WINDOWS INTO CHANGING WORLDVIEWS:
A CRITICAL CARTOGRAPHIC ANALYSIS OF FOUR INFLUENTIAL WORLD MAPS
FROM THE 13TH TO THE 21ST CENTURY

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A thesis presented in partial fulfillment of the requirements for completion
Of the Bachelor of Arts degree in International Studies
Croft Institute for International Studies
Sally McDonnell Barksdale Honors College
The University of Mississippi

University, Mississippi
December 2015

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ABSTRACT

It is an inherent part of human nature to seek knowledge of the world around us. As knowledge of the world grew, so did the need for its visual representation—thus came the introduction of the map into society. The map is a technology that allows us to see an expansive view of the world around us and to understand our own place in the world. In the past, displaying a full view of the world was more of a challenge—many regions remained unexplored or undiscovered. The mapmaker was given the task of representing both known and unknown lands. The representation of the world that resulted reflected the most current knowledge of the world, but also created a worldview for its spectators. In essence, this is where the idea of critical cartography, a field focused on viewing maps as powerful tools that influence culture, comes into play. My thesis serves as a critical cartographic analysis of the varying ways that maps represent known and unknown space. Furthermore, it shows how cartographic representations of the world serve not only to reflect worldviews, but also to create realities. Four maps throughout history, the Vercelli map, the Catalan Atlas, the Mercator map, and Google Earth, are analyzed using a critical cartography framework in order to draw conclusions about the map’s place in society.
ACKNOWLEDGMENTS

This dedication is meant to honor all those who have been integral to the completion of this thesis. I would first like to give a tremendous thank you to my mentor, Dr. Matthew Murray. If not for his constant support, enthusiasm, and advice, this thesis would not have been possible. I would also like to thank my second and third readers, Dr. William Schenck and Dr. Gregory Heyworth, for their interest in my topic and their valued suggestions. I would like to thank all of those at the Croft Institute for International Studies, the Sally McDonnell Barksdale Honors College, and The Lazarus Project team, led by Dr. Gregory Heyworth. The Lazarus Project allowed me to become aware of the Vercelli mappamundi and was the driving force that fueled my research. Specifically, I would like to extend thanks to Mr. Chet van Duzer, a map historian who provided a wealth of information and support for the completion of the work, as well as Dr. Roger Easton Jr., who provided his insight on the relationship between mapping and digitization. Finally, I would also like to give a special thanks to the Sally McDonnell Barksdale Honors College for allowing me to participate in the Lazarus project and for, along with the Croft Institute for International Studies, providing me with a plethora of challenges, opportunities, and support throughout my time at the University of Mississippi.
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CHAPTER 1: INTRODUCTION—THE MEANING OF MAPS

To impose order and structure onto the vast, seemingly limitless space of the world has been a human ambition since the dawn of time. Since the Babylonians created the first known map on a clay tablet in the 6th century B.C., maps have had a consistent presence across cultures around the world (Brotton, 2012, 1). When studying maps, historians and cartographers alike give detailed accounts of their sites of origination and approximate dates of creation. Nevertheless, the more over-arching, anthropological questions surrounding mapping have only recently come to the forefront. Acknowledging the need for in-depth analysis of the way in which maps represent the world in light of the political and social perceptions influencing them, map historian J.B. Harley formed the field of critical cartography (Edney, 2005). Critical cartography asks questions that challenge the claims of “truth” inherent in maps; and it serves to highlight the potential political and social statements that are made through cartography.

Maps are partial and inherently tendentious, leading to inevitable political appropriation. As J.B. Harley points out in The New Nature of Maps, “cartography remains a teleological discourse, reifying power, reinforcing the status quo, and freezing social interaction with charted lines” (Harley & Laxton, 2001, 79). The representation of the world is in the hands of a mapmaker who seldom travels to all of the areas depicted on the map. The mapmaker’s limited experiential knowledge in the midst of cultural, political, and stereotypical ideals about the world is one of the defining factors of a map’s bias. Maps permeate societal views and serve as political tools—in other words, they should be viewed as ‘controlled fiction’ (Harley & Laxton, 107). By identifying not only the spaces which are depicted on maps, but also the areas that the cartographer left out of the map, one can come to conclusions about the political atmosphere and culture during a map’s time period. My thesis is a critical cartographic analysis of the way maps
deal with known and unknown space and how their representations of the world serve both to reflect and enact changes in our conceptual knowledge of the world.

I consider four unique maps from different periods in history to draw inferences based on their depictions of unknown space and how politics and society affect each map’s portrayal of the world. Maps are dialectic—they are created to represent a worldview and in turn they create that worldview. As knowledge of the world changed over time, the depiction of the world on maps changed as well. Nevertheless, the underlying force of the unknown remained a burden—mapmakers were required to represent unknown space as they saw fit and in turn lay down an inherently biased foundation. The Vercelli map, the Mercator map, the Catalan Atlas, and Google Earth represent three periods in history—the medieval period, the Renaissance period, and the modern period. The criteria that I apply to each of the four maps are worldview, maps as political tools, and the representation of known and unknown space. I hypothesize that once the maps are analyzed according to these three criteria, new knowledge will be revealed on the use of maps as powerful tools that shape society’s view of the world.

Maps of the medieval period were identified by their dedication to faith—within one world both tangible areas on the earth and more abstract religious events were represented. The first medieval map I analyze is the Vercelli mappamundi, which is a thirteenth-century map of the world housed in the Museo del Tesoro del Duomo in Vercelli, Italy. I traveled with the Lazarus Project\(^1\) to Vercelli, Italy to digitally image the Vercelli map, an opportunity which enabled me to examine the original map first-hand. As with other medieval “mappamundi”—meaning “map of the world” in Latin—the Vercelli mappamundi depicts a religious view of the

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1 The Lazarus Project is a collaborative team of students and textual scholars who facilitate manuscript recovery by providing researchers free access to multispectral imaging technology. More information about the project can be found at [www.lazarusprojectimaging.com](http://www.lazarusprojectimaging.com).

2 Marco Polo was a Venetian merchant and explorer who traveled from Europe to Asia in 1271-95 and remained in
world. Jerusalem is placed near the center of the map and “earthly paradise” is shown in Asia. Areas of the world that were unexplored were represented according to legends of the time, which tended to involve mythical creatures. As Jerry Brotton states in A History of the World in 12 Maps, “[The mappamondo] is an image of the world defined by theology, not geography, where place is understood through faith rather than location, and the passage of time according to biblical events is more important than the depiction of territorial space” (Brotton, 89). Influential writings such as those of Pliny the Elder provided inspiration for cartographers’ portrayals of the Eastern part of the world and other unfamiliar regions. Mythological and religious figura populated the unknown areas of the maps, indicating cartographers’ insistence upon including these areas despite the mapmakers’ lack of empirical knowledge.

The Catalan Atlas, drawn and written in 1375, is the most important map of all world maps produced in the Catalonia region during the medieval period (Thrower, 1996, 56). In the historical scope of this thesis, the Catalan Atlas represents the period between the Vercelli mappamundi of ~1200 and the Mercator map of 1569. Though in many ways it still exemplifies the features indicative of medieval maps, the Catalan Atlas incorporates new knowledge from Marco Polo and his travels to Asia², and is therefore a more accurate representation of geographical knowledge of certain parts of the world at the time (Lester, 2009, 98). Along with the more accurately depicted physical geographic features, the Catalan Atlas features expanded knowledge of the economic, political, and religious landscapes of the East. For example, trade routes, sites of raw materials and resources, and dynasties in the Near East and North Africa are shown on the map (Thrower, 1996, 56). The first two leaves of the Atlas include text concerned with cosmography and the beginnings of the world—in this way, the Catalan Atlas serves as an

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² Marco Polo was a Venetian merchant and explorer who traveled from Europe to Asia in 1271-95 and remained in China for 17 of those years. He wrote Il milione, which is a travel journal detailing his adventure. See the Encyclopedia Britannica entry on Marco Polo for more information.
example of the transition from the medieval mappamundae, which are rich in iconography and Christian symbolism, to the more geographically accurate maps of the Renaissance period. Whereas the medieval mappamundae portrayed a Christian worldview centered on Jerusalem, the Renaissance maps shifted to the completely humanistic worldview.

The Mercator map of 1569 is a particularly striking example of how culture and politics influence mapmakers and how maps serve to reify and cultivate stereotypes through their projections of the world. Its projection of the world is significantly different from that of the medieval maps. The Mercator projection was the first cylindrical conformal projection, which means that the rhumb lines on the Mercator map are straight, but the size of features on the map become larger as the latitude increases (Brotton, 252). North America is a huge land mass. South America is shown with its southwestern coast jutting out—differing starkly from its elongated form in previous maps. Europe appears twice its true area, and Africa is reduced in size. Southeast Asia is also smaller than was previously depicted (Brotton, 247). The polar regions on the map encompass the entire length of the upper and lower edges of the map. The four qualities of spatial relationship are direction, distance, area, and shape, and due to Mercator’s focus on creating an accurate navigational map, he had to sacrifice displaying the correct proportions for each continent (Van Riper, 1962, 31). The disproportion that resulted unintentionally amplified stereotypes about Africa’s being the ‘third-world’ and Europe’s being the more developed and sophisticated continent (Brotton, 391-392). Due to the conformal projection and the placement of Europe at the center of the world, the landmasses extending out from Europe are significantly distorted in a way that has the ulterior purpose of enforcing the European sense of superiority.
In the years following these early maps, ships became satellites. With such tools of exploration as Google Earth, the breadth of our knowledge of the world around us grew exponentially. The process of digitally mapping the world first took root with the invention of the Global Positioning System (GPS). Through a collection of satellite signals, GPS technology is able to essentially map one’s position in space. Google Earth uses similar technology, allowing us to view satellite imagery, maps, and buildings. Though satellite mapping through tools such as Google Earth claims to be technologically accurate, it still possesses limitations in terms of presentation of spatial relativity. Military sites and areas that are high-priority appear blurry on Google Earth. Furthermore, border disputes reveal power relationships in Google Earth. For example, in Syria a major highway was shown to have both the name given to it under the ruling regime and the name used by the opposition (Lynch, 2012). Complete knowledge of the world is still subject to relativity, allowing room for the mapmaker’s interpretation.

Google Earth is the leading provider of online mapping (Brotton, 434). It allows viewers to interact with the Earth much more than any paper map or atlas can provide. Google Maps has essentially redefined mapmaking, allowing users to interact with the world more freely than in the past. Anyone can potentially see the Earth without the subjective bias of the cartographer. However, the quality of the data received by Google from satellite providers is almost impossible to evaluate and the details of its code are confidential (Brotton, 432). A concept that has surfaced in current literature about Google Earth is the notion of “me-mapping” (Garfield, 2013, 429). Me-mapping is the idea that when we visit Google Earth to look at the world, we tend to begin by looking up our own address and then viewing the world from the perspective of our hometown. The idea of placing your native land at the center of the world is not new—this
concept is seen in all three of the other maps under analysis. Thus, this concept of “me-mapping” is the fourth criteria of my analysis.

Each of the maps that I analyze is an image of—and a set of beliefs about—the world. Each map is inherently tied to the time and place in which it was made. By analyzing maps throughout history from varying origins, one can begin to draw links between these maps and come to substantive conclusions about the world that we live in and the way that we view our surroundings. Upon reflection, we can make inferences about how historical maps confirmed certain biases about different cultures and how they served to impose particular views of the world upon their audiences. We can see how power influenced the maps that were made and how majority views were continually propagated and expanded upon throughout history. The shape of the world has been defined and drawn by others in the past. One is led to beg the question, “Can a map ever become truly objective, creating a true portrait of the world?” We have come close to reaching this ideal with geospatial technology, but there are still areas in which the world is misrepresented. Ultimately, one should take a critical cartographic view of maps, understanding the fact that they are not solely scientific, absolute representations of the world. Imbedded within their images, maps hold the inherent biases of their creators; biases which are capable of shaping our own worldviews for better or for worse.
CHAPTER 2: REVIEW OF LITERATURE—EXPLORING MAPS

The representation of the unknown in the cartographic context and the issue of how maps shape cultural concepts of the world are particularly pertinent in our current time—a time in which maps pervade every aspect of society. From GPS to mind mapping, we rely on maps to organize our thoughts and guide us on our adventures.

Space, Place, and the Unknown

How does one ontologically make sense of the world? The visual image of the map is one way—it provides a means of locating and understanding the self in relation to its surroundings. To satisfy humanity’s instinct to understand locations in relationship to other locations around the world, one would suspect that only known areas of the world would be presented on maps—this would provide a defined spatial plane on which to situate oneself. Nevertheless, this is not the case—maps, from as far back as the 6th century B.C. represent both known and unknown areas. To understand the need for representing the unknown on maps, one must differentiate between space and place. In Space and Place: The Perspective of Experience, Yi-Fu Tuan differentiates between space and place with the simple statement, “Place is security, space is freedom” (Tuan, 2001,1). Tuan points out that man is not just an object in the world, but that he in fact inhabits the world, commanding and creating it; after all, world comes from the root word “wer” meaning man. It is only when man feels entirely familiar with space that it becomes place (Tuan, 73). Place is established over time, while space is present inherently. Tuan also reinforces the idea that society has a strong influence on the development of spatial skills that in turn translate into the symbolic language of maps (Tuan, 76). The unknown is essentially “space” that has not become familiar enough to be displayed as a “place” on the map. Displaying both the familiar places and the unknown spaces on maps is crucial to creating a
satisfactory understanding of the world. The representation and means of filling “unknown space” changed over time as knowledge of the world evolved.

The creation and filling of “space” on maps is a process that Francesco Relaño touches upon in *The Shaping of Africa*. Relaño speaks of the *ecumene*, a medieval term used to describe the limited area of inhabitable space, or known world (Relaño, 2002, 185). According to Relaño, Africa was not even conceptualized as an integrated, continental body until the Renaissance, when explorers rounding the Cape of Good Hope plotted the coastline of a new space open to exploration and knowledge—the African continent. Though the recent discovery of Ptolemy’s fourteenth-century map of Africa shows topographical detail of the Southern African coast, before the Renaissance the inner parts of Africa were still essentially unknown and the cosmographers of the period felt it necessary to fill in the “vacuum” created (Relaño, 185). The “vacuum” that unknown space creates on maps requires the mapmaker to fill in the space some way.

The unknown is an uncomfortable topic for humans—to seek knowledge is one of the purposes of our existence and the placement of –un in front of such a valued idea as the “known” is particularly unsettling. In *On the Map: A Mind Expanding Exploration of the Way the World Looks*, Simon Garfield writes, “Blanks on maps make it look like vital information is absent. So we put in something to hide our shame: very big curving country names (M-E-X-I-C-A-N-A), chunks of text about unusual flora of a country, a proud message from the mapmaker about his new projection” (Garfield, 2013, 72). The cartographer’s representation of the unknown primarily depends on the purpose of the map. For medieval mapmakers, maps were used as teaching tools, and the unknown was represented through iconography. For navigationally focused maps the unknown was represented in various ways: with stories from explorers, as in
the Catalan Atlas; with text or designs, as in the Mercator map; or simply with terrestrial areas less-densely populated with data, as in Google Earth. As Relaño emphasizes, “A map reflects above all the public to whom it was addressed and the mentality of the period in which it was made” (185). Maps reflect the public whom they address, but they also construct the public’s mindset about the world, especially through their representation of the unknown.

Explorers who circumnavigated the coast of Africa gave mapmakers borders by which to define a new body of land. Borders, both natural and man-made, can be an effective means of turning space into place. In “The Outside Within: Medieval Chester and North Wales as a Social Space,” Helen Fulton writes, “Borders themselves, whether physical or representational are semiotic constructs whose authority of meaning rests solely upon a hegemonic consensus regarding the status of the places on each side of the border” (Fulton, 2011, 151). Borders can create the sense that one place is “inside” and the other “outside” the boundary. Drawing boundaries subverts hegemonic control over the area considered in the domain of a certain regime (Fulton, 151). Historically, boundaries and borders were drawn on maps, even before the area was fully explored. During the imperialist era, the inner areas of Africa were divvied up between the European nations with little respect to the natural landscape or the peoples living there—yet, these are the borders that remained. Place was socially constructed and the unknown was given value. Today, border disputes resulting from civil wars can leave mapmakers to make political judgments about where a boundary should exist. Though interactive maps may give more agency to viewers today, one still needs to remember that maps like Google Earth are controlled by companies which could be imposing political opinions onto their products.
Critical Cartography

Viewing world maps as political mouthpieces instead of unbiased, scientifically accurate depictions of the Earth is a fairly new concept. The field born from the mindset of a map as a mouthpiece came to be known as “critical cartography,” and it began with the posthumous publication in 2001 of famed scholar J.B. Harley’s series of essays entitled *The New Nature of Maps*. Critical cartography seeks to provide a careful analysis of maps and to identify attributes of maps that are taken for granted; specifically, critical cartography links geographic information with power (Crampton & Krieger, 2006). My analysis will specifically draw upon theories established in critical cartography as well as philosophical views of the idea of space and place—ultimately seeking to draw connections and conclusions as to how maps essentially *create* our view of the world that we live in, not just *represent* it.

In *The New Nature of Maps*, Harley outlines the idea of viewing maps as “controlled fiction,” claiming that cartography is a tool that is used to reify power and reinforce the status quo (Harley & Laxton, 102). In doing so, Harley makes an argument contrary to the positivist theory preceding his work (Casti, 2015, 9). As Casti points out in *Reflexive Cartography: A new Perspective in Mapping*, three chronological critical approaches derived from the notion of critical analysis of maps: the object-based approach, the deconstructive approach, and the semiotic approach. The object-based approach—the first to veer away from the positivist theory—called for the exact representation of spatial objects as single entities; the main hindrance to this theory was limitation of modeling topological relationships between parts of a set of spatial objects. The subsequent deconstructive approach focused on viewing maps within a social context. The semiotic approach focused on map symbolism and theoretical advances in cartography (Casti, 9). Harley’s commentary supports the newest theory of cartography based

3 The positivist theory is a theory based on the idea that maps are reliable constructions of fact.
on the iconological and semiotic theory of the nature of maps. The interest of maps is not shown to lie in its mimetic value but instead as “simulacra which exert a profound influence upon the way space is conceptualized and organized within different societies” (Harley, questionnaire, November 25, 1991). Harley’s notion of maps influencing space is a springboard for my study of specific maps throughout history and the way that they serve to reify the conception of space that was held by their makers. Though, in my research I go a step further to look specifically at unknown space—areas that are thought to exist, but have not yet been explored. For each of the maps I analyze, I consider the cartographer’s representation and reasoning behind including unknown areas on maps.

At the end of his collection, Harley asks whether there can ever be an ethically informed cartography, what the motives of cartographers are when they make their maps, how map production and observation are related in cartography and GIS⁴, and how specific ways of mapping influence people’s thoughts and actions when it comes to social issues (Harley & Laxton, 205). Applying these thoughts to modern-day mapping, the question regarding the motives of the cartographer takes on a new meaning. Essentially, every person today has the power to be a cartographer, creating our own maps that center around ourselves using devices such as Google Earth. Whereas in the past, a map was fixed in time and place according to the cartographer’s design, Google Earth’s two-dimensional image of the world is now a malleable, interactive tool that allows the viewer the power to view it as he or she chooses. Google still owns the technology, though, which implies potential company biases; data discrepancies also exist between cities across the globe, a topic that is explored thoroughly in my analysis.

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⁴ GIS stands for Geographic Information System and is a system that can be used to present spatial or geographical data.
Maps are influential tools that shape cultural conceptions of the world and can play various roles, from contest to stratagem. In *Drawing the Line: Tales of Maps and Cartocontroversy*, Mark Monmonier focuses on the map’s manipulative capabilities by stating “The process of mapmaking requires cartographers to limit content in order to create a readable map and so allows them to manipulate their audience with the information they choose to include. This combination of power and subjectivity has repeatedly put maps at the center of controversy” (Monmonier, 1995, 1). Monmonier primarily reviews maps as political tools, but I will be focusing on his later statement of intent—to examine maps in the form of contests, prizes, or stratagems with the contest serving to “influence beliefs, values, or self-esteem” (Monmonier, 2).

Maps are reflections of culture and civilization—a viewpoint that Thrower supports in *Maps and Man*. He states, “a sensitive indicator of the changing thought of man, and few of his works seem to be such an excellent mirror of culture and civilization” (Thrower, 1972, 1).

Though maps do reflect cultural conceptions of the world at the time in which they are created, I assert that maps shape societal views in addition to reflecting them. The Vercelli map, Catalan Atlas, Mercator map, and Google Earth, all mirror and influence the cultures that created them—each of these maps shows emblems of the time of their creations, such as the biblical presence in the Vercelli map and the global awareness feature in Google Earth. Each map also shapes societal views of the world, a fact most clearly displayed through the continued use of the Mercator projection for classroom teaching maps despite its unsatisfactory distortions. Once maps have been instituted in society and curriculum, they become part of daily life and often go unquestioned. Yet, one must be taught to be critical of the information about the world obtained through the form of maps; knowledge of the limitations and distortions inherent in mapping is a critical understanding for viewers. Our lives and our understanding of the world depend upon
Google Earth is introduced as a political tool inspiring action in Joshua Ewalt’s “Mapping Injustice: The World is Witness, Place-Framing, and the Politics of Viewing on Google Earth.” Ewalt outlines how place can be used as a means of social change, primarily through interactive maps on Google Earth. Ewalt argues that Google Earth “frames place as one of embedded injustice, which promotes solutions based on global entrance into place, and constructs the Google Earth user as a witnessing outsider” (Ewalt, 2011, 347). Ewalt’s essay is particularly interesting because it introduces the idea that Google Earth’s interactive maps, which have been created by the United States Holocaust Memorial Museum, Greenpeace, and the World Wildlife Fund, display imagery, narratives, and videos that can become associated with geographies in order to “map spaces of oppression and resistance” (Ewalt, 2011, 333-354). Interactive mapping on Google Earth is considered a rhetoric that establishes place and displays it in a way that motivates action from its users. Ewalt eloquently describes the problem of Google Earth’s “Global Awareness” feature by stating,

One should be critical of the association of injustice to physical features of the landscape as this constructs the presumption that injustice naturally occurs in Africa, which may reinforce colonial assumptions…. The Google Earth-using subject [becomes] the very globally focused courageous Western hero who needs to enter local place and assist action (Ewalt, 333-354).

In other words, Google Earth is being used in this context as a way to enlist the viewer as a witness to the injustice occurring in other areas of the world; however, this injustice is presented through the eyes of a Western worldview. Through my analysis of Google Earth, I analyze the presentation of ‘unknown’ social issues in non-Western parts of the world through the medium of maps.
Map History

The Vercelli map is a mappamundi, meaning world map in Latin. In The Hereford World Map: Medieval World Maps and Their Context, the Vercelli map is viewed in the context of other medieval maps of the period. For instance, in the essay “Defining Mappaemundi,” Alessandro Scafi refers to the presence of Earthly Paradise as one of the defining features of the mappamundi. In reference to Earthly Paradise, he writes,

> The representation of Paradise refers us back to the very structure of the mappamundi. It describes the first event of human history. It was known not to be part of the human world, so was marked on the map in ways that underlined its contiguity rather than any spatial specification, still less a precise location. The mapping of a Paradise, neighboring but inaccessible from the inhabited earth, presented no contradiction to medieval scholars so long as geographical space was framed within a well-defined temporal structure and was not conceived of as an abstract, autonomous, and infinite container (Scafi, 351).

The representation of Paradise in reference to the physical world is one instance in which an unknown location is portrayed on the Earth. Other areas, such as the lands in the region now know to be Africa, are replete with mythical creatures such as the “ostrich with a horseshoe on its beak” (Harvey, 2006, 158). Because these areas were not yet explored, the mapmakers of the time represented them as the lands in which mythical creatures dwelled, giving the lands purpose. Unknown lands were represented in very specific ways on the Vercelli mappamundi—a topic that is worthy of further exploration.

Any thorough analysis of maps would be remiss without mention of the Mercator projection. Because the Mercator map is so famous, there is a wealth of knowledge on this map and its impact on society. In The Mapmakers, John Noble Wilford writes of how the expanse of North America was just beginning to be appreciated when the Mercator map was created, but the interior was still unknown. According to Wilford, Mercator “chose the North American interior as a conveniently blank space for a decorative cartouche” (Wilford, 2001, 75). I use this idea
about how Mercator represented the interior of North America to add to my analysis of the representation of the unknown in the Mercator map.

The Mercator projection is a type of map termed “conformal.” Conformal maps preserve the shapes of small parts of the mapped surface, though they do not preserve the shape of large countries or continents (Wilford, 77). Thus, though serving its original purpose as a navigational tool that would allow straight rhumb lines instead of curved, the Mercator map is distorted when viewed as a representation of the world. It shows Greenland as nine times larger than South America, even though Greenland is in actuality no larger than Mexico (Wilford, 1988). Despite its accuracy for use in navigation, the Mercator projection reinforces stereotypes about the West being the center of the world and everything below Europe being the “Global South.”

My final map study is Google Earth. In terms of Google Earth, new questions about the role of mapping and its ability to facilitate social change are pertinent. With the accessibility of satellite imagery the world is essentially “at your fingertips”; no place is left unmapped. Nevertheless, at the present moment Google Earth is not “real-time” and does not depict the moment-by-moment changes in the scenery of the Earth—in fact, the average age of the images featured is between six months to five years (Kamadjeu, 2009). Taking into account the perennial changes in both human and nature-made landscapes, there is still a sense of unknown when viewing Google Earth. Furthermore, who is to say that the images of the world through the form of Google Earth are not inherently biased, as in historical maps? The literature surrounding Google Earth raises fascinating questions about the future of cartography. Google Earth has allowed the world to be viewed in a revolutionary new way. As mentioned in *On the Map*, Google Earth represents a new form of cartography termed “Me-Mapping” which is “the placing of the user at the instant center of everything” (Garfield, 429). The world of Google
Earth is not centered on a set point, but instead is an attempt to represent the world in the form that each viewer seeks to see it.

In *A History of the World in 12 Maps*, Jerry Brotton reaffirms the point that Google Earth is universally participatory. He states, “It seems that anywhere on the earth can potentially now be seen and mapped by anyone online, without the inevitable subjective bias and prejudice of the cartographer” (Brotton, 407). However, Brotton then goes on to say that Google Earth has essentially created a monopoly on the mapping business, keeping the access to geospatial knowledge for its own profit. With the greatest wealth of data that we currently have about the world being owned by one company, who is to say that maps may not still be the tools of capitalist oppression. The world, as Brotton notes in his conclusion, “cannot be represented. There is simply no such thing as an accurate map of the world and there never will be. The paradox is that we can never know the world without a map nor definitively represent it with one” (Brotton, 445). The representation of the world through Google Earth is a valuable subject to explore, especially given its relevance today. I look to draw upon literature on Google Earth in order to come to new conclusions about its means of representing the world. Maps are a microcosm of the ultimate problem of representing reality—representations are always just small pieces of reality and the decision of what to represent and what to leave out is never a straightforward choice. Furthermore, this decision has profound implications on the way in which we come to understand the world.
Map 1: The Vercelli Mappamundi
Map 3: The Mercator Map of 1569
Map 4: Google Earth
CHAPTER 3: METHODS—THE ANALYSIS OF MAPS

Depicting the world in a two-dimensional format is a formidable undertaking, just as is analyzing the maps that are made as a result. In my analysis I use the primary documents of the Vercelli map, the Catalan Atlas, the Mercator map, and Google Earth as well as several secondary documents to draw conclusions about how and why maps represent unknown space, how they serve to reify certain political and social conceptions of the world, and how they in turn serve to shape our worldview. The key point of this study is to create links between maps throughout history by analyzing the ways in which they represent unknown space and how they portray and shape worldviews. I apply three critical cartographic criteria—worldview, politics of viewing, and space, place, and the unknown—to each of the maps under analysis. I then conclude with a broader review of these three criteria to make claims about the relevance of maps as tools for shaping the mind’s eye, reflections of society, and lenses by which to make sense of unknown areas.

I analyze the Vercelli mappamundi, the Catalan Atlas, the Mercator map, and Google Earth to examine how the unknown is represented—how did the medieval mapmakers in Europe represent non-European territories? How did the views of the previously un-explored Asia change after Marco Polo’s explorations and how did depictions of this area on maps change? In Google Earth, are less developed areas represented with less detail? I then draw upon the meaning behind the maps in order to present how each one represents the society of its respective period—specifically, cultural history will be referenced to draw links between historical events and the maps being made at the time. For instance, religion during the medieval period played an enormous role in society—how did this affect the way in which maps presented the world? In this analysis, new light is shed on the limitations of maps, the way in which cartographers
represent these limitations, and the way in which a map’s presentation can serve to influence cultural conceptions of the world.

In each of these case studies, I draw upon the overarching ideas that are laid out in the works of J.B. Harley and Yi-Fu Tuan. In *The New Nature of Maps: Essays in the History of Cartography*, Harley discusses how maps can become tools of power that serve to shape cultural conceptions of the world and reinforce the status quo. This idea is also supported in Denis Wood’s *The Power of Maps* and Mark Monmonier’s *Drawing the Line: Tales of Maps and Cartocontroversy*. These works, as bases of critical cartography, are the foundation that I build upon using the specific cartographic examples that I have chosen. The key points that critical cartography seeks to remark upon are the social, political, and ethical aspects of mapping. Ultimately, the three criteria I explore for each map are its worldview, its propaganda, or the political positions it subverts, and its difference in representation of unknown versus known spaces. Each of these criteria touches upon the core values of critical cartography, thereby creating a framework by which each map can be analyzed.

In my analysis of the representation of the unknown in each of the chosen maps, I draw upon literature surrounding the idea of space, place, and time in the cartographic representation of the world. The leading literature on the notion of space and place that is consulted is *Space and Place: The Perspective of Experience* by Yi-Fu Tuan. The connection between space place and time also resurfaces in other cartographic literature such as William Washburn’s *The Representations of unknown lands in XVI- XV- and XVI-century cartography* and Alfred Hiatt’s *Blank Spaces on the Earth*. In order to make value judgments on the unknown, it is imperative to understand the known world at the time of the map’s creation. Thus, the historical setting for each map is also referenced.
The analysis begins with the Vercelli mappamundi and proceeds chronologically. The primary source that I use is the incorporation of my own experience with the Vercelli Mappamundi in order to gain insight into the map’s meaning. As a member of the Lazarus project team, I digitally imaged the Vercelli Mappamundi and saw the document first-hand. I also received a copy of the most comprehensive source written about the Vercelli Mappamundi by C.F. Capello, *II mappamondo medioevale di Vercelli (1191-1218?)* and draw upon this work to understand the layout and meaning of the figures presented on the map. I critically view our high-resolution multispectral images of the Vercelli mappamundi in order to study the areas that had not yet been explored. I examine in detail the figures and text presented on the map to gain insight into the cultural conceptions of the world in Italy during the thirteenth century.

I also consult several secondary sources in my analysis of the Vercelli mappamundi. “Jerusalem on medieval mappaemundi: a site both historical and eschatological” by Anna-Dorothee von den Brincken and “Animals and the Symbolic in Medieval Art and Literature” by Margriet Hoogvliet are referenced in the analysis of the Vercelli map as a cultural mirror, or in this case a reflection of the religious atmosphere that pervaded the time period. Hoogvliet’s and von den Brincken’s works mention the Vercelli map in terms of its place within history as a medieval mappamundi, and also add more detailed descriptions of its iconography and text. These documents add depth to the discussion of the cultural implications of the Vercelli map. *The Shaping of Africa: Cosmographic Discourse and Cartographic Science in Late Medieval and Early Modern Europe* by Franscesco Relaño, as described in detail earlier, discusses the way in which Africa was represented in the medieval period before its geographical details were known. This work is tied into the way in which space and place is represented in the two-dimensional format. I use the source *Mapping the Medieval City: Space, Place and Identity in*
Chester C.1200-1600 by Catherine Clarke in order to discuss the unknown areas on the Vercelli map as well as how these areas were mapped in a similar fashion in other medieval renditions of the world. I also draw upon Brotton’s *A History of the World in 12 Maps* and Garfield’s *On the Map: A Mind-Expanding Exploration of the Way the World Looks* to more adequately and substantially discuss the Vercelli map as a medieval map.

The original Catalan Atlas is currently held at the Bibliothèque Nationale de Paris; however, there is an excellent facsimile of the map, along with a commentary and translation in English, which can be referenced at the Library of Congress in Washington, D.C. This facsimile serves as my primary source for the analysis of the Catalan Atlas. In order to determine how the Catalan Atlas served to bridge the gap between the more “diagram-like” medieval maps and the more scientifically accurate maps that came in the Renaissance period, I use *Medieval Maps* by P.D.A. Harvey and *Maps and Civilization: Cartography in Culture and Society* by Norman J.W. Thrower. I describe the importance of the Catalan Atlas within its place in history, reflecting on its representation of the cultural conceptions of the world at the time—David AbuLafia provides an exceptional basis for my historical analysis in *A Mediterranean Emporium: The Catalan Kingdom of Majorca*. I also look at the areas that were considered the unknown during the period of the Catalan Atlas’ creation and also the areas that were considered to exist but had not yet been explored. I then draw a conclusion about how the representation of the unknown changed throughout the medieval period before I proceed to discuss the Mercator map.

The Mercator map analysis is primarily based on secondary sources with the exception of the primary source of the map itself. There is a wealth of information about the Mercator map. The ways in which the Mercator map influenced cultural conceptions of the world is explored in several of the secondary sources I reference, including John Noble Wilford’s *The Mapmakers*,...
Jerry Brotton’s *A History of the World in 12 Maps*, and William Washburn’s *Representation of unknown lands in XIV-, XV-, and XVI-century cartography*. The *Representation of unknown lands in XIV-, XV-, and XVI-century cartography* specifically touches on areas of the Mercator map that were unknown at the time and how they were represented. I draw upon these sources to analyze the Mercator map in light of my research question and to come to more overarching conclusions about the way in which the Mercator map shaped our worldview and the way in which unknown spaces were presented on the map.

Google Earth represents the modern day period of mapmaking. I draw upon several secondary sources such as Simon Garfield’s *On the Map: A Mind-Expanding Exploration of the Way the World Looks*, Jerry Brotton’s *A History of the World in 12 Maps*, and Joshua Ewalt’s “Mapping Injustice: The World Is Witness, Place-Framing, and the Politics of Viewing on Google Earth.” I reference three news articles, “Modern Explorers Seek a Place in a GPS World”, “Syrian Opposition Seeks to Wipe the Assad Name off the Map—via Google”, and “Israel Questions Google's Decision To Recognize Palestine” to display the relevance of mapping issues in today’s society. I also use the primary source of Google Earth Pro to exemplify my claims. I claim that Google Earth is a representation of the culture in the age of information. I also show how areas of the unknown are represented in this digitally created representation of the world.

Through the use of the aforementioned sources, I draw new connections between the Vercelli map, the Catalan Atlas, the Mercator map, and Google Earth in order to shed light upon the differing representations of the unknown on maps throughout history as well as the ways in which maps shape the world for their viewers.
CHAPTER 4: ANALYSIS—WHAT MAPS HAVE TO SAY

The focus of this research lies in the field of critical cartography and provides an analysis of how unknown and known spaces weave seamlessly together on map to shape worldviews. The representation of the world in a two-dimensional format is malleable. Just as a seal will set its form in wax, maps set the image of the world in the mind of the viewer. I support the notion of maps as change agents that mold our views of the world through their displays. With respect to the more philosophical ideas of space and place, maps throughout history have dealt with unknown space in various ways. Limitations in knowledge and areas yet to be explored vary considerably throughout history, and maps serve as fascinating glances at how different cultures address the unsettling notion of unknown lands.

The Vercelli Mappamundi

A thirteenth-century map of the world, the Vercelli mappamundi is housed in Vercelli, Italy and is an excellent representation of the medieval style of mapping because of its rich iconography and plethora of text.

Space, Place, and the Unknown

What is most fascinating about this map is the way in which the images and text not only serve to supplement the areas that are presented on the map but also visually represent these areas for the viewer. For example, Asia and Africa lack the presence of buildings and instead are represented as expansive areas with beast-like animals and geographical elements (von den Brincken, 2006, 368). In Africa, we see the familiar creatures of a leopard and lion on the prowl. An elephant with a turret on its back leads a caravan across the expanse labeled “India.”

Such a glimpse of the familiar is intermingled with the fantastical. On this same map, Ethiopia harbors a Cyclops and four-eyed human. Similarly, a unicorn-like figure follows on the
heels of the Indian elephant (Vercelli Map, ~1200). These figures of legends populate the unexplored areas of Africa and Asia in locations that Pliny the Elder suggested in his writings (Capello, 1976, 17). The frightening nature of these images indicates the discomfort that the Vercelli mapmaker and other cartographers of the time felt with regard to the unknown. The Vercelli mapmaker in turn formed value judgments surrounding images placed in unknown areas—the bestiary icons located in Asia and Africa visually display the European social understanding of these areas as savage (Capello, 1976, 17). The bestial creatures in Asia and Africa indicate the fear of the unknown and the semi-human creatures indicate the strangeness that medievalists associated with these areas.

The connection between time and space is oddly approached on the medieval mappamundi. With icons spanning from the Tower of Babel to Noah’s Ark, time seems to rest side-by-side with the objects on the map. Layers of different epochs in the unified field of the map allow the correlation of geographical description with historical exposition (Kupfer, 1994, 262). The map serves both to represent biblical history through its icons and to indicate the most current geographic knowledge of the world at the time in which it was made. The concept of space was also significantly altered to show not just a representation of landmasses and bodies of water, but also a perspective on the nature of the world and its relationship to its creator. On the Vercelli map, though Adam and Eve are absent, other biblical figures present mark distinct periods in history. The most noticeable figures that serve as landmarks in time are Noah’s Ark, the Tower of Babel, Mt. Sinai, and Abraham’s Camp (Galichian, 2007, 158).
Politics of viewing

Political implications are also seen in the presentation of the Western areas of the map. In the section depicting France, the crowned figure “riding” an ostrich with a horseshoe in its beak is shown bearing a whip. Debate is ongoing as to whether this image is one of King Philip II or King Philip III. Capello asserts that the weapon in the king’s hand proves his identity as the forceful and authoritative King Philip II—this furthers Capello’s hypothesis regarding the date of the map’s creation (120). However, King Philip III was the only king known to have traveled to Africa and was known as “the Bold” due to his abilities in combat and on horseback. The icon of the ostrich with a horseshoe in its beak appeared in Pliny the Elder’s writings and serves as a metaphor for hardiness and stoicism. The ostrich plume was an ancient symbol of justice, and the horseshoe represents the iron-stomach of the ostrich (Hoogvliet, 2006, 158). The ostrich’s features of hardiness and stoicism reflect upon King Philip, and when shown along with the whip in King Philip’s hand, portray the king as a forceful, relentless ruler. According to Capello, details of France, or La Gallia, were the most precise and realistic of all of the regions (Capello, 1976, 123). These details have since been damaged and are no longer visible.
The Vercelli mappamundi is also a testament to the overwhelming influence of the church on society during the medieval period. Locations such as Earthly Paradise and the Cities of the Plains and icons such as Noah’s Ark and Sodom and Gomorrah are placed in geographic locations on the map. The text imbedded in the area labeled “Earthly Paradise” describes the first event of human history (Capello, 1976, 119). Because it was perceived as apart from the human world, Paradise was marked on the map in ways that underscored its continuity with the present day but also lacked any specific spatial location (Scafi, 351). Not considered to be a contradiction to medieval scholars, Paradise was mapped as adjacent to but inaccessible from the inhabited earth. As long as geographical space was framed within a well-defined temporal structure and was not conceived of as an abstract, autonomous, and infinite mappamundi, the presence of Paradise did not pose a problem (Scafi, 351). On the Vercelli map, Paradise is located in the center at the top, next to India, and is represented by a cross in the middle of a square. In the description, it states that a wall of fire surrounds it and reaches up to the sky, preventing the access by any outsiders into this perfect world (Capello, 1976, 119). The traditional representation of Paradise with Adam and Eve placed near a tree is not present on the Vercelli map. Instead, the Vercelli map shows Paradise according to legend and explicitly calls
it “Parradisus Terrestris”, or “Earthly Paradise.” Paradise, though noted as being separate from the earthly world, is placed on the map in Asia, an area of the unknown.

Figure 3: Earthly Paradise on the Vercelli Mappamundi

On the Vercelli mappamundi, Jerusalem is situated near the center of the map. Placing Jerusalem near the center reinforced the theological perspective of the map—a perspective in which Jerusalem is the focus of the story of salvation and so the center of the world. Compared to other large cities such as Paris and Rome, Jerusalem is significantly larger (Vercelli Map, ~1200). Though Jerusalem is not a striking feature at first glance, it was clearly important to the author based on its placement and size on the map—a testament to the importance of religion during the medieval period.

Figure 4: Jerusalem on the Vercelli map
The medieval mappaemundi were not meant to show just the geographical placement and physical attributes of countries. Instead, maps were theological tools meant to teach religious stories and portray places as the mapmaker saw them (Jacob, 1996, 193). The maps were usually shown as a monolayer, presenting religious icons, mythological beings, and geographical landmarks all on one plane. The medieval mapmakers showed very little concern with representing geographical reality. Many scholars have come to refer to medieval maps as “diagrams”, a term which reifies the idea of the documents as simply transmitting basic information within the framework of a spatial representation (Harvey, 1991, 7-17).

Understanding the original intent of the map is vital to understanding why it is presented in a certain manner as well as how it functioned in society. With a Eurocentric and religious worldview, the Vercelli map served to reflect the dominance of the Catholic Church over all aspects of life and also to continue the thread of me-mapping that weaves itself seamlessly through the maps featured in this analysis.

**The Catalan Atlas**

The Catalan Atlas, which was created in 1375, displays many of the characteristics of medieval maps, but it also represents another level of knowledge about the world due to its inclusion of information from early explorers of the East, such as Marco Polo, Sir John Mandeville, and the early missionaries Cathay and Manzi (Lester, 2009, 98). As David Abu-Lafia has claimed, the cartographic evidence supports the theory that the Catalans, or more specifically the Majorcans, developed impressive navigational skills in the 13th and 14th century (AbuLafia, 1994, 204-208). As was the case with the Vercelli map, Jerusalem is placed in the central region on the Catalan Atlas, but not directly in the world’s center.
Space, Place, and the Unknown

Unlike the Vercelli map, the Catalan Atlas presents the non-European world with images that suggest a habitable place instead of a savage entity. Northern Africa is shown in more complete detail on the map due to the knowledge gained from the Majorcan Jews who travelled between Christian Europe and Muslim North Africa (Lester, 98). Stories from Marco Polo and other explorers of the East added substantial content to the areas of Asia and the Middle East on the map. For instance, the Atlas describes pearl fishers who would dive to the bottom of the sea in the Indian Ocean, reciting magic spells that were thought to frighten away large fish. They were said to supply pearls to the town of Baghdad—this knowledge, which was noted in Marco Polo’s journals, is found twice on the Catalan Atlas (Grosjean, 81). Eyewitness accounts from Marco Polo and other explorers of the period added definition to previously unknown areas such as Iraq.

Other areas that remained unknown at the time of the Catalan Atlas were displayed using iconography. For example, the Indian Ocean is said to have 7548 islands full of gold, silver, spices, and precious stone (Cresques, 1375). Though Marco Polo attributes these islands to the China Sea, they are still roughly the same number and in roughly the same areas as presented on the Catalan Atlas. What is interesting, though, is the fact that these islands are represented in an
elaborate, imaginative way. As it is written in Grosjean’s translation and commentary on the Catalan Atlas, “The imaginative painting of the islands in our Atlas is meant to suggest their wealth of wonderful things, and at the same time to cover up ignorance” (Grosjean, 92). Thus, just as in the Vercelli mappamundi, iconography was still being used to represent lack of knowledge. In a way, the known information was amplified on the Catalan Atlas in order to provide a semblance of greater knowledge about that area. Many of the less credible myths, such as the people who live on raw fish, drink seawater, and wear no clothing, were placed in the Far East on the Catalan Atlas (Grosjean, 92). The placement of people and mythical places in the unknown areas of the world is perpetuated in the Catalan Atlas. The Eurocentric worldview is also continued, serving to reify the self-mapping aspect of the Catalan Atlas. Though the Catalan Atlas contains more knowledge of the East, the European region is still the most heavily detailed and the most geographically developed.

Figure 6: The 7548 islands and the people who lived on raw fish and drank seawater
Politics of Viewing

The economic, political, and religious situation in the Near East and North Africa are also depicted on the Catalan Atlas. Specifically, the dynasties around the Mediterranean, the trade routes spreading across the East, and the sites of raw materials and resources are noted in these areas (Thrower, 1996, 56). The mapmaker was apparently enlightened by the writings of Marco Polo nearly one hundred years before the making of the Catalan Atlas. As a Portolan chart,5 The Catalan Atlas also exemplifies three main elements: orientation, geometry, and accuracy (Grosjean, 15-16). Given the knowledge of the world at the time of the Catalan Atlas’ creation, the accuracy is remarkable. However, what is surprising is the fact that such accuracy can come with an almost complete lack of borders between the territories—instead, iconography, such as miniature banners and coats of arms, is used to distinguish among different areas (See Figure 7: Cresques, 1375). With the lack of borders, the figures represented on the map take on new meaning, acting as the delineating features of the landscape. During the early medieval period, fixed state borders were not meaningful realities—precedence was given to political bonds instead of territorial ones (Sahlins, 1989, 28). Toward the end of the medieval period, the period during which the Catalan Atlas was created, porous frontiers were replaced by fixed border lines (Popescu, 2011, 34). It is interesting that the Catalan Atlas does not portray the world in terms of this new notion of defining spatial limits.

5 Portolan charts are maps created to portray the geographical landscape in the most accurate way possible.
Several areas are either misrepresented or misplaced on the Catalan Atlas, indicating the limitations of the cartographer’s knowledge of these areas. For example, the text on the map mentions that the Saracens visit the shrine of the Prophet of Mohammad in Mecca and that because they have seen something so magnificent, they later blind themselves in Mohammed’s honor (Cresques, 1375). According to Grosjean’s commentary on the Catalan Atlas, which is found accompanying the translation on the Catalan Atlas facsimile, this story of the Saracens is incorrect. The tomb of Mohammad is thought to be in Medina, not Mecca; furthermore, the fact that the pilgrims take out their eyes lacks historical support (Grosjean, 82). This misrepresented information propagated an inaccurate public perception of Muslim traditions. These inaccuracies were portrayed alongside accurate descriptions of Christian traditions, which were thereby reinforced in the minds of the public.

**Worldview**

Many religious events were depicted in the Far East portion of the map. The prisons in the story of Gog and Magog, which were thought to be found in the Caspian Mountains, are shown in the outskirts of Asia, to the north of China (Cresques, 1375). According to Grosjean’s
commentary on the Catalan Atlas, this is because the cartographer already knew the Caspian Sea fairly well and thus did not want to place a hypothetical event in its midst (Grosjean, 86). In the Far East, images of legendary Christian patriarch Prester John and the Three Magi\(^6\) can also be found (Cresques, 1375). The extension of scenes of religious events into areas of the unknown perpetuates the Vercelli map’s approach—to represent the Christian tradition upon the map, storied characters from the Bible were placed in the unexplored areas of the world. Interestingly, Earthly Paradise makes an appearance in the Catalan Atlas as well. It is found in Ethiopia near the area referencing Prester John (Relaño, 2004, 1-11). Despite the continued presence of religious figura, their placement on the Catalan Atlas reflects the greater knowledge that contemporary explorers carried with them back to Europe.

Though significantly more accurate than the Vercelli map, due to the knowledge gained from Marco Polo, Sir John Mandeville, and the Majorcan Jews, the Catalan Atlas still possesses a Christian image of the world and contains limitations in terms of its placement of some geographical features on the map. As with the Vercelli map, the worldview was still strongly dominated by religion; however, the Catalan Atlas marks the beginning of the transition into a more inquisitive, explorer-based worldview. It is a striking example of the relationship between the religious basis of the medieval world and the new curiosity with exploration and accurate geography that was to accompany the Renaissance.

**The Mercator Map**

The Mercator map’s intent was drastically different than that of the Vercelli map and Catalan Atlas. Gerard Mercator created his first world map in 1569 during a thriving Renaissance period of global discovery (Wilford, 89). With exploration at an all-time high and

\(^6\) Prester John was believed to be a descendant of the Three Magi.
the search for knowledge as the priority, voyages of discovery provided new information regarding areas that had previously only been the subject of speculation. The Mercator map falls into the category of maps called “conformal” due to its ability to preserve the shapes of small parts of the mapped surface, but not the shape of a large country or continent (Wilford, 77). Borders of Africa and Asia were more precisely defined and rendered maps of the period drastically more accurate than any maps preceding the Renaissance. Mercator references the findings of explorers Marco Polo, Vasco de Gama, Christopher Columbus, and Ferdinand Magellan (Brotton, 248). Furthermore, Asia and North America were distinguished on Mercator’s world map—a first for the era.

*Space Place and the Unknown*

The way in which Mercator portrayed unknown areas is also fascinating. As mentioned, he placed the caption explaining the map in the interior of North America, thus masking the gaping hole of knowledge surrounding this unexplored continent. Mercator also distinguishes between known and unknown borders on the map. The known lands on Mercator’s map are outlined with a solid line, while the unknown areas have no definite outline but are instead created with short parallel lines (Washburn, 1969, 7). What is fascinating is that the land of *Terra Australis*, or *Magellanicum*, which is found bordering the southern edge of the map, is shown with a solid line indicating that it is known. The understanding of *Terra Australis* stemmed from Greek scholars’ theory that the continent covered the entire polar region and extended almost as far north as the tips of South America and Africa (Wilford, 90). As Mercator notes in the legend, the existence of the Antarctic lands was certain despite the fact that their limits and extents were not yet confirmed (Mercator map, 1569). On the other hand, the land areas at the North Pole are shown outlined in dashed line insignia, indicated a lack of knowledge
surrounding its borders (See Figure 8 below). Although the borders of Africa and Asia are built upon information from explorers of the period, Mercator still references Pliny’s “Samogeds, that is the people who devour each other,” “Perosite, with narrow mouths, who live on the odour of roast flesh,” and “men who unearth the gold of ants” (Brotton, 248). Therefore, Mercator still made reference to classical and medieval authorities despite his concentration on accurate navigational geography.

It is interesting to note at this point the distinction between considering unknown areas as areas known to exist and yet unexplored as opposed to areas that were hypothetical places. As Hiatt noted in “Blank Spaces on Earth,” there was a change in mentality between the medieval period and the Renaissance. More and more “blank spaces” that were formerly hypothetical became tangible places that humans were capable of exploring (Hiatt, 2002, 223-250). The relationship between mankind and the surrounding world was utterly changed as a result. As Brotton stated, “Even Ptolemy said any world map must make decisions about what it includes and what it leaves out. Some of those can be sinister decisions, but more often they’re simply practical ones. Do you need to show the North and South Poles if you don’t think you’ll ever go there? Probably not” (Brotton, 2012). During the Renaissance, the scope of habitable areas increased dramatically, allowing more room for exploration and adventure.

While each of these aspects was a notable improvement on the cartographic display, Mercator’s map is best known for its projection. Mercator realized that navigators were in need of a map portraying rhumb lines instead of charts based on portolan principles. His chart accurately displays rhumb lines in such a way that a straight, accurate course can be plotted on the map. The lines of latitude run parallel to the equator, while the lines of longitude and the lines of latitude intersect each other at right angles (Wilford, 90). Through this model, Mercator
was able to translate the round Earth onto the plane surface of a map so that navigators could have a simple, reliable image of the Earth on which to plot straight-line courses to distant lands.

Nevertheless, due to limitations that inevitably arise when attempting to represent a three-dimensional object onto a flat plane, Mercator’s map does have significant distortions. The area surrounding the equator in Mercator’s projection is completely true to scale, however at the 30th parallel there is a scale increase of fifteen percent (Wilford, 91). As one moves north and south on the map, the “Greenland problem” occurs and the countries look significantly larger than they actually are (Wilford, 91). As a result, the entire map does not have one set scale. This at first hindered navigators; a key was then formed to convert chart measurements to nautical miles. The North Pole cannot even be shown in its location on the map and appears as an offset.

Politics of Viewing

The projection done by Mercator also had particularly strong implications on society. Mercator showed a more realistic map length for the Mediterranean, changing Ptolemy’s 62° length to 52° (Thrower, 1996, 76). The west coasts of South and Central America were closer to their defined shapes. Though the interior of North America was still left unexplored, the width of the continent was closer to the actual size than it had ever before been geographically displayed. The outline of Asia was also significantly better defined than was previously seen (Wilford, 75). Mercator used the interior of North America to present a decorative flourish along with text describing how his map was the “New and Improved Description of the Lands of the World, amended and intended for the Use of Navigators” (Mercator Map, 1569). Elaborate embellishments and explanatory text were used in place of mythical creatures and biblical icons.
The limitations of the Mercator map, as mentioned above, served to shape societal views of the world. Due to the popularity that grew around this particular map projection, it became the standard way of portraying the world (Brotton, 220) (See Figure 9). The original purpose of Mercator’s world map was navigation, so in repurposing the map as a standard view of the world for teaching purposes, the limitations in accuracy of size and scale were problematic. Former State Department geographer S. Whitmore Boggs once said, “no man ever saw or will ever see a world that has much resemblance to the Mercator map, and the misconceptions it has engendered have done infinite harm” (Monmonier, 21). Unfortunately, humanity’s image of world geography became founded on Mercator’s projection, which shows Greenland as roughly the same size as Africa. In actuality, Africa’s area is 30.22 million km² and Greenland’s area is a mere 2.166 million km².
The Mercator controversy was the source of a new projection in the late 1900s called the Peters projection. The Peters map sought to remedy the Mercator projection’s “Eurocentric” bias and its supposed “colonialist and racist mentality” (Monmonier, 18). The Mercator projection does in fact show the more industrialized North larger than the Global South. Greenland is larger than China, which is a country that is in actuality more than four times the size of Greenland (Brotton, 391). Africa is also shown as a significantly smaller continent than it is in actuality. The reason that Mercator’s map shows the world in such a manner is due to the fact that his original intent was to display the world accurately for those who sought to navigate it; furthermore, land-surrounding Europe was the area easily explored and therefore the area that was more accurately defined. Since Mercator was creating the map in Europe, he portrayed the world in a Eurocentric view, which relates to the concept of “me-mapping.” During the period in which Mercator’s map was created, exploration of Africa and Asia was a new experience, and
the size of these continents was not definitively known. Mercator’s map was never intended to
give an accurate view of the world for teaching purposes.

The distortions on both the Peter’s projection and Mercator map once again hearken back
to the fact that presenting a three-dimensional object such as the Earth in a two–dimensional
scale will result in the loss of accuracy in one form or another. As John Pickles states and
Monmonier quotes in *Drawing the Line*, “Cartography shares and reproduces the values of the
age. . . . Although cartography might be useful in promoting different, more egalitarian views of
the world, maps themselves are more adept at reflecting existing images of the world than in
forming or reshaping those images” (42). Although Peter’s projection had ambitious intentions,
it was still replete with flaws itself and primarily served only to shed light upon the fact that no
rectangular map is going to show a complete and accurate picture of the world if it is forced to be
confined to two-dimensional space. The Mercator map, through its distortions of the world,
portrays a secular, Eurocentric worldview based upon accuracy in the nautical realm. The power
of the European empire during the period of imperialism is furthered through the Eurocentric
worldview and disproportion between the northern and southern hemispheres. Finally, in terms
of unknown space, the Mercator map represents the shift from iconography to text in order fill in
and represent unknown space.

**Google Earth**

Shifting away from medieval and renaissance mapping, Google Earth is a tool built for
portraying the globe in its entirety and is a natural extension of cartography given the
 technological capabilities of the world today. Its display of the world in a more interactive
format, with the illusion of three dimensional space, allows the viewer to gather a more accurate
depiction of the spatial locations of various places in the world as well as how countries
relationally compare to one another. The ability to zoom in and out and the incorporation of satellite imagery provides accurate photos of the areas which are portrayed and allows the viewer to come away from the map with a better perspective of not only spatial locations but also localized images of places around the world.

Worldview

Google Earth is particularly representative of modern culture and also serves to shape cultural conceptions of the world. In the world today, technology and Internet availability are vital commodities. The extension of mapping into this realm is a necessary step to continue the quest for knowledge and awareness of the world. The current generation is socially conscious while continuing to have an interest in discovering self. With the creation of such things as the “selfie,”7 individuals are craving a better understanding of self in society—the “selfie” grants and signifies human agency just as Google Earth permits the viewer to choose the central origin of location. As Garfield describes in On the Map, the process of “Me-Mapping” allows the user of Google Earth to stand at the center of everything (429). The individual is able to locate exactly where he or she is in relation to other areas of the world and in turn is able to form a more personalized worldview. Throughout history cartographers have placed the self at the center of the world, but Google Earth introduces a new-age flexibility to mapping and has given this capability to all people regardless of their cartographical skills.

The current generation is also becoming increasingly aware of social inequalities in the world. A growing support for humanitarian aid awareness among the younger generation is also reflected in Google Earth. There is an option on the Google Earth application menu in which one can select “Global Awareness” (Google Earth, 2013). Once this feature is activated, icons

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7 According to Oxford Dictionaries, a “selfie” is defined as “a photograph that one has taken of oneself, typically one taken with a smartphone or webcam and shared via social media.”
illustrate areas on the map where humanitarian aid groups are based. One can click on each icon to discover more information about each cause. The practice of spreading awareness of humanitarian aid efforts in such a manner is particularly effective due to the notion of proximity that it evokes in the viewer. Though the humanitarian aid efforts may be happening on the other side of the Earth, the ability to view photos and information about the efforts in relation to a map that also shows one’s own location gives the viewer a stronger emotional connection to the cause. The use of Google Earth as a tool to raise social awareness allows one to “map spaces of oppression and resistance” while being subtly drawn into a call to action (Ewalt, 333-54).

Though Google Earth makes no overt mention of colonialism, capitalism, or global politics in Africa within these interactive maps, an inherent political viewpoint is present in these maps and subsequently imposes a colonialist mindset on the viewer. Because of the way the map embeds information about social injustices into the spatial fabric of the African continent, the colonial perspective that injustice is natural to the African space is reified in the viewer’s mind. Google Earth is acting under the assumption that viewers of the map do not know about the injustice in Africa; it does not show the inequality and social disparities in parts of the Western world, such as the Mississippi Delta.

The practice of tying images and physical features to such broad, philosophical notions as injustice links these notions to physical locations in the mind of the viewer. As Joshua Ewalt states, “The Google Earth-using subject [becomes] the very globally focused courageous Western hero who needs to enter local place and assist action” (Ewalt, 333-54). The main consideration of the Global Awareness feature is to raise awareness of issues affecting individuals across the globe. When one examines the “Global Awareness” layers, however, the geographic distribution is noticeably limited—the United States is shown as a site of
environmental issues—such as the Appalachian Mountaintop Removal and prevalence of endangered species—rather than human rights violations. All of the global awareness layers featuring human rights advocacy are concentrated in South Sudan or the Great Lakes region of Africa. No issues of violence are portrayed in the United States or in any other areas of the Western world. The unequal distribution of “Global Awareness” information leads the viewer to develop incomplete understandings of where violence, environmental issues, and other aspects of inequality are most prevalent.

![Figure 10: Global Awareness feature of Google Earth](image)

**Space, Place, and the Unknown**

Unknown space is difficult to identify on Google Earth due to the site’s claim that all areas of the world are mapped. Though there are still some areas that are left to explore, such as the depths of the oceans, these areas are becoming increasingly limited. Through the use of GIS technology, Google Earth has mapped out the terrestrial areas of the Earth, such that today one can view the world in its entirety. Though the implication that there are fewer areas left to discover is exciting, is also somewhat disheartening. A *New York Times* article published March 30, 2015, circuitously touched upon this issue. The article described the Explorers Club annual meeting and spoke of how exploration is continually being redefined. As Rosalind Williams
states, “The whole idea of exploration will get redefined over and over again, and it will continue
to trouble people” (Engber, 2015). In the 19th century a new age in which humans dominated the
planet, for better or for worse, was coming to fruition. This idea of the “loss” of new lands to
discover and explore sets significant limits on the human drive to explore and gain knowledge of
one’s surroundings. With the mapping of the entire world at our fingertips, will exploration be
lost? Though the majority of the terrestrial landscape is mapped in Google Earth, there is so
much more to maps than just drawing rivers, coasts, and mountains, as I have pointed out with
the analysis of the Vercelli map, Catalan Atlas, and Mercator map. A complete map of the world
would need to show what kinds of people live in certain areas and the names of their settlements.

In the United States almost every public road and street is mapped; however, in Africa and parts
of Asia this is not the case. Even though Google Earth can show a satellite picture of anywhere
on the terrestrial Earth and its algorithms can trace most roads, it is still incomplete. Poorer
regions—such as the Annawadi slum in Mumbai, India—and war-torn regions, such as North
Korea, are significantly undermapped. Places that states deny or don’t have a desire to portray as
part of their landscapes are either not labeled or labeled without direct reference to their living
conditions.8 Without anyone to insert data or advocate for their place on the map, whole
communities are left unknown to the viewer of Google Earth. Contrast this scarcity of
information with the incredible detail that Google Earth provides regarding some parts of the
world, and one can notice the disparity of data across the globe.

At the present moment Google Earth is not “real-time” and does not depict the moment-
by-moment changes in the scenery of the Earth. According to an interview I conducted with Dr.

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8 For example, Brazilian tourist boards and Rio de Janeiro’s city hall have asked Google to remove from its maps the
word “favelas,” which means “slum” in Portuguese, and replace it with the word “morro,” meaning “hill.” See
Times
Roger Easton Jr., a professor at the Carlson Center for Imaging Science and son of the creator of GPS technology, “Google Earth is a tool for plotting locations on the earth’s surface that may have been measured by GPS” while “GPS is a technology for accurately locating objects on earth. Google Earth can be used to look for patterns in the data, such as movements by groups of people or animals.” GPS primarily comes into play with Google Maps, and Google Maps—which is linked to Google Earth—also contains limitations in its purpose. Google Maps’ primary purpose is navigational use, just as was the Mercator Map and Catalan Atlas. However, instead of by sea, Google Maps is geared towards land use, particularly automobiles. Google Maps seems to be alternative-transportation friendly, but it is still limited by its technological platform because its route-finding algorithms are based around roads. Furthermore, Google Earth’s “places” overlay is also distorted. When one turns on the “places” overlay, many businesses are not shown in their exact locations. For example, in Oxford, MS, many of the shops are lined up on the west side of the courthouse lawn when in actuality the shops are found around the whole circumference of the roundabout. In order to obtain correct locations on Google Earth, one has to create a Google page for the business or organization then enter the address.

With the majority of the world mapped, however, there are still areas on Google Earth that are “prohibited” from being viewed. Such spaces fall into the categories of Governmental military sites, political disputes on Google Earth and Google Maps’ street view, nuclear weapon sites, energy reserves, and scientific college and research labs (Brotton, 425). Though these areas are technically known to exist, they are presented as being unknown, primarily for legal issues and reasons of national security. Furthermore, there may still be unknown areas even in our age of massive data. Google Earth emphasizes information in certain regions of the world,
such as in the United States, and deemphasizes information in others, thus creating areas of unknown for the user. For example, the images below display snapshots of Google Earth’s view of Providence, Rhode Island, USA and Abidjan, Ivory Coast. While Providence has a population of 177,994, Abidjan boasts a population of over 4 million inhabitants—yet observe the relative amount of data displayed for each of these cities. Is this lack of data in Abidjan due to lack of knowledge about the area or is the city simply a lower priority than other Western areas? Clearly there are still areas of the world that are considered unknown when it comes to viewing Google Earth.

![Figure 11: Abidjan, Ivory Coast on the left, Providence, Rhode Island, USA on right](image)

**Politics of Viewing**

Furthermore, when border conflict or place names are disputed, Google Earth can be misleading. When Palestine was recognized as a country by the United Nations, Google changed the name from the “Palestinian Territories” to “Palestine.” In response to this move, Yigal Palmor, a foreign ministry spokesman for Israel, voiced the sentiment of many: “This change raises questions about the reasons behind this surprising involvement of what is basically a private Internet company in international politics—and on the controversial side” (Kleinman,
2013). Furthermore, when Syria was in the midst of revolts against the al-Assad dynasty, the main highway through Damascus changed names on Google Earth. Throughout the nation there was a patchwork of both Assad-era and revolutionary names. The major Damascus highway was identified on Google Earth as being named both Hafez al Assad and Ibrahim al-Kashosh, an icon of the uprising (Lynch, 2012). The reasoning for these changes was linked to the fact that Google Earth crowdsources its information for areas such as Syria. However, Google still uses a screening process to verify the information before the map names are officially changed. Thus, the political agenda of Google in these conflicts could be called into question. Though seemingly unbiased when it comes to those areas that rest in a peaceful state, Google Earth may be less reliable when it comes to those areas facing disputes and conflicts. As Jerry Brotton states, “All cultures produce a world map that puts their own interests and concerns at its heart. Even Ptolemy said any world map must make decisions about what it includes and what it leaves out” (Brotton, 2012). Thus, just as with each of the other maps that have been surveyed thus far, Google Earth shows an inherent political bias.

In light of the aforementioned instances, won’t there always be unknown areas on maps? There will still be areas that will be deemed “too sensitive” to be portrayed on a public interface. Furthermore, because of Google’s monopoly over the online, interactive mapping business, it has an incentive to keep access to geospatial knowledge under its own jurisdiction for profit (Brotton, 430). Thus, it is ultimately the Google, Inc. that decides whether an area is “prohibited” or where its borders end. Even though geographic knowledge has improved exponentially and Google Earth seems to be a way of avoiding the cartographer’s bias in representing the world, given the aforementioned facts, maps will continue to be inherently political.
CHAPTER 5: CONCLUSION—WHERE DO WE STAND?

Maps give us the ability to make sense of our world. They shape our conceptions of where we are and where we can go. Inherently, however, we lack the ability to depict a complete, accurate view of the world through the map. Distortions and biases are inevitable. It is up to the mapmaker to choose which projection to use, what information to display, and how to display it. The ultimate political and societal ramifications for this choice serve as the basis for critical cartography. As I have shown, maps provide knowledge that serves to represent but also reproduce both political and social views of the world.

Over time, as knowledge of the world grew, maps shifted their purpose from teaching tools which reflected societal values to accurate navigational tools. As mentioned with regard to the Vercelli mappamundi, society in the medieval period was saturated with religious figura. The maps that were created at this time centered themselves on Jerusalem and showed biblical images as landmarks (Scafì, 2006, 351). Maps during this period were also used as teaching tools and therefore represented images from biblical stories, such as Noah’s Ark (Jacob, 1996, 193). Unknown areas were represented by the images of myths. Iconography provided a means of both filling space and conveying the current knowledge of distant regions via images. During this period, maps were heavily influenced by the staunch religious atmosphere and portrayed the world in light of biblical stories and landmarks.

The Catalan Atlas represents a bridge between the emphasis on religion in medieval maps and the emphasis on navigation in renaissance maps. As Fernandez-Armesto so well phrased in Before Columbus, “[The Atlas] is as rich and intricate as a spilled jewel casket, resplendent with images of exotic beings and untold wealth…[the] practical portolan chart could be drawn with grace and adorned with illustrations…[the medieval period] was a period in which maps could
inspire more than music” (Fernandez-Armesto, 1987, 151). With new knowledge from explorers such as Marco Polo, Sir John Mandeville, and the early missionaries, Cathay and Manzi, the Catalan Atlas portrays the most geographically accurate view of knowledge of the world in the 14th century (Lester, 2009, 98). The Catalan Atlas contains a plethora of iconography, which relates back to its categorization as a medieval map, but it also contains information from explorers’ stories of the Near East and Asia, leaving only the unexplored Far East areas full of elaborate, space-filling images. Religious stories, such as Gog and Magog, are portrayed on the map; however, there are also images such as the pearl fishers off the coast of Iran, which are stories that came directly from Marco Polo’s transcript (Grosjean, 81). In terms of the unknown, iconography is still the primary source of representation. The lesser-known areas are full of elaborate drawings that both make use of blank space and also serve to comment on societal views of these places, such as the many misconceptions about Mecca and the placement of Earthly Paradise in Ethiopia. The map is centered on Jerusalem, which harkens back to the religious dominance of the period. The European areas contain more buildings and flags, which represent countries on the map, than the eastern regions—thus, the notion of me-mapping returns.

The Mercator map, representing the renaissance era, exhibits a transition in the use of maps as tools of navigation. It also represents the shift in the display of unknown areas as spaces full of myth and instead fills the unknown areas with text or elaborate cartouches. With its use of rhumb lines, the Mercator map’s purpose was to be a navigational tool for explorers, not a teaching tool for students (Wilford, 90). Due to the inability to maintain accurate size, shape, and distance, the Mercator map shows some significant distortions. The Northern hemisphere is significantly larger than the southern and the map is centered on Europe (Monmonier, 18).
Though this was not a tremendous problem in its purpose as a navigational tool, it did become more of an issue when this same projection was brought into the classroom and became the standard geographical teaching tool (Wilford, 90). The fact that Europe is larger and more prominent than the other areas on the map, though not a hindrance to the map’s original purpose, perpetuates power structures when used as a tool to teach children about their place in the world and their relation to the rest of the world.

Finally, Google Earth represents the modern era of mapping. With the world becoming ever more digitized, maps have become almost exclusively focused on being the most accurate navigational tools possible. Google Earth seeks to map the entirety of the world, showing every business, park, and landform known to humanity. However, Google still has limitations—not all businesses have Google sites or publish their address information on the web. Furthermore, the areas known to Google are still not all shown equivalently. For example, if one were to search for a Walmart they would be able to find its location fairly easily. If one were instead to search for a family-run grocery store located in more rural territory, it may be harder to locate. Even though Google Earth claims to have the entire world mapped, there is still a hierarchy in mapping, with the more developed areas being easier to find than those that are poorer or less well known. Google Earth currently has a monopoly over the digitized mapping sector (Brotton, 407). Therefore, who is to say that this view of the world that it is presenting is the most accurate one? Google is a corporation and thus may have incentives to present the world in a certain way. Company advertisers have become the equivalent of map commissioners with the ability to manipulate the way the world is presented. Therefore, Google Earth is still as inherently biased as each of the other maps presented, and unknown areas still exist that are disclosed from the public.
By analyzing maps throughout history, one can come to the conclusion that all maps are first subject to the powers of the cartographer and commissioner creating them. Furthermore, once maps are created, they are not static objects. They continue to be active sources of change—shaping, subverting, and reifying societal worldviews. Maps are ultimately humanity’s way of portraying and making sense of the world—biases will always be present. Due to the inability to map time and space simultaneously and the limitations placed on mapping space, there will always be unknown areas on maps. Humanity will forever be the mind behind the map and the map will forever be the window into our worldview.
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