The story of Christopher Columbus stands in stark contrast to that of Cheng Ho during this same century. The Italian-born Columbus had a dream of exploring the ocean to the west. Such a dream required the funding and support of a wealthy state. Columbus pursued this backing first in Italy, and when refused switched his alliance to France, Portugal, the Duke of Medina-Sedonia, the Duke of Medina-Celi, and finally the Queen of Spain, all of whom refused his initial request. It was not until he was able to convince Queen Isabella of the competitive advantage that his expedition would create for Spain that she agreed to sponsor his dream. The geographic division of Europe gave rise to the many individual states that Columbus approached for backing. Had Europe, like China, been unified under a singular rule,
such an enterprise would have most probably ended with the first refusal (Diamond 1998).

While Columbus made his celebrated journey under a Spanish flag, he could have easily made the same journey under a Portuguese or Italian flag (Braudel 1992). The success of the Portuguese mariners to the south opened up a new age and level of competition amongst the European states. As the world grew in the European imagination, so did the expansionary and economic potential for the European states. New markets opened, old markets were restructured, and a new form of European imperialism developed and spread. This era may be seen as one of the fundamental steps that drove the transition of the European economy from a feudalistic to a capitalistic orientation, a step that led to the creation of an economic process begun in Europe in the century after 1450 and spread with the explorers across the world (Langton 1996).

Summary

The example of Portugal demonstrates that exploration, in itself, is a geographic process. Through the act of exploration, Portugal broke down many physical, cultural, and mental barriers, which resulted in a new level of spatial interaction. These explorations may be identified as a leading edge of geographic change. The exploratory journeys of the Portuguese caravels began the process of transformation that followed in their wake. These explorations brought the previously isolated lands of the New World and the far-off lands of Africa and Asia
into the realm of the European world, henceforth altering the economic, political, religious, and environmental processes in all of these regions.

It must be remembered that exploration is rarely spontaneous and requires prerequisite conditions. For exploration to occur there must be both the motivation and the methods to explore. Portugal had the motives due to its absolute and relative location in the human and physical spheres of the medieval world. Portugal stands in contrast to the other great medieval powers of the Islamic and Chinese worlds, which had little, to no motive for exploration. The stimulus for the brief phase of Chinese exploration was rather more a passing fancy than a strongly felt need. That China was largely self-sufficient in its needs and required little external support afforded it the freedom to rapidly turn its back on the outside world. The Islamic world, as we have seen, maintained control over a vast global trade network and thus was able to provide for most of its needs. Therefore, there was little motivation for exploration in the medieval Islamic world. While both of these cultures possessed the methods for oceanic exploration, they did not have the motivations. Without motivation, the methods were largely superfluous.

Due to its relative location in both the human and physical spheres of the medieval world, 15th century Portugal had the motive for oceanic exploration. The physical setting, the climate, soils, and topography of Portugal allowed for the development of a marginally productive domestic state. The rise of the Atlantic trade enhanced Portugal’s economy, but any true economic or political advancement in the human dimensions of the medieval world required physical expansion (Braudel
Portugal was limited in its potential avenues of physical expansion. The powerful kingdoms of Aragon and Castile were formidable foes and restricted any hope of expansion in the Iberian Peninsula. On the contrary, the Atlantic coast of Portugal provided an open boundary for expansion. To the west and southwest lay the islands of the Canaries, Madeiras, Azores, and Cape Verdes. With the exception of the Canaries, these islands were unclaimed and open to Portugal’s expansionary ambitions. To the south also lay the vast “dark continent,” with unexplored and unrealized potential. The Atlantic provided the potential outlet for Portugal’s motives, and so it was only a matter of developing the methods to realize that potential.

The methods for Portugal’s explorations were largely the result of its relative location in the medieval world. Economic, political, religious, and cultural dynamics all contributed to the development of the methods for Portuguese exploration. From an economic perspective, Portugal formed a bridge between the trade networks of the Mediterranean and northern Europe. The bridging of these two trade networks began in the late 12th century and relied heavily on the supplies, harbors, and peoples of Portugal. The result of this economic bridge was the advancement of maritime technology in Portugal as well as an economic boost to its fledgling economy, both of which proved vital in the later exploratory efforts. Portugal also formed a cultural bridge in the medieval world. Due to its close proximity to the Islamic lands of North Africa, Portugal was a meeting place of Christian European and Islamic African and Southwest Asian culture. One may also find the distinct imprint of Jewish culture in
15th century Portugal, especially after the persecution of Jews in Spain. The Iberian Jews were tolerated by both the Islamic and Christian cultures of the western Mediterranean and were thus important intermediaries between this cultural and religious divide (Birmingham 1999). This mix of cultures gave rise to a richly developed civilization that incorporated the technological innovations, cultural traditions, and scientific learning from the seemingly disparate worlds of northern Europe, the Mediterranean, Southwest Asia, and North Africa. The cultural mix of medieval Portugal was instrumental in creating the methods for 15th century exploration.

In summary, the Atlantic orientation of Portugal created opportunity. The physical and human geography of Portugal helped to create a culture that was both able and willing to pursue this Atlantic opportunity. But the geography of Portugal did not predestine this development. It was through a serendipitous combination of factors that the Atlantic opportunity was realized and the "Age of Exploration" occurred. The physical landscape, the economic networks, the political and religious atmosphere, and the spatial interaction among these elements all contributed to the exploratory zeal and accomplishments of the 15th century Portuguese.
CHAPTER 5
CONCLUSION

In a recent conversation with a fellow graduate student, the question was posed to me: did early Native Americans explore? While I am not a student of Native American history, my immediate response was a hesitant "yes." Hesitant, because I know of no particular stories about early Native American exploration, and I think that this ignorance may be traced to three potential reasons. The most obvious reason is my own lack of study in the field of Native American history. The next reason is the general paucity of a literary tradition in Native American cultures. This scarcity of primary written works leaves the history of early Native Americans largely at the whims of oral history, which is both easily lost and distorted through time. The final and most profound reason may be our general misunderstandings and conceptions of what exploration is. The word exploration will typically conjure up images of 15th century European voyages or 19th century geographic expeditions to far off and inhospitable places. Indeed, these images are a correct association with what exploration is, but there is more.

As stated earlier, exploration is a process that results in "discovery." Any human that travels over an unknown horizon is an explorer. The simple observation of the wide geographic dispersal of humans around the globe points toward the necessary process of human exploration. By definition, people must "explore" a region when they first visit that area. Therefore, the well-defined and analyzed human processes of dispersal, migration, and colonization have the necessary pre-
condition of exploration. Early Native American migrations throughout the Americas must have involved exploration at some level. But exploration has not been adequately defined or analyzed as such a fundamental human process to allow for this logical deduction. Instead, exploration is most often viewed as an event and is seldom placed within its wider human and geographic context.

The academic discipline of geography possesses a unique perspective in which to view exploration as a holistic entity. Geographers study the spatial distribution of phenomena (both physical and human) on the earth’s surface. They attempt to understand how the physical and human phenomena interact over time and space. Because of the broad focus of geography, it is interdisciplinary by nature. It is able to cross academic boundaries, in order to view the entire system, while maintaining a unique perspective in its spatial orientation.

Exploration, by its very nature, is a geographic phenomenon. Exploration is the process by which humans move across the earth’s surface, from a “known” area to an “unknown” area. Therefore, exploration is a spatial process that must be examined within its geographic context. This geographic context must view exploration in relation to the human and physical factors that affect and are affected by it. In other words, exploration must be examined in its broadest context and placed in perspective with the myriad of factors that relate to it. These factors include, but are not limited to: politics, religion, economics, demography, culture, atmosphere, lithosphere, biosphere, and hydrosphere. All of these phenomena have a spatial component that may affect a particular exploration and should be recognized.
When this holistic perspective is applied to the vast and fascinating history of exploration, there appears a pattern that is consistent throughout. At its most basic level, a pattern may be observed in the spatial morphology inherent in all explorations (source, route, target, and return). At a slightly more complex and theoretical level, a pattern may be discerned in the components of exploration (motives, methods, and impacts). When analyzing exploration within the framework of these patterns, one begins to see that each aspect is distinctly influenced by the above mentioned geographic factors. One cannot separate the influence of climate or economics on the motives or routes of a particular exploration. Such a separation of dependent parts will distort the analysis and leave the conclusion impoverished as a result.

This thesis has attempted to identify some of the parts inherent in the process of exploration. It has broken down this process with the goal of creating a systematic perspective in which to evaluate this important human activity. The models and theories presented in this thesis are designed to provide a framework in which to view and compare explorations. It is hoped that these models will be applied to different explorations, western and nonwestern, ancient and recent, and compared. Such an approach to exploration may begin to describe this fundamental human activity as the essential behavior that it is. The author recognizes that this perspective is far from complete. This thesis has been a step taken toward the goal of creating a more holistic perspective on the history of exploration. It is a step that is supported by the intellectual and physical explorations of many previous scholars and adventurers. Hopefully, it is also a step that will be used by some future adventurers and scholars.
to climb toward a higher understanding of the immensely complicated and fascinating human process of exploration.
NOTES

1 Pangea is the name given by A. Wegner in his theory of ‘continental drift’ to the ancient super-continent of Precambrian times. It is thought that Pangea began to break up some 190 million years ago to eventually form the current continental configuration (Clark 1998). Historian, Alfred Crosby, has written extensively on the ecological ramifications of the European explorers and often refers to these explorations as “reuniting the seams of Pangea” (Crosby 1986: 10).


3 The great Alexandrian geographer, Eratosthenes said that you would be able to chart the course of Odysseus’s travels only when you found the cobbler who sewed the bag in which Aeolus confined the winds (Fagles 1996).

4 For sources that exemplify the ‘mythological approach’ to exploration see: Morison 1942 for Columbus, Huntford 1985 for Scott or Amundsen, Rogers 1990 in regard to Byrd, Bradford 1960 for Prince Henry, or Subrahmanyan 1997 for Da Gama.

For Columbus see: Morison 1942, 1955, 1971, or Colon 1959. In regard to DeGama see: Jayne 1970, or Cuyvers 1999. For Polo see: Walsh 1953, or Humble 1975. For concise compilations that deal with all of the mentioned explorers see: Sykes 1949, or Boorstin 1983.

For a detailed account of the exploratory efforts sponsored and recorded by the Royal Geographical society over the past 150 years see: Cameron 1980.

The voyage of the Vivaldi brothers in 1291 is one of the more well known examples of an exploratory effort that was lost from the historical record because the explorers never returned. The Vivaldi brothers set out from Genoa in two galleys with the goal of sailing around the west coast of Africa and reaching the Indies via a new sea-route. The fate of the Vivaldis is unknown, but it is expected that they perished somewhere off the west coast of Africa (Law 1987, or Crosby 1986). Both Law and Crosby point toward the Vivaldis’ insufficient technology, boats and geographical knowledge as a cause for their failure and demise.
The 'push-pull' theory was developed to help explain the phenomena of migration. This theory suggests that people are pushed by adverse conditions to leave an area and are pulled to another area by seemingly favorable conditions (Clark 1998). While this model has traditionally only been used to describe migration, it may also be beneficially used to describe exploration.

"Distance Decay" refers to the various degenerative effects of distance on human spatial structures. In short, the degree of interaction decreases as distance increases (deBlij and Muller 1992). When applied to exploration, "distance decay" may be found in the process of supplying an exploratory effort with the necessary provisions. If the expedition is relatively close to the "source" than provisioning is usually not a major obstacle. In contrast, on longer explorations distance becomes an important logistical consideration and often prohibits the ability of the source to supply an expedition. The result is either a self-sufficient exploratory effort or a significantly strained attempt at provisioning the exploration.

Recent historical analyses of the early Norse explorations and colonization in the North Atlantic and North America point toward factors of distance-decay being responsible for their ultimate failure (Diamond 1998, McGovern 1994). These studies recognize the inability of the Norse colonies (the source) to adequately supply and sustain exploratory efforts and marginal settlements (the targets) during that particular time period. Environmental factors, such as the "Little Ice Age," probably played a crucial role in this failure. Human factors, such as weak and narrow
economic structures linking the colonies to the homeland (Scandinavia), as well as inadequate social structures and survival strategies in the colonies themselves also played a distinct role.


12 Examples and explanations of Medieval Christian maps may be found in Whitfield 1994. Of particular interest to this paper are the maps of Hereford 1330, Psalter 1250 and Beatus 1109, which clearly display the power of Christian theology over that of scientific geography and cartography.

13 Covilhao and Pavia disguised themselves as Berber merchants in order to undertake this journey. Both were fluent in Arabic and were convincing enough in their disguises to travel widely throughout the Islamic world. While the fate of Pavia is uncertain, Covilhao traveled for almost thirty years before he settled in Ethiopia (Edmonds 1997).

14 For a more detailed analyses of the world communication and economic zones of the medieval period see: Braudel 1992 or Abu-Lughold 1989.
REFERENCES


Kimble, G. 1938. Geography in the Middle Ages. London: Methuen & CO.


Parker, J. 1972. Discovery: Developing Views of the Earth from Ancient Times to The Voyages of Captain Cook. New York: Scribner’s Sons.


