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This study examines the uses and misuses of the Mercator Projection for the past 400 years. In 1569, Dutch cartographer Gerard Mercator published a projection that revolutionized maritime navigation. The Mercator Projection is a rectangular projection with great areal exaggeration, particularly of areas beyond 50 degrees north or south, and is ill-suited for displaying most reference and thematic world maps. The current literature notes the significance of Gerard Mercator, the Mercator Projection, the general failings of the projection, and the twentieth century controversies that arose as a consequence of its misuse. This dissertation illustrates the path of the institutionalization of the Mercator Projection in western cartography and the roles played by navigators, scientific societies and agencies, and by the producers of popular reference and thematic maps and atlases. The data are pulled from the publication record of world maps and world maps in atlases for content analysis. The maps ranged in date from 1569 to 1900 and displayed global or near global coverage. The results revealed that the misuses of the Mercator Projection began after 1700, when it was connected to scientists working with navigators and the creation of thematic cartography. During the eighteenth century, the Mercator Projection was published in journals and reports for geographic societies that detailed state-sponsored explorations. In the nineteenth century, the influence of well-known scientists using the Mercator Projection filtered into the publications for the general public. This dissertation offers a glimpse into the complexities of mapping, the choice of map projection and why the Mercator Projection changed human’s ability of

moving from one place to another, or, their perception of spatial arrangement of the globe.

THE MERCATOR PROJECTION: ITS USES, MISUSES, AND ITS ASSOCIATION WITH SCIENTIFIC INFORMATION AND THE RISE OF SCIENTIFIC SOCIETIES

by

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CHAPTER I

INTRODUCTION

In 1569, Gerard Mercator, a Dutch cosmographer, mathematician, and cartographer, published 'A New and Enlarged Description of the Earth with Corrections for Use in Navigation,' unveiling a projection that revolutionized maritime navigation. The Mercator Projection allowed mariners to chart and follow a course based on a compass bearing over long distances. In the preface to his projection Mercator wrote,

> if you wish to sail from one port to another, here is a chart, and a straight line on it, and if you follow carefully this line you will certainly arrive at your port of destination. But the length of the line may not be correct. You may get there sooner, or you may not get there as soon as you expected, but you will certainly get there.[1]

Mercator's comments reflect the navigational significance of his famed map projection. His projection allowed a mariner to safely sail from one point to another without needing detailed geographic knowledge of the area. Mercator helped modernize cartography by applying mathematics and information from western European explorations to known Ptolemaic and portolan cartographic traditions.[2] However, by 1900 cartographers, led by

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[1] Gray Brannon and Less Harding, *Carto-Quotes: An Inspirational Companion for the Map-Maker and the Map-User* (Kitchener, Ontario: Upney Editions, 1996), 82.

[2] Helen M. Wallis and Arthur H. Robinson, eds., *Cartographical Innovations: An International Handbook of Mapping Terms to 1900* (Tring, Hertsramped: Map Collector Publications in Association with the International Cartographic Association, 1987), 191-192. Jerry Brotton, *A History of the World in 12 Maps*

the German Max Eckert and the American geographer John Paul Goode, began to criticize the wide-spread use of the Mercator projection for world reference and general thematic map. A criticism that continues to this day.[3]

As a rectangular projection with great areal exaggeration, particularly of areas beyond 50 degrees north or south, the Mercator Projection is generally ill-suited for displaying most reference or thematic information on world maps.[4] Despite this obvious flaw the Mercator Projection has been and is still widely used for such world maps aimed at the general public.[5] Susan Schulten commented that the Mercator Projection has had a profound effect on geographical knowledge in United States history.[6] "It presents a historical problem of how political, cultural and social imperatives have shaped ideas about geography and space, and how these ideas have in turn influenced American

(New York, New York: Penguin Books, 2012), 248. David Greenhood, *Mapping* (Chicago, Illinois: University of Chicago Press, 1964). John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections* (Chicago, Illinois: University of Chicago Press, 1993), 43-49. Nicholas Crane, *Mercator: The Man Who Mapped the Planet* (New York, New York: Henry Holt and Company, 2003), 229-237. Andrew Taylor, *The world of Gerard Mercator: the mapmaker who revolutionized geography* (New York, New York: Walker & Co., 2004). Mark Monmonier, *Rhumb Lines and Map Wars: A Social History of the Mercator Projection* (Chicago, Illinois: University of Chicago Press, 2004), 31-46.

[3] Wolfgang Scharfe, "Max Eckert's "Kartenwissenschaft": The Turning Point in German Cartography" in *Imago Mundi* 38 (1986): 63-64. John Paul Goode, "The Map as a Record of Progress in Geography," in *Annals of the Association of American Geographers* 17, no. 1 (1927): 8.

[4] Arthur Robinson, "Rectangular Maps – NO!," *The Professional Geographer* 42, no. 1 (1990): 103.

[5] Colin Dwyer, "Boston Students Get a Glimpse of A Whole New World, With Different Maps," National Public Radio, http://www.npr.org/sections/thetwo-way/2017/03/21/520938221/boston-students-get-a-glimpse-of-a-whole-new-world-with-different-maps (Retrieved 9/19/17).

[6] Susan Schulten, *The Geographical Imagination in America, 1880-1950* (Chicago: University of Chicago Press, 2001), 3.

history and culture."[7] Schulten lays out a compelling case that the use of the Mercator Projection for world maps has influenced United States history and culture. Similarly, the ongoing use of the Mercator Projection on world maps since the mid-16th century has affected many western European cartographic histories and cultures.

This dissertation traces how the Mercator Projection became a default projection for world maps. It examines the uses and misuses of the Mercator Projection, documenting its association with scientific information, the rise of scientific societies and thematic cartography and how it became the projection of choice for the display of scientific data on world maps.

Research Approach

This dissertation documents the path of the institutionalization of the Mercator Projection in western cartography and the roles played by navigators, scientific societies and governmental agencies, and by the producers of popular reference and thematic maps and atlases. Examining the rise of the Mercator Projection sheds light on the complexities of mapping, the choice of map projection, and the nuances of the role of maps in and throughout history. This dissertation is structured in several ways: chronologically, theoretically, and by stages of map production, consumption, and reception. This line of inquiry creates an overarching narrative of why and how the Mercator Projection became so widely and often inappropriately used. The following

[7] Susan Schulten, *The Geographical Imagination in America, 1880-1950* (Chicago: University of Chicago Press, 2001), 3.

three objectives frame the progression of this dissertation. The first objective is to assess the literature, theories, and histories of cartography and geography in order to define the parameters of the study and identify gaps in the literature that warrant further assessment of the Mercator Projection. The second objective is to assess how academic and professional cartographers have engaged with the Mercator Projection and consider available alternative projections. The third objective is to reveal how the inappropriate use of the Mercator Projection for reference and thematic world maps rose from early scientists' attempts to improve navigation and the publication of their work by geographic and scientific societies.

Broadly, this project engages with literature from cartography, the history of cartography, and geography. Narrowly, this project uses discourses from geographies of the book and critical cartography to explain how the Mercator Projection became a prominent choice for world maps. Early thematic maps, and the subsequent version published in scientific journals and official government reports, created a connection between the Mercator Projection and science. It validated the perception to the general public that the Mercator Projection was scientific.

Structure of the Dissertation

The dissertation is divided into four chapters. Chapter one is a review of map types and map projections. It also discusses the decision process of cartographers for the selection of an appropriate map projection, the uses of the Mercator Projection and why it is ill-suited for world maps. Lastly, it describes alternative projections for world maps.

Chapter two identifies the need for the Mercator Projection due to the limitations of portolan charts and its origins. The chapter additionally records the limited diffusion of the Mercator Projection into Dutch atlas production and how Edward Wright designed latitudinal tables to create a method for recreating the projection that greatly expanded its use. Chapter three reviews how archival maps were selected and analyzed for this study. It is the quantitative results detailing the frequency of use and misuse of the Mercator Projection by map type and period. Chapter four is the empirical heart of the dissertation. This chapter traces the spread of the Mercator Projection from navigation to its entwinement with thematic cartography, into the journals of geographic societies based on state-sponsored scientific explorations and, finally, its reception into school atlases based on its use by respected scientists.

While navigators have always strived for more reliable and safer means of travel, the late sixteenth to eighteenth centuries was a critical time in the history of navigation and empire building for western Europe. During this period several instruments were invented that formed the basis of modern navigation. Development or refinements in these tools were developed by scientists and paid for by governments to produce accurate maps. First, was s the compass, which was necessary to find direction. The usefulness of the compass for long voyages was greatly enhanced by the work of Edmund Halley and others on plotting magnetic declination across the globe. Second, was s the creation of the Mercator Projection. Third, was the invention of the sextant which allowed the mariner to precisely determine their latitude, replacing the crude estimates gained from the ancient cross staff. Lastly, the chronometer, which for the first time allowed the mariner to determine longitude while at sea. These four elements were essential, the sextant and chronometer to determine your location, the compass to know the direction you were heading, and the Mercator Projection to plot a route that could be easily followed, and formed the basis of maritime navigation until the end of the twentieth century.

Western European empires used the Mercator Projection and the other navigational tools to great advantage in building and controlling their global empires. These sprawling empires of the eighteenth and nineteenth centuries were linked by ships. Merchant ships brought home the wealth of the colonies and ships of war helped maintain the needed control. The new instruments and the accurate navigational charts they spawned led to more economical and safer travel greatly aiding in the development, maintenance and profitability of Western European empires.

Navigators trained in scientific methods and the new navigational tools were at the forefront of a new form of mapping, thematic cartography. Navigators recorded data that was useful to sailing ships such as wind patterns, ocean currents and temperature, using the projection with which they were most familiar, the Mercator Projection. These early thematic maps, and the subsequent versions published in scientific journals and official government reports, created a connection between the Mercator Projection, science, government and empire. They validated the perception of the general public that the Mercator Projection was scientific and the erroneous depiction of an immense empire.

CHAPTER II

UNDERSTANDING MAP PROJECTIONS

Cartographers commonly classify maps into three general categories based on their intended function: navigation, thematic, and general reference. While the function of an individual map may exhibit considerable overlap in each of these categories, map type is based on their designed primary purpose. A navigational chart is designed to assist the user in navigation, whether by sea, land or air.[1] Hobbs noted, "the nautical chart is historically the most important and certainly the most frequently used tool employed by the navigator in the execution of his functional responsibilities."[2] A navigational chart is used to both plot routes and as an aid in the successful following of those routes. These are the express purposes for which Gerard Mercator created his famed projection.

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[1] The US Navy distinguishes between a map and a nautical chart. A map is a representation of land on the earth's surface that shows social, political and cultural phenomena. A nautical chart is concerned with navigable waters and with the display of information regarding coastlines, harbors, channels, depths of water and aids to navigation. Robinson provides a further delineation between a chart and a nautical chart. A chart is a map designed for navigation and a nautical chart is designed to assist navigation at sea or along another waterway. Arthur Robinson and Helen M. Wallis, *Cartographical Innovations: An International Handbook of Mapping Terms to 1900* (Herts, UK: Map Collector Publications Ltd in association with the International Cartographic Association, 1987), 2-3, 8-11. Richard R. Hobbs, *Marine Navigation: Piloting and Celestial and Electronic Navigation*, 4th ed. (Annapolis, Maryland: Naval Institute Press, 1998), 21-22.

[2] Richard R. Hobbs, *Marine Navigation: Piloting and Celestial and Electronic Navigation*, 4th ed. (Annapolis, Maryland: Naval Institute Press, 1998), 21-22.

General reference maps are designed to familiarize the reader with the location of a variety of phenomena across a given region. They are broad in nature and are typically designed for a wide audience.[3] The information displayed is usually at the qualitative nominal level. Examples include boundaries, cities, capitals, highways, rivers and lakes, and terrain. Numerous projections have been employed for reference maps. A map projection is typically selected that least distorts the specific area being displayed. There is a particular projection for the continental United States, another for Japan, and another for Africa.

The most recent map type is the thematic map. This form emphasizes the spatial distribution and intensity of one or more related variables.[4] Quantitative data, at the ordinal, interval or ratio level, is typically displayed on thematic maps, though maps displaying specific qualitative phenomena can also fall into this class (i.e., language spoken in each country or dominant political party affiliation by county). While cartographers continue to debate the appearance of the first thematic maps, there is agreement that prior to the late eighteenth-century thematic maps were virtually

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[3] Terry Slocum, *Thematic Cartography and Geographic Visualization* (Upper Saddle River, New Jersey: Pearson/Prentice Hall, 2005), 1.

[4] Thrower defines the thematic map as being designed to serve a specific purpose or to illustrate a specific subject and does not use base data as the phenomena being mapped. In this case "base data" refers to general reference material such as the location of cities, rivers, or political boundaries. Robinson originally defined the thematic map as the mapping of quantifiable information. However, he later expanded the definition to be a map whose objective is to portray the character of a particular distribution of variables. Arthur Robinson and Helen M. Wallis, *Cartographical Innovations: An International Handbook of Mapping Terms to 1900* (Herts, UK: Map Collector Publications Ltd in association with the International Cartographic Association, 1987), 72-73. Norman Thrower, *Maps & Civilization: Cartography in Culture and Society*, 3rd ed. (Chicago, Illinois; London, UK: University of Chicago Press, 2008), 95.

unknown.[5] Like reference maps, thematic maps do not have, nor did they have, an agreed upon "best" projection. From the early eighteenth to early nineteenth centuries, most of the techniques cartographers used to display data on thematic maps were developed. These included isolines, choropleth shading, isopleth divisions, prism maps, and graduated symbols. Geographers attribute the rise of thematic mapping to the confluence of several events. These were the development of the field of statistics, the rise of state-sponsored census taking, scientific expeditions to newly discovered regions of the planet, technological advances reducing the cost of paper and the printing of maps, geographies and atlases, and a large market for those materials with the rise of compulsory education in Europe and North America.[6]

Unlike the Mercator Projection for navigational charts, no particular projection was ideally suited for reference or thematic maps. It was not until the early twentieth century that cartographers began to construct projections specifically for thematic maps. Little had been expressly written by geographers/cartographers concerning projection choice for thematic maps until the early twentieth century, when they began to question

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[5] Arthur Robinson, *Early Thematic Mapping in the History of Cartography* (Chicago, Illinois: University of Chicago Press, 1982), 26-30. Arthur Robinson and Helen M. Wallis, *Cartographical Innovations: An International Handbook of Mapping Terms to 1900* (Herts, UK: Map Collector Publications Ltd in association with the International Cartographic Association, 1987), XIV. Norman Thrower, *Maps & Civilization: Cartography in Culture and Society*, 3rd ed. (Chicago, Illinois; London, UK: University of Chicago Press, 2008), 95.

[6] Norman Thrower, *Maps & Civilization: Cartography in Culture and Society*, 3rd ed. (Chicago, Illinois; London, UK: University of Chicago Press, 2008), 125-161. Susan Schulten, "Thematic Cartography and Federal Science in Antebellum America," in *History of Cartography* (Springer Berlin Heidelberg: Berlin, Heidelberg, 2012), 37–56.

the impact of the projection upon the message transmitted in maps at a global or near global scale.

A map projection is the foundation of a map. It is the mathematical rendering of the lines of latitude and longitude found upon a three-dimensional sphere, a globe, laid flat to a two-dimensional planar surface showing true location.[7] These lines of latitude and longitude are known as the graticule.[8] The methods for laying the graticule upon a flat surface are classified as being derived either mathematically or by projecting (hence the name) the graticule upon a shape that can be laid flat with minimal distortion. Shapes that can be laid flat without distorting what is drawn upon them are said to be developable. Three developable surfaces used in mapping are cylinders, cones, and planes (azimuthal).[9] (See Figure 2.1.) The use of a developable surface does not remove distortion. The distortion occurs when the sphere is projected upon the cylinder, cone, or plane—not when they are laid flat. As shown in Figure 2.1, a sphere placed into a cylinder or a cone will have one line that is tangent to the surface of the cone or cylinder.

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[7] Arthur Robinson and Helen M. Wallis eds., *Cartographic Innovations: An International Handbook of Mapping Terms to 1900* (Tring, Herts: Map Collector Publications in association with the International Cartographic Association, 1987), 191. John P. Snyder, *Flattening the Earth* (Chicago, Illinois: University of Chicago Press, 1993), 1. David Greenhood, *Mapping*, 122-123. ESRI, *Map Projections: Georeferencing Spatial Data* (Redlands, California: Environmental Systems Research Institute Inc., 1994), 2-1. ESRI, *Map Projections: Georeferencing Spatial Data* (Redlands, California: Environmental Systems Research Institute, Inc., 1994), 2-1. Terry A. Slocum et al., *Thematic Cartography and Geographic Visualization* (Upper Saddle River, NJ: Pearson/Prentice Hall, 2005), 137.

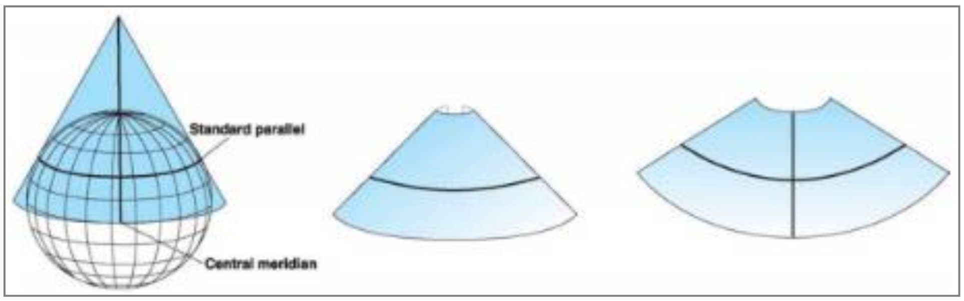
[8] Arthur Robinson and Helen Wallis, *Cartographical Innovations: An International Handbook of Mapping Terms to 1900*, 172-173. John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 2. ESRI, *Map Projections: Georeferencing Spatial Data*, 2-7.

[9] David Greenhood, *Mapping*, 124. John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 2.

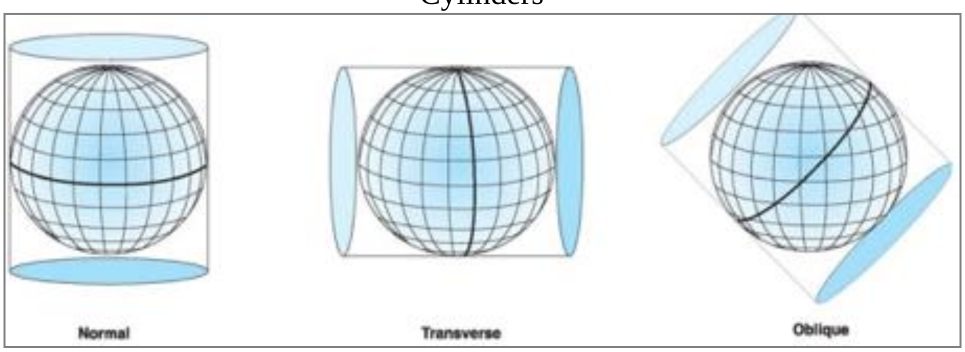
Along that line there is no distortion. Normally the cartographer will choose to place the sphere into the cone or cylinder so that the line without distortion is a line of latitude, hence the name “Standard Parallel.”

Figure 2.1. Diagram Showing the Developable Surfaces in Mapping: Cones, Cylinders, or Planes.

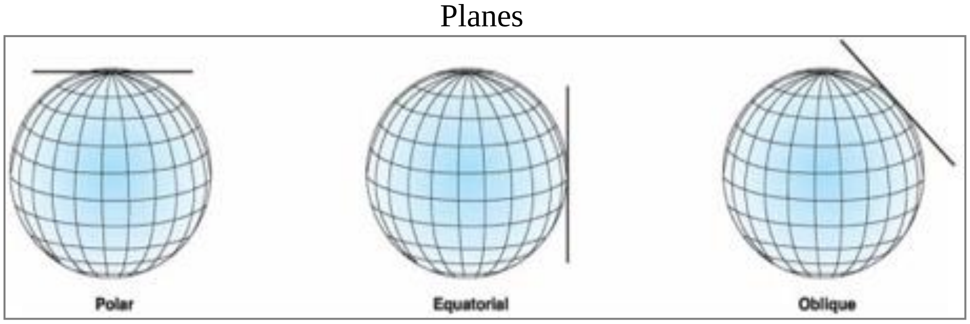
Cones



Cylinders



Planes



Many map projections are classified in terms of one of these geometric shapes because a cone, cylinder, or plane can be flattened with minimal distortions in some cases. (Source: ESRI).

The most commonly used developable surface is the cylinder. Typically, its surface is unrolled from a globe along the 45th parallel, giving this surface straight lines of longitude (meridians) and latitude (parallels) that intersect at right angles. The equator is the standard parallel.[10] A conic projection looks like a fan or pie wedge with the lines of longitude radiating outward from a central point. The standard parallel can be placed anywhere by simply changing the size of the cone. Wherever the sphere touches the side of the cone becomes the 'standard parallel.' This allows the cartographer to choose where on the globe they wish the degree of distortion to be minimized.[11] Finally, azimuthal is a 'point-centered' projection. When the point chosen is one of the earth's poles, the lines of longitude appear straight and equally spaced, radiating from a central point.[12] The lines of latitude appear as equally spaced concentric circles growing from that central polar point.[13] Azimuthal projections do not have a standard parallel; the only area without distortion is the single point where the theoretical plane touches the sphere.[14]

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[10] David Greenhood, *Mapping*, 134. Terry A. Slocum et al., *Thematic Cartography and Geographic Visualization* (Upper Saddle River, NJ: Pearson/Prentice Hall, 2005), 143.

[11] David Greenhood, *Mapping*, 136-137. Terry A Slocum et al., *Thematic Cartography and Geographic Visualization*, 144.

[12] David Greenhood, *Mapping,* 147. Terry A Slocum et al., *Thematic Cartography and Geographic Visualization,* 144.

[13] Terry A Slocum et al., *Thematic Cartography and Geographic Visualization*, 144.

[14] Arthur Robinson and Helen M. Wallis eds., *Cartographic Innovations: An International Handbook of Mapping Terms to 1900,* 192.

The cartographer prepares a projection by determining the spacings of the graticule.[15] The simplest form is to draw lines of latitude and longitude as straight lines and space them evenly, resulting in a simple rectangular projection.[16] These points are then georeferenced and given an x and y positional value and become projected on the developable surface.[17] The result is a mathematical transformation of the graticule onto a plane creating the map projection. There are four properties a cartographer can choose to preserve during this process: distance, direction, shape, and size.[18] However, as Erwin Raisz notes, not all projections are created based on developable surfaces and are not geometrically projected.[19] As a result, there is an additional "other" category.[20] The cartographer may choose not to preserve any of the properties in their entirety but mitigate extreme distortion in two or more properties. These projections are known as compromise projections, a 'balance of errors' where shape, area and scale are not correct, but none are greatly distorted.[21]

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[15] Terry A. Slocum et al., *Thematic Cartography and Geographic Visualization*, 137.

[16] John Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 2.

[17] Terry A. Slocum et al., *Thematic Cartography and Geographic Visualization*, 137.

[18] David Greenhood, *Mapping*, 114.

[19] Erwin Raisz, *Principles of Cartography* (New York, New York: McGraw-Hill, 1962), 168.

[20] Erwin Raisz, *Principles of Cartography*, 168.

[21] David Greenhood, *Mapping*, 138.

All maps are distorted by their respective projections because all projections distort one or more attributes in order to preserve another. The Ancient Greeks encountered this issue early in their cartographic endeavors by realizing that to prepare a flat map based on a curving surface in all directions leads, inevitably, to distortion.[22] In his book *Mapping*, David Greenhood summarizes the Greek myth about the giant Antaeus, the son of Poseidon, the god of the sea and Gaea, the goddess of the earth. "As long as Antaeus kept in touch with the earth, his mother, he was an invincible wrestler."[23] Greenhood notes that the same is true for map projections: they derive their strength from Gaea, their mother, and where they lose touch with her they weaken.[24] John K. Wright, referencing German cartographer Max Eckert, states, "Every map is thus a reflection partly of objective realities and partly of subjective elements."[25] The reality is that a two dimensional representation of a three dimensional object can never be wholly accurate.[26] In the case of the world map, even the largest is a radical distortion of the globe by size

[22] John Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 1.

[23] David Greenhood, *Mapping*, 123-124.

[24] David Greenhood, *Mapping*, 123-124.

[25] Maps function, and have functioned, as a representation of spatial perspectives, and map projections are the foundation on which those realities are formed. John K. Wright noted that "the image on a map is drawn by human hands, controlled by operations in a human mind." Later, Arthur Robinson and Barbara Bartz-Petchenik remark how maps are spatial surrogates, standing in place of reality. John K. Wright, "Map Makers are Human: Comments on the Subjective in Maps," in *The Geographical Review* 32, no. 4 (1942): 527. Arthur Robinson and Barbara Bartz-Petchenik, *Nature of Maps: Essays Toward Understanding Maps and Mapping* (Chicago, Illinois: University of Chicago Press, 1976), 86.

[26] John K. Wright, "Map Makers are Human: Comments on the Subjective in Maps," in *The Geographical Review* 32, no. 4 (1942): 527.

alone. The amount of reduction in size is known as the map's scale. Most maps inform the reader of the degree of reduction by including a representative fraction, verbal scale, or scale bar.[27] After size of the map (scale), the next step for the cartographer is choosing an appropriate projection. What should determine the appropriate projection for a map is the message the cartographer is communicating to the reader. In explaining the importance of projection, Max Eckert clarifies that while a map projection has the impossible task of reproducing a three-dimensional extent of space on a two-dimensional plane, its most important task is still to portray the surface of the Earth, or a portion of it, shape and area and scale as accurately as possible.[28] Given this awareness, a cartographer should account for the necessary properties of the map and wisely choose an appropriate projection for it.

In the 1880s, French mathematician Nicolas Tissot developed a method to analyze the degree and character of distortion produced on a map projection.[29] Tissot's concept was to plot a theoretical circle shape having a unit radius of one on the map at various locations. An area on the map with no shape or size distortion would have a radius of one and be a perfect circle. Due to the distortion present in a projection, the circle would

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[27] A. Jon Kimerling, Aileen R. Buckley, Phillip C. Muehrcke, Juliana O. Muehrcke, *Map Use Reading and Analysis*, 6th edition (Redlands, California: ESRI Press, 2010) 21-22.

[28] Max Eckert, "On the Nature of Maps and Map Logic," in *Bulletin of the American Geographical Society* 40, no. 6 (1908): 345.

[29] John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 147. Terry A Slocum et al., *Thematic Cartography and Geographic Visualization*, 150.

change in size, shape, or both when plotted on different areas of the map. Any changes in the size and shape of the theoretical circle reveal the degree and type of distortion a projection produces across the map.[30] This type of analysis became known as Tissot's Indicatrix and has four possible configurations: no distortion, no change in area but a change in angles, a change in area and no change in angles, or a change in area and angles.[31]

On a conformal projection, like the Mercator Projection, that preserves angles, only the size of the ellipse will change with each increase in latitude.[32] On a compromise map, where neither area nor angle is preserved, the size, shape and orientation of the ellipse will vary.[33] On an equal area projection, the size of the ellipse is preserved since area is the preserved value. However, the shape and orientation of the ellipse is distorted.[34] (See Figure 2.2.)

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[30] John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 147. Terry A Slocum et al., *Thematic Cartography and Geographic Visualization*, 150-151.

[31] Terry A Slocum et al., *Thematic Cartography and Geographic Visualization*, 151.

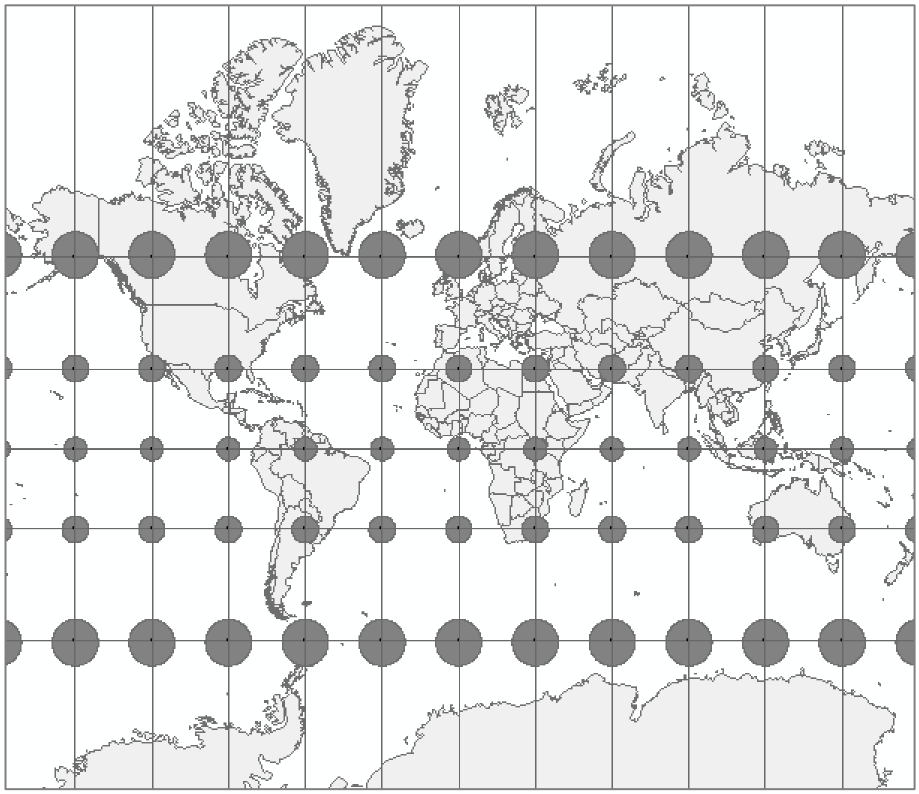
[32] ESRI 2010. ArcGIS Desktop: Release 10. Redlands, CA: Environmental Systems Research Institute. The data of this figure is provided by the data accompanying the ESRI's ArcGIS Desktop. The construction and methodology of the figures are provided by the author.

[33] ESRI 2010. ArcGIS Desktop: Release 10. Redlands, CA: Environmental Systems Research Institute. The data of this figure is provided by the data accompanying the ESRI's ArcGIS Desktop. The construction and methodology of the figures are provided by the author.

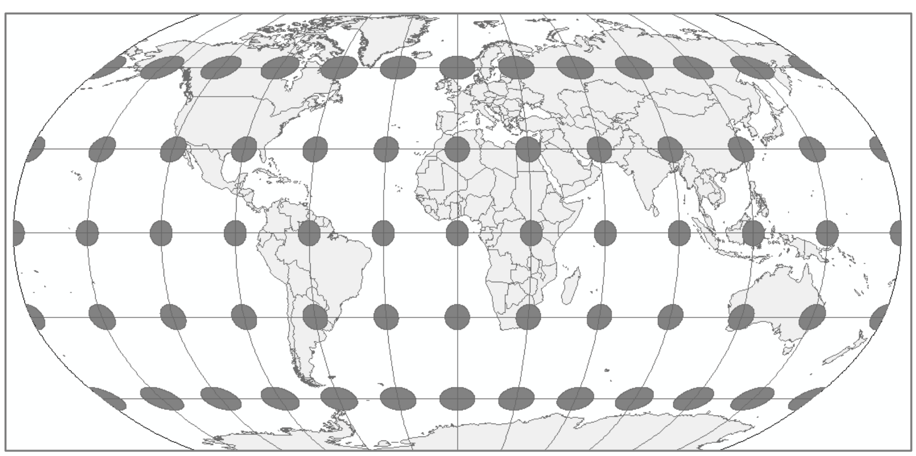
[34] ESRI 2010. ArcGIS Desktop: Release 10. Redlands, CA: Environmental Systems Research Institute. The data of this figure is provided by the data accompanying the ESRI's ArcGIS Desktop. The construction and methodology of the figures are provided by the author.

Figure 2.2. Tissot's Indicatrix for (a) the Mercator Projection, (b) a Compromise Projection, and (c) an Equal Area Projection.

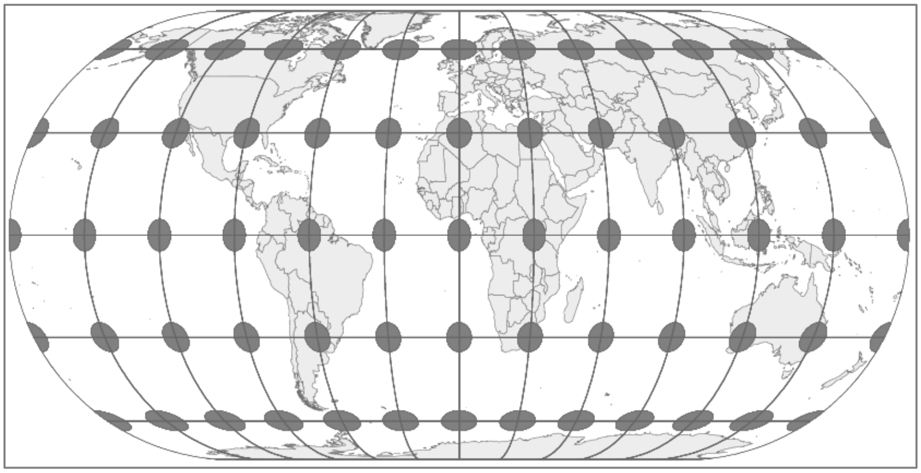
a. Tissot's Indicatrix for the Mercator Projection; a Conformal Projection.



b. Tissot's Indicatrix for the Robinson Projection; a Compromise Projection.



c. Tissot’s Indicatrix for the Gall Projection; an Equal Area Projection.



A graphical representation of the spatial distortion at any given map location. At any given point, the shape, size and orientation of an indicatrix depend on the map projection. As a diagrammatic aid, indicatrices convey distortions; however, they can also be used mathematically to quantify distortion. Maps Generated by Michele Abee.

Tissot’s Indicatrix illustrates both the advantages and disadvantages of the Mercator Projection. As the angles of a Mercator Projection are preserved (no distortion in the shape of the circles) it is conformal. However, the disadvantages are just as apparent on the indicatrix in that they reveal extreme distortion in the relative sizes of land masses at various latitudes. This degree of size distortion (particularly as you move poleward) makes the Mercator Projection generally ill-suited for most reference maps and thematic maps.

Even a globe distorts the Earth. Reduction in scale alone is a severe distortion and globes, like all maps, are selective in nature. The Polish-American scientist and philosopher Alfred Korzybski notes, “the map is not the territory and that ‘the word is not the thing,’” reminding us that maps and globes and words are abstractions derived from something and are not the thing itself.[35] The globe maker must select what will and will not be shown. The globe is three dimensional while most maps are two dimensional. Overall, a globe or a map is a tool with the goal to illustrate a geographically based spatial relationship.

Choosing a Map Projection

There are thousands of map projections to choose from and each one may serve a specific purpose, variety of purposes, or be well suited, or not well suited, for particular geographic areas.[36] It is therefore important to select an appropriate projection for the information displayed on the map and for the geographic area being shown. The degree to which each map property is preserved and the effect the properties have on the message the cartographer is attempting to convey, are fundamental concerns when selecting an appropriate projection.

Choosing a projection is often a frustrating experience for cartographers as invariably they must settle for what is acceptable, as the ideal does not exist. Projection choice is based on the degree to which certain spatial properties are maintained: shape (conformality), extent and degree of areal distortion, as well as distance constancy and direction (true-direction).[37] Another characteristic not related to projection distortions

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[35] Alfred Korzybski, *Science and Sanity: An Introduction to Non-Aristotelian Systems and General Semantics* (Fort Worth, TX: Institute of General Semantics, 1994), xvii, 58.

[36] John P. Snyder, "Map Projections: A Working Manual," USGS Numbered Series, Professional Paper (Washington, D.C.: U.S. Government Printing Office, 1987), http://pubs.er.usgs.gov/publication/pp1395.

[37] David Greenhood, *Mapping*, 114. ESRI, *Map Projections: Georeferencing Spatial Data* (Redlands, California: Environmental Systems Research Institute Inc., 1994), 2-12 - 2-13.

that is also an important factor, is how efficient is the projection in utilizing the available space on the page. Efficient space use increases visibility of small areas and allows for clearer labeling. Projection shape may also be a consideration - i.e., oval, pointed at the poles, or rectangular.[38] The selection of a projection should be based on three criteria. The first criterion is the geographic area being displayed. For example, a map projection that is good for North America may not necessarily be good for Australia because the shape, size and area of each landmass are different. A second criteria is the type of data being displayed, whether nominal, ordinal, interval, or ratio. The third is the audience for whom the map is intended.[39]

Every projection is a balance of virtues and limitations. (See Figures 2.3 and 2.4.) Cartographers must weigh which attributes they want to preserve based on the message and relationships they are trying to communicate to their audience. For example, Figure 2.3 illustrates the amount of sea ice left in the Arctic Ocean. If the cartographer chooses the Mercator Projection (cylindrical), the reader may be deceived into concluding there is considerably more sea ice than there is in reality. Whereas, the azimuthal (plane) projection shown in Figure 2.3, exhibits a smaller amount of sea ice, which is the unfortunate reality of the situation. Figure 2.4 shows the significance of the choice of projection when relative areal extent of countries is important to the purpose of the map.

[38] Alan M. MacEachren, *Some Truth with Maps: A Primer on Symbolization and Design* (Washington, D.C.: Association of American Geographers, 1994), 13. Alan M. MacEachren, *How Maps Work: Representation, Visualization, and Design* (New York, New York: The Guilford Press, 1995), 1-16.

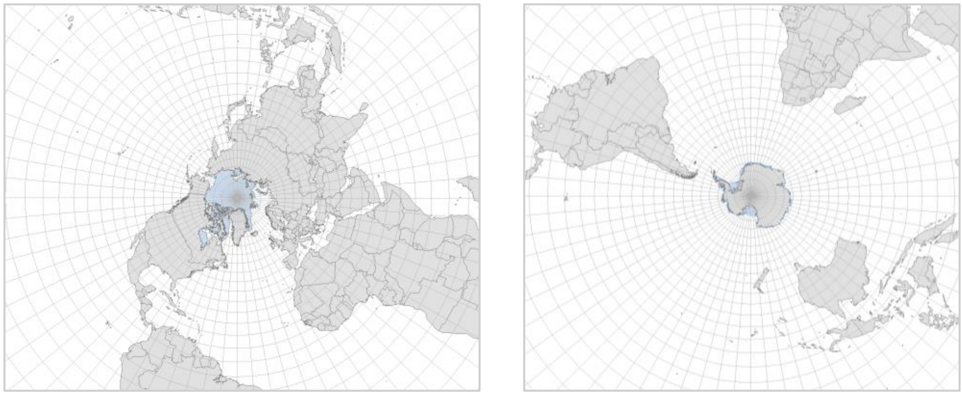
[39] Alan M. MacEachren, *How Maps Work: Representation, Visualization, and Design*, 4.

Figure 2.4 shows the extreme size distortion that occurs on the Mercator Projection as Cameroon and Sweden are roughly the same size. Note, however, the degree of shape distortion that is applied to Sweden in order to maintain the correct areal relationship with Cameroon.

Figure 2.3. The Loss of Sea Ice on the Mercator Projection Versus a Polar Projection.

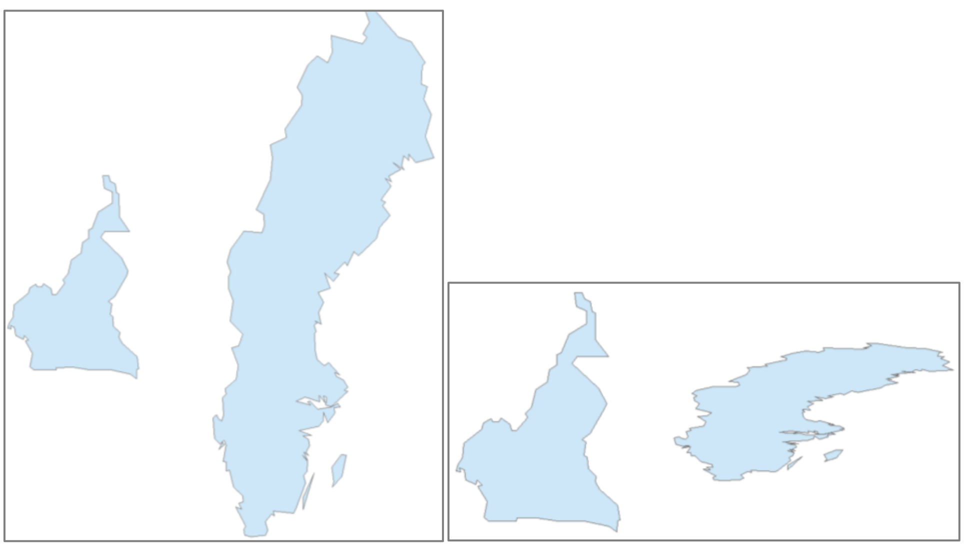
a. The Loss of Sea Ice on the Mercator Projection.

b. The Loss of Sea Ice on a Polar Projection, North (Left) and South (Right).



These maps illustrate how projection is important. One map, the Mercator Projection, creates an illusion that there is plenty of sea ice. Whereas, the polar projection, because it is appropriately designed for maps showing the poles, illustrates the current extent of sea ice. Maps Generated by Michele Abee. (Source: ESRI, Natural Earth Data).

Figure 2.4. The Relative Size of Sweden and Cameroon on the Mercator Projection Compared to an Equal Area Projection.



The left graphic uses the Mercator Projection. The inference is the country of Cameroon is smaller than Sweden. The right graphic uses an equal area projection and shows in reality that Cameroon and Sweden are similar in size. Maps Generated by Michele Abee.

How is an appropriate projection selected based on the purpose of the map? There is no simple list a cartographer can use to select the "right" projection because the audience, purpose, and geographic extent of each map is different. To help choose the best map projection, cartographers Waldo Tobler and John Snyder have provided a series of recommended guidelines. In 1962, Tobler provided a mathematical parametric classification of projections into eight categories with four rectangular coordinates and four polar coordinates.[40] Snyder simplified Tobler's categorization by dividing his hierarchy of map projections into three areal scale categories: world; hemisphere, continent, and ocean; or smaller region.[41] Using Snyder's system the cartographer first chose the areal category to be displayed, then the properties and characteristics which were most important to be maintained. Snyder's system would then determine the known projections that met the stated criteria.[42] These guidelines provide appropriate frameworks for thinking through what an appropriate projection is to represent the world.

The Mercator Projection

As Denis Wood notes, "every projection is like this, good for one thing, but not another."[43] The Mercator Projection was designed to allow a navigator to draw a compass bearing as a straight line, greatly simplifying and increasing the accuracy of

[40] Waldo Tobler, "A Classification of Map Projections," in *Annals of the Association of American Geographers* 52, no. 2 (1962): 167-168.

[41] John Snyder, *Map projections: A Working Manual*, 34-36.

[42] John Snyder, *Map projections: A Working Manual*, 34-36.

[43] Denis Wood, *The Power of Maps* (New York, New York: The Guilford Press, 1992), 57.

maritime navigation. The same property also has proved useful on many weather maps where movement of phenomena, such as wind, can be plotted as straight lines which portray the same angular relationships across the map. The meteorologist can maintain that the wind angle shown anywhere across the map is directly comparable to that of any other place on the map.

The Mercator Projection is typically classified as a cylindrical conformal projection. However, the spacing of the lines of latitude used on a Mercator Projection cannot be projected onto a cylinder of any dimension. Therefore, the spacing is mathematically derived. The parallels are placed so that for any small area the scale along a parallel and intersecting meridian is the same as on a globe. By preserving the ratio of these two lengths, north-south and east-west, a small area on the earth is nearly similar to its image on the map. This is the property of conformality. A conformal projection can preserve the shape only across small areas. Large areas are distorted, even by conformal projections, as the ratio of similarity (scale) varies by location.

While lines of longitude merge towards the poles on a globe, the Mercator Projection keeps them parallel and equally spaced to each other. The lines of latitude are horizontal straight lines and are spaced further apart as their distance away from the equator increases. This makes the equator the only portion of the projection where there is no distortion. As one moves poleward from the equator the degree of areal distortion increases. In areas north and south of 75 degrees latitude the projection produces such severe distortion that it is seldom used to show these regions.[44] These characteristics give the Mercator Projection its unique appearance where the areas within the tropics have little noticeable distortion. However, the Polar Regions are greatly exaggerated, or unable to be shown. (See Figure 2.5.)

Figure 2.5. Gerard Mercator, 'New and More Complete Representation of the Terrestrial Globe Properly Adapted for Use in Navigation,' Duisburg, Duchy of Cleves, 1569, and The Mercator Projection Today.

This graphic illustrates the unique features that characterize the Mercator Projection by showing the original and the more familiar, current projection. The appearance has not changed, it has just become more recognizable. (Source: Bibliotheque National de France) Map of the Mercator Projection Today Generated by Michele Abee.

[44] Erwin Raisz, *Principles of Cartography*, 169-171.

Gerard Mercator understood the shortcomings of his projection and testified that he knowingly and specifically created the projection to be a tool for mariners. Mercator explains in one of the legends on the world map, previous maritime charts were "unsuitable for navigation."[45] In response to this need, Mercator created a new arrangement of latitude and longitude.[46] Mercator further describes the necessary spacing of the parallels and meridians in relation to the equator caused the shape of the lands inevitably to be enormously distorted.[47] Mercator knew the projection created immense distortions, but he knew the distortions were necessary to keep distance and direction correct, which are critical properties of maritime charts.[48] Without the benefit of calculus, Mercator's determination of the correct rate of continuous change was undoubtedly the result of repeated trial and error and his final solution only an approximation of the correct spacing, but it was sufficiently accurate to be of great practical use to navigators. As for the geographical information displayed on the 1569 map -- it was based on reports from scholars and travelers, as well as seafarers' and others' knowledge, and for its time was certainly cutting edge.[49]

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[45] John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections* (Chicago, Illinois: University of Chicago Press, 1993), 46.

[46] John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 46.

[47] John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 46-47.

[48] John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 46-47.

[49] Nicholas Crane, *The Man Who Mapped the Planet* (New York, New York: Henry Holt and Company, 2003), 231.

The spacing between the lines of latitude is what makes the Mercator Projection appropriate for navigation.[50] The Mercator Projection purposefully maintains certain aspects of the globe while acknowledging the distortion of others. These are the same considerations cartographers make today in designing or selecting a projection. The spacing of meridians and parallels makes the Mercator Projection unique because any straight line drawn upon it is a rhumb line, a line of constant compass direction. Rhumb lines, also known as loxodromes, allow a navigator to draw a straight line connecting two points on the map and then to follow that course using the same compass reading for the entire journey.[51] A loxodrome plotted on a globe is the curving mathematical equivalent of the rhumb line.[52] (See Figure 2.6.)

In order for the rhumb lines to remain straight on the map, the parallel spacing (meridian length) must increase away from the equator at the same rate, as the parallels lengthen compared with their true length on the globe. In practice, a straight line drawn across the map would cross each successive meridian at the same angle; thus, as long as a ship travelled that line its compass heading would never need to change.[53] While this

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[50] David Greenhood, *Mapping*, 125-127. John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 45.

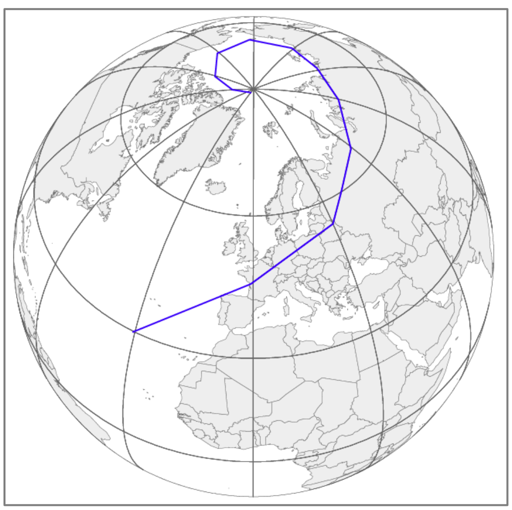
[51] Norman Thrower, *Maps & Civilization: Cartography in Culture and Society* (Chicago, Illinois: University of Chicago Press, 2007), 77.

[52] Arthur Robinson and Helen M. Wallis, eds., *Cartographic Innovations: An International Handbook of Mapping Terms to 1900*,185.

[53] Arthur Robinson and Helen M. Wallis, eds., *Cartographic Innovations: An International Handbook of Mapping Terms to 1900*, 201. David Greenhood, *Mapping*, 129.

allowed for easier and safer navigation it should be noted that the straight line on the Mercator Projection was not the shortest distance between two points on the globe. The shortest surface distance between any two points on land is a portion of an arc of a great circle.[54] A Great Circle is the line across the surface formed when a plane passes through the center of a sphere.[55] The best known great circle is the Equator.[56] For long voyages the Great Circle route was plotted on the Mercator Projection and then the navigator could draw a series of short segments that approximated the great circle route. Each of the segments, referred to as legs, were rhumb lines and could be easily followed using a compass. (See Figure 2.7.)

Figure 2.6. Loxodrome on a Globe.



This is what a loxodrome would look like if it were to be drawn onto a globe by a navigator. Map Generated by Michele Abee.

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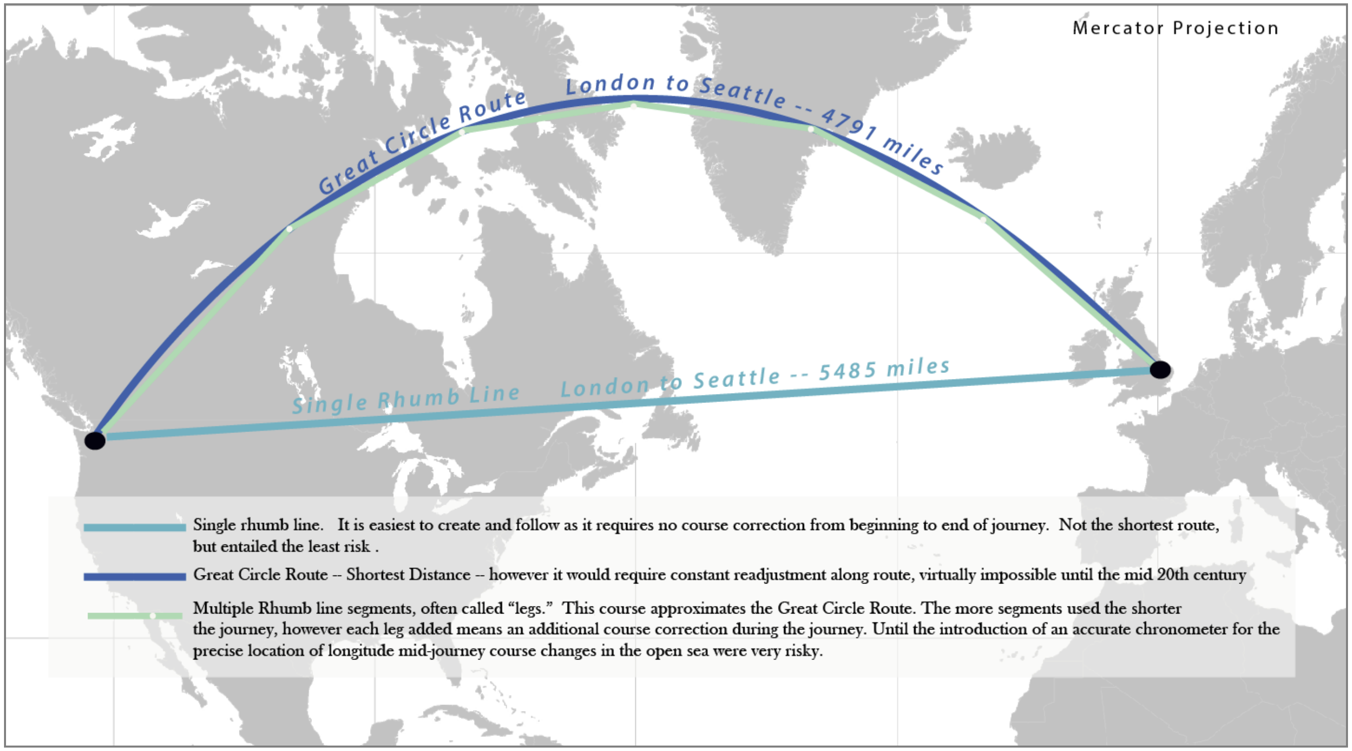
[54] David Greenhood, *Mapping*, 129.

[55] David Greenhood, *Mapping*, 30-31.

[56] David Greenhood, *Mapping*, 31.

Figure 2.7. A Great Circle Route Compared to the Rhumb Line and Multiple Rhumb Lines.



Additional to navigation, weather maps are an appropriate use of the Mercator Projection. Mark Monmonier states, the Mercator Projection is best used for maps illustrating navigation, weather and geophysics.[1] Weather maps need to accurately display wind direction or the movement of storm systems across the earth's surface. These needs are met through the use of the Mercator Projection as local angles measured from a point, such as a weather station, are correct and all local shapes are true.[2] Distance is important, but angles are more so, especially where isobars, isotherms or arrows intersect with meridians and parallels.[3] The accurate depiction of this data relies on conformality which makes the Mercator Projection appropriate for this type of data visualization.[4]

While the Mercator Projection is a tremendous asset for navigation and weather maps, it has major disadvantages for general reference or thematic maps particularly at a global scale. An advantage for cylindrical projections that the Mercator Projection shares, is that they fit well onto a page. The projection provides space for lettering and other types of labeling with minimal white space. In contrast, other projections do not utilize all of the page space, making labeling more difficult. However, the efficient use

[1] Mark Monmonier, *Rhumb Lines and Map Wars: A Social History of the Mercator Projection* (Chicago, Illinois: University of Chicago Press, 2004), 14.

[2] Mark Monmonier, *Rhumb Lines and Map Wars: A Social History of the Mercator Projection*, 94-96.

[3] Mark Monmonier, *Rhumb Lines and Map Wars: A Social History of the Mercator Projection*, 94-96.

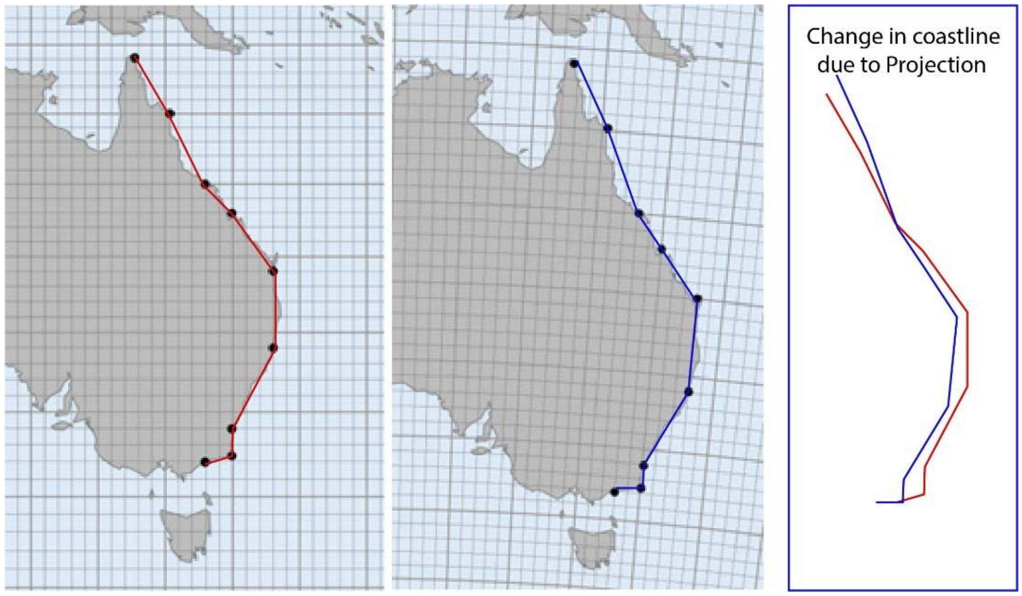
[4] Mark Monmonier, *Rhumb Lines and Map Wars: A Social History of the Mercator Projection*, 94-96.

of the page is little justification for its general use considering the extreme degree of areal distortion inherent in the projection.

Unlike the case of the Mercator Projection for navigational charts, no particular projection was ideally suited for general global thematic maps. It was not until the early twentieth century that cartographers began to construct projections specifically for thematic maps.[5] Initially, thematic data were shown on projections that had long been used for general reference data or, most importantly for this study, the Mercator Projection. The adoption of the Mercator Projection for non-navigational world maps may have been aided by the sheer difficulty of converting geographic data recorded on one projection to a map applying another projection. At that time when converting geodetic data, and then the location of thematic information from one projection to the next, the cartographer would need to determine the geodetic coordinates of thousands of identifiable geographic locations on the original map and then mark those same locations on the desired projection. Once the points had been located the outline of coasts, routes of explorers, locations of cities, rivers, mountains, etc. could then be transposed onto the new graticule in an elaborate game of connect the dots. If a cartographer or a publisher wished to change the projection, it was a lengthy time-consuming process to ensure that all of the locations were accurately represented on the new grid. (See Figure 2.8.) Today cartographers can change projections with a few keystrokes, making projection change a much more routinely utilized design option.

[5] Norman J. W Thrower, *Maps & civilization: cartography in culture and society*, 221-227.

Figure 2.8. The Process of Transferring Data from One Projection to Another.



Ten points were plotted on a Mercator Projection grid (left) and a conical grid (right) with one-degree lines of latitude and longitude shown to illustrate how cartographers ‘connect the dots’ while changing projections. Clearly, more dots increase accuracy. Maps Generated by Michele Abee.

Alternatives to The Mercator Projection

The Globular Projection is an excellent alternative projection. It predates the Mercator Projection and is one of the oldest known projections in western mapmaking. The first known use of the Globular Projection was in approximately 1000 C.E. by Islamic scholar Abu al-Rayhan Muhammah ibn Ahmad Al-Biruni for star maps.[6] The 1600 reinvented projection by Nicolosi is the more popular and reproduced version.[7] The Globular Projection gives two hemispheres a globelike appearance by drawing the chosen

[6] John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 14.

[7] John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 14.

central meridian as perpendicular and the remaining meridians as arcs of circles meeting at the poles, which are equally spaced along the equator and two maps. One of each hemisphere is typically presented as the whole world map.[8] (See Figure 2.9.) Although this projection is older than the Mercator Projection it is nevertheless an excellent alternative because it maintains the circular nature of the earth and the shapes of its hemispheres. It is also simple to manually construct. A cartographer creates it with a compass and straight edge. Although an excellent and popular alternative, it still has its shortcomings. The Globular Projection does not use space well and is often difficult to label, making the labeling process more selective for the cartographer.

Figure 2.9. Oestliche und Westliche Halbkugel der Erde…Western and Eastern Hemispheres, Carl Ferdinand Wiland (Weimar, Germany: Geographisches Institut, 1842).

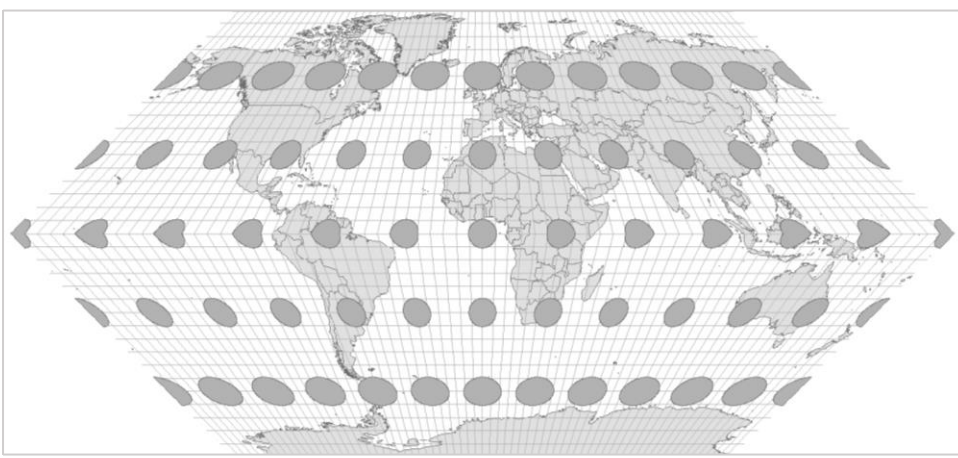
(Source: David Rumsey Map Collection)

[8] John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 14.

Since the late 1800s and early 1900s, cartographers have advocated to discontinue the use of the Mercator Projection for most world maps. To assist with that transition, cartographers have made suggestions for more appropriate alternative projections to use for world maps. During the late 1800s and early 1900s, German cartographer Max Eckert was the first to identify the inherent shortcomings of the Mercator Projection for general world maps. He created a series of his own projections as alternatives: Eckert Projections I-VI.[9] (See Figure 2.10.) Eckert stated that while the Mercator Projection was "par excellence, the map of the navigator," it was rarely suited for any use outside of navigation.[10]

Figure 2.10. Eckert Projections I, III, and VI.

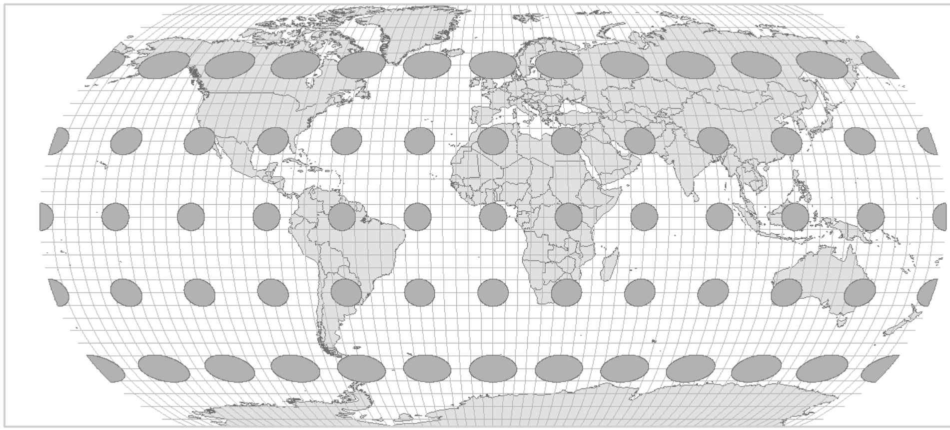
a. Eckert I



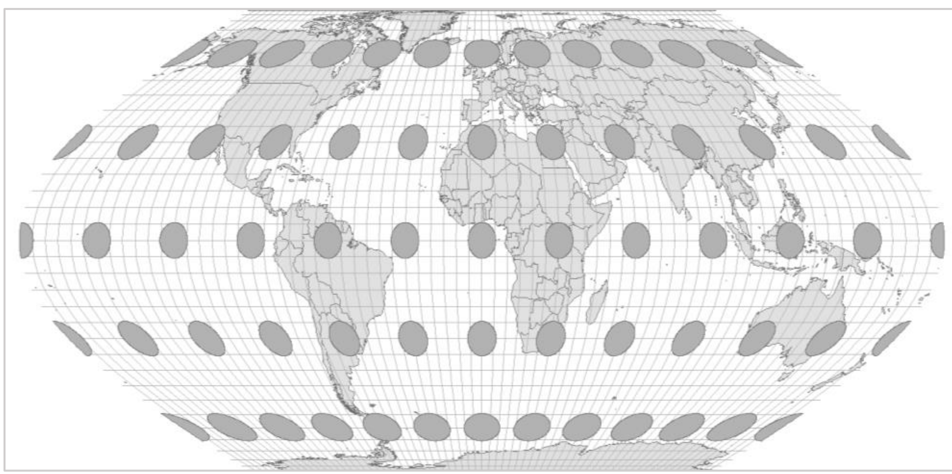
[9] According to ESRI, there are six Eckert projections. Wolfgang Scharfe, "Max Eckert's "Kartenwissenschaft": The Turning Point in German Cartography" in *Imago Mundi* 38 (1986): 63-64.

[10] Max Eckert and W. Joerg, "On the Nature of Maps and Map Logic," in *Bulletin of the American Geographical Society* 40, no. 6 (1908): 346.

b. Eckert III.



c. Eckert VI.



Eckert III and VI are the more popular projection choices for world maps.
Maps Generated by Michele Abee.

In his 1926 Association of American Geographers (AAG) Presidential Address, John Paul Goode echoed Eckert's concerns.[11] The Mercator Projection, according to Goode, is

[11] John Paul Goode, "The Map as a Record of Progress in Geography," in *Annals of the Association of American Geographers* 17, no. 1 (1927): 7. A. H. Robinson and Helen M. Wallis, "Humboldt's Map of Isothermal Lines: A Milestone in Thematic Cartography," *The Cartographic Journal*, 4, no. 2 (1967): 192.

indispensable for its intended function of navigation. However, Goode deplored its general use, writing, “but for most of the uses for which a geographer requires a map it is an evil Mercator just the same.”[12] The entirety of Goode’s address is about the progress of map making up until the 1920s.[13] Goode, outside of Eckert, was one of the earliest to note how quickly and firmly ingrained the Mercator Projection had become with world maps. In his discussion with American geographers, Goode called geographers present to address this oversight and correct it across the discipline.[14]

Goode, like Eckert, developed his own projection, the interrupted homolographic projection, as a more suitable replacement for the Mercator Projection.[15] (See Figure 2.11.) Goode, upon release of his projection, claimed that the Mercator Projection became popular “because it was familiar.”[16] Goode also stated, “Mercator’s projection has been used almost exclusively for world distributions in all previous atlases.”[17] From that point, Goode only used the Mercator Projection in his *School Atlas* once, and that was as a comparison to his projection to show the degree of distortion caused by the

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[12] John Paul Goode, “The Map as a Record of Progress in Geography,” in *Annals of the Association of American Geographers* 17, no. 1 (1927): 8.

[13] John Paul Goode, “The Map as a Record of Progress in Geography,” 1-14.

[14] John Paul Goode, “The Map as a Record of Progress in Geography,” 1-14.

[15] John Paul Goode, *Goode’s School Atlas Physical, Political and Economic for American Schools and Colleges*, x. William Haas and Harold Ward, “J. Paul Goode,” in *Annals of the Association of American Geographers* 23, no. 4 (1933): 241-246.

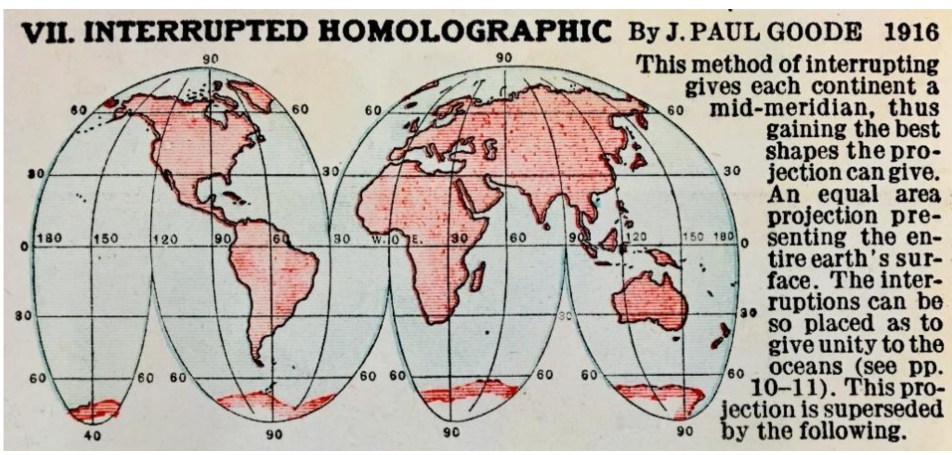
[16] John Paul Goode, *Goode’s School Atlas*, 119.

[17] John Paul Goode, *Goode’s School Atlas*, x.

Mercator Projection for world maps.[18] From 1923 to today's twenty-third edition, Rand McNally has applied the Goode Homolographic Projection, in which Goode cited 'truth of area' as the most important factor in selecting a projection for general geographic use.[19] Goode's close relationship with one of the most popular cartographic publishers was an important outlet for academic cartographers bent on educating the public. However, few other map publishing firms followed suit.

Figure 2.11. Goode's Homolographic, Homolosine, and Current Projections.

a. J.P. Goode, 'VII. Interrupted Homolographic Projection by J. Paul Goode 1916,' Chicago, Illinois; New York, New York; San Francisco, California: Rand McNally & Company, 1948.

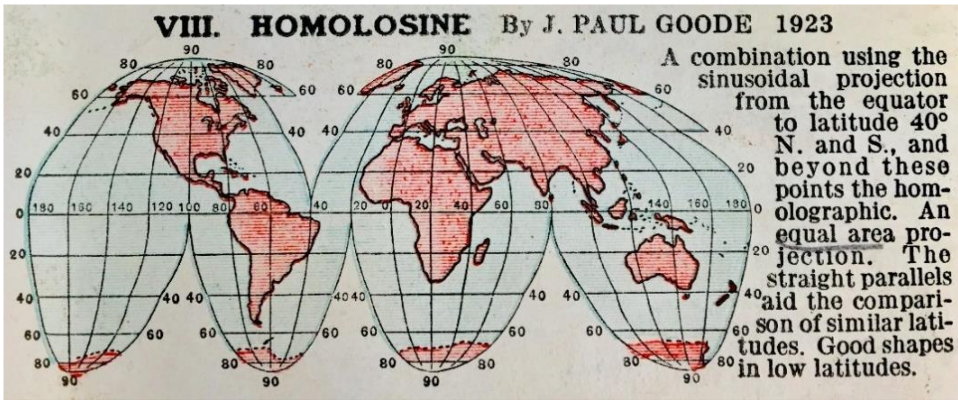


(Source: *Goode's School Atlas Physical, Political and Economic for American Schools and Colleges Revised and Enlarged*)

[18] John Paul Goode, *Goode's School Atlas*, xi-xiii.

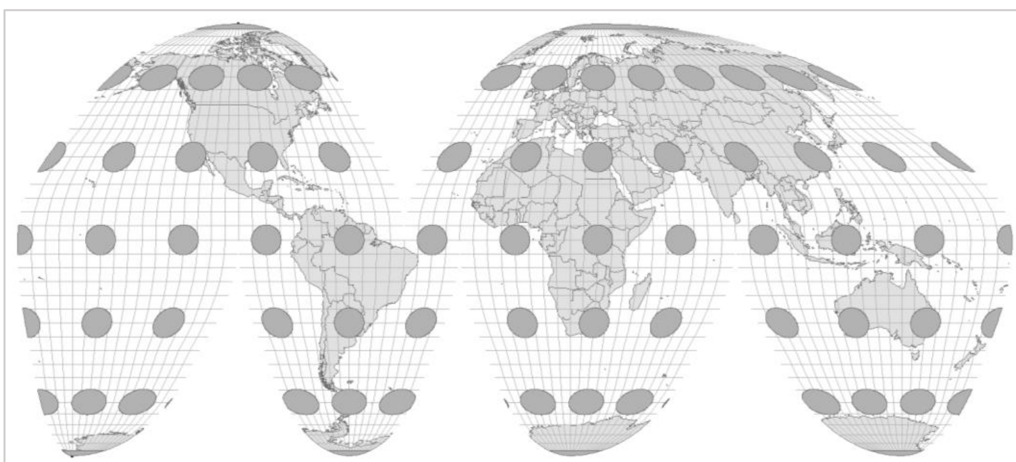
[19] Mark Monmonier, *Rhumb Lines and Map Wars: A Social History of the Mercator Projection*, 132.

b. J.P. Goode, ‘VIII. Interrupted Homolographic Projection by J. Paul Goode 1923,’ Chicago, Illinois; New York, New York; San Francisco, California: Rand McNally & Company, 1948.



(Source: *Goode’s School Atlas Physical, Political and Economic for American Schools and Colleges Revised and Enlarged*).

c. The Current Goode Homolosine Projection.



Map Generated by Michele Abee.

Goode did not advocate that his projection was the best for general use; he praised the development of the Van der Grinten projection for that purpose. Goode claimed that the Van Der Grinten projection was a median between the Mercator and Mollweide (an equal area projection) projections, by representing on one circle the earth's surface that reduced the angular distortion of the Mollweide Projection, and at the same time reduced at a proportional rate the distortion of areas and distances on the Mercator Projection.[20] Goode also noted that the projection maintained a sense of the curvature of the Earth.[21] From 1922 to 1988, the National Geographic Society adopted the Van der Grinten as their "official" world map projection.[22]

In 1942, O. M. Miller developed a new cylindrical projection as a compromise to the extensive shape deformation found on most equal area world maps and the areal distortion found on the Mercator Projection.[23] (See Figure 2.12.) The Miller projection, like the Mercator Projection, is a mathematically derived cylindrical projection.[24] By reducing the distance between lines of latitude as they approach the poles, the Miller Projection reduces the exaggeration of the polar region's areal extent that is the hallmark of the Mercator Projection.[25] While the modification decreases the distortion in area, it introduces significant distortion in local shape and direction.[26]

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[20] John Paul Goode, "A New Method of Representing the Earth's Surface," in *Journal of Geography* 4, no. 9 (1905): 370-371.

[21] John Paul Goode, "A New Method of Representing the Earth's Surface," 370-371.

[22] John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 258-262.

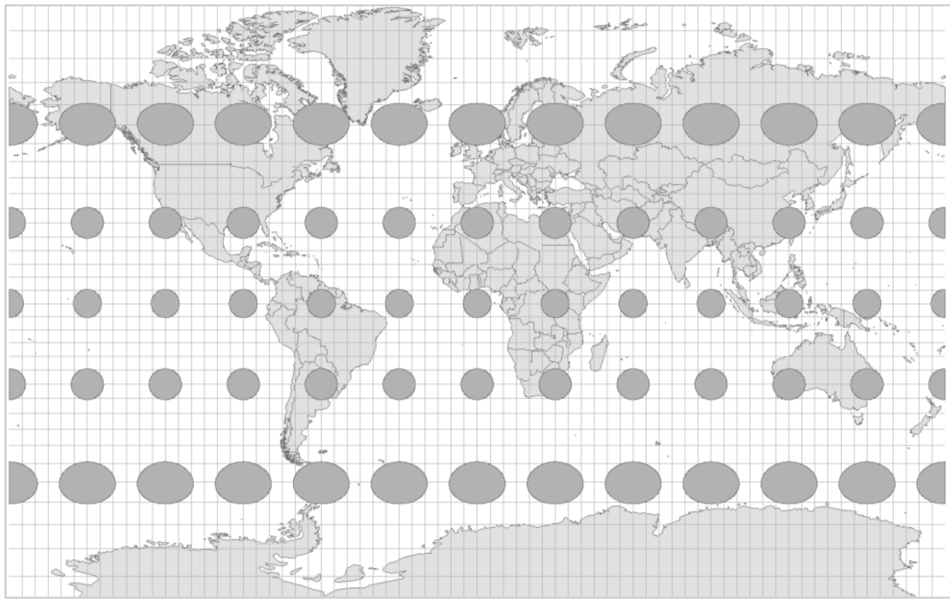
[23] Mark Monmonier, *Rhumb Lines and Map Wars: A Social History of the Mercator Projection*, 128-129.

[24] O.M. Miller, "Notes on Cylindrical World Map Projections," in *Geographical Review* 32, No. 3 (July 1942): 242-245.

[25] O.M. Miller, "Notes on Cylindrical World Map Projections," 242-245.

[26] O.M. Miller, "Notes on Cylindrical World Map Projections," 430.

Figure 2.12. The Miller Projection.



Map Generated by Michele Abee.

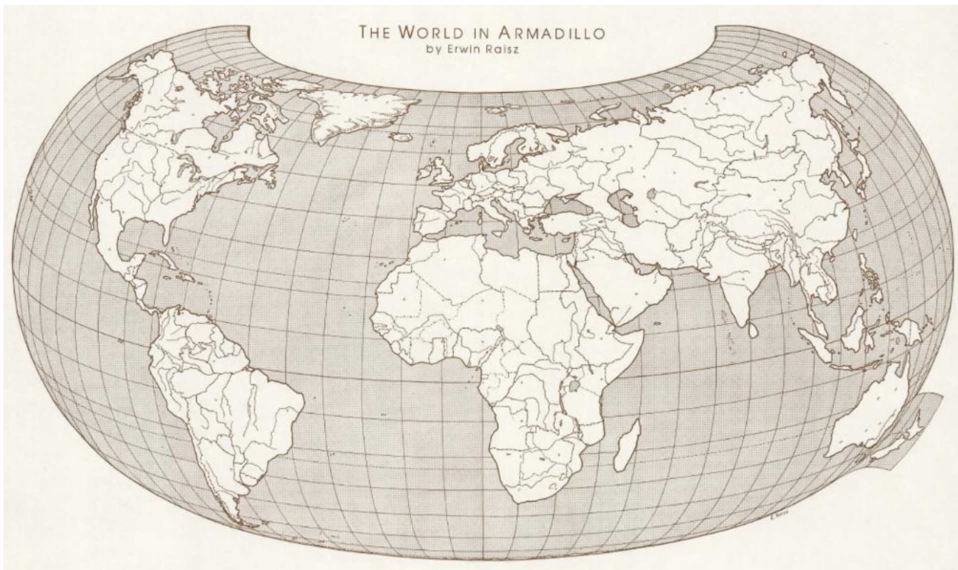
In the early 1940s, cartographer Erwin Raisz created the orthoapsidal double projection, affectionately referred to as the 'armadillo' projection.[27] (See Figure 2.13.) On a tilt of 20 degrees, the parallels and meridians are equally spaced with semicircles forming the poles to show a relatively high land-to-sea ratio on a world map.[28] While Raisz, like other cartographers, railed against the use of the Mercator Projection for general world maps, he did not advocate the use of his orthoapsidal projection, believing there were better options. Despite Raisz's lack of support the projection has seen use,

[27] John P. Snyder, *Flattening the Earth*, 267-268.

[28] John P. Snyder, *Flattening the Earth*, 267-268.

most notably by the G.F. Cram Mapping Company, a leading provider of classroom wall maps in the U.S. A part of its appeal may be the illusion of three dimensions.

Figure 2.13. The World in Armadillo by Erwin Raisz.



(Source: David Rumsey Map Collection)

Undoubtedly, the alternative projection that has spurred the greatest debate is the Peters or Gall-Peters projection. In 1967, Arno Peters began attacking academic cartographers for perpetuating a Eurocentric bias through the continued use of the Mercator Projection. Peters claimed to have developed a new cylindrical equal area projection, which he promoted as a superior alternative to the Mercator Projection.[29] The Gall-Peters Projection is an equal-area projection that preserves the shape of a region

[29] Arthur Robinson, "Arno Peters and His New Cartography," in *The American Cartographer* 12, no. 2 (1985): 103.

between the 45th north and south latitudes.[30] Peters stated his reason for developing a "new projection" was that there were no usable equal area projections available. However, Peters's projection was a revision of the nineteenth century Gall equal area projection.[31] In 1885, Reverend James Gall published three new projections: Stereographic, Isographic and Orthographic.[32] The orthographic is the equal area projection that Gall claims is best used for physical maps or statistical maps.[33] (See Figure 2.14.) After the publication of the Gall-Peters Projection, a controversy erupted between the academic cartographic community and Peters when he asserted that the widespread use of the Mercator Projection was the result of Eurocentrism, supported by academic cartographers.[34]

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[30] John P. Snyder, *Flattening the Earth*, 165.

[31] Arthur Robinson, "Arno Peters and His New Cartography," in *The American Cartographer* 12, no. 2 (1985): 104.

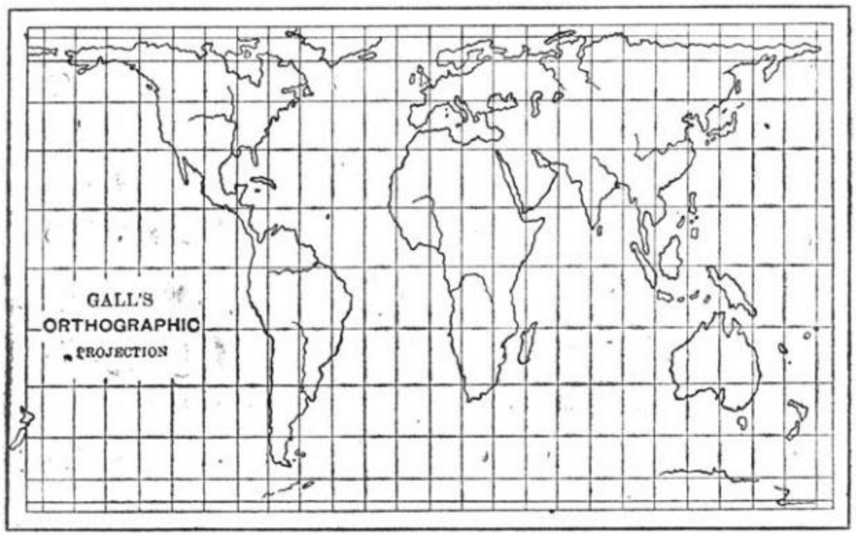
[32] James Gall, "Use of Cylindrical Projections for Geographical Astronomical, and Scientific Purposes," *Scottish Geographical Magazine* 1, no. 4 (April 1885): 119–23.

[33] James Gall, "Use of Cylindrical Projections for Geographical Astronomical, and Scientific Purposes," 121.

[34] Arthur Robinson, "Arno Peters and His New Cartography," 103.

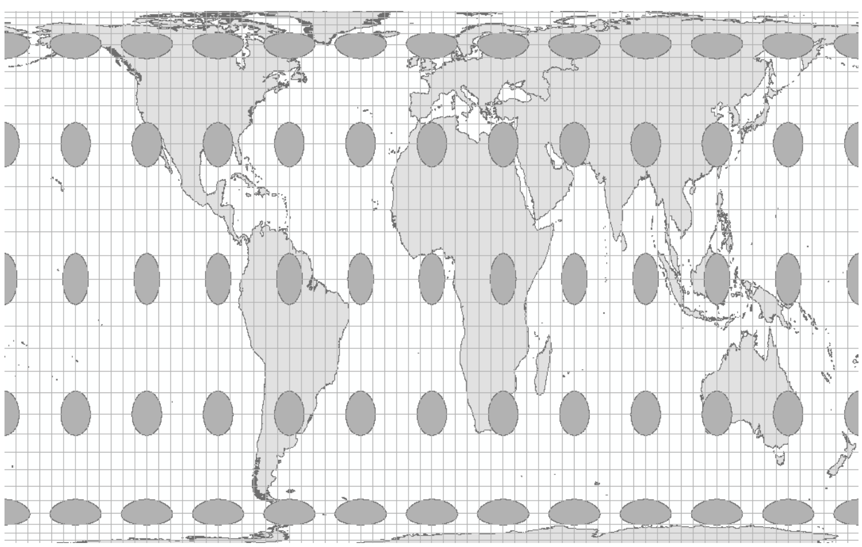
Figure 2.14. The Gall Projection Versus the Gall-Peters Projection.

a. Reverend James Gall's Orthographic Projection.



This is the map Arno Peters relied upon to create his equal area projection. (Source: *Scottish Geographical Magazine*)

b. Gall-Peters World Map.



This is Arno Peters's equal area projection for world maps. While the projection preserves areal distortion, it does not preserve shape, distance or direction. Map Generated by Michele Abee.

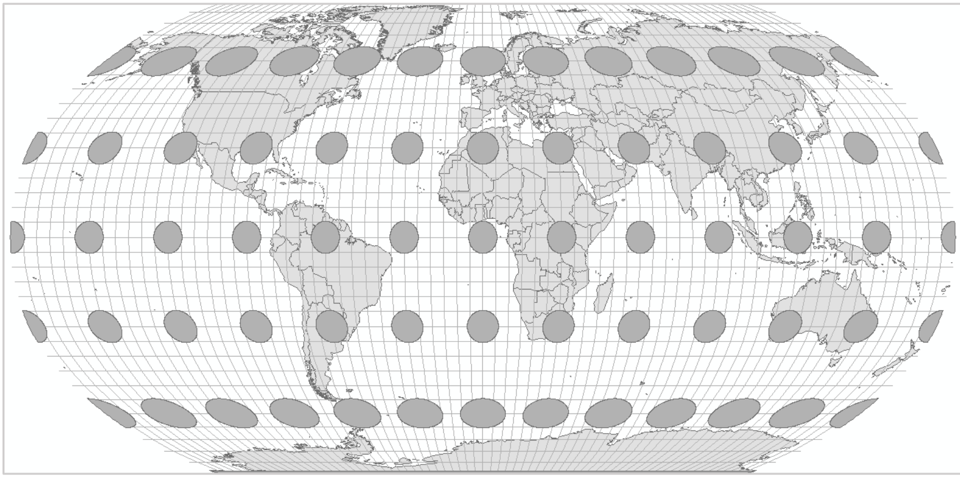
Three recently designed alternatives to the Mercator Projection that have received a great deal of support from the academic and commercial cartographic communities are the Robinson Projection, the Patterson, and Equal Earth Projections. The Robinson Projection was devised by Arthur H. Robinson in 1963 in response to an appeal from the Rand McNally Company. Rand McNally, the largest commercial map maker in the United States, wanted a visually appealing projection that met a set of practical requirements for labeling, printing, and space use. The resulting projection, mathematically developed, compromises on all map properties.[35] (See Figure 2.15.) Rand McNally and National Geographic both adopted the Robinson Projection for their world maps after the projection's publication.[36] As a response to the popularity of Arno Peters and his projection, the American Congress on Surveying and Mapping, a committee formed by the America Cartographic Association, adopted a resolution denouncing the use of any rectangular projections for general world maps.[37] The committee asserted, "Other rectangular world maps proposed as replacements for the Mercator also display a greatly distorted image of the spherical earth."[38]

[36] John P. Snyder, *Flattening the Earth*, 214-216.

[37] Arthur Robinson, "Rectangular World Maps - NO!," *The Professional Geographer* 42, no. 1 (1990): 101.

[38] Arthur Robinson, "Rectangular World Maps - NO!," *The Professional Geographer* 42, no. 1 (1990): 101.

Figure 2.15. The Robinson Projection.



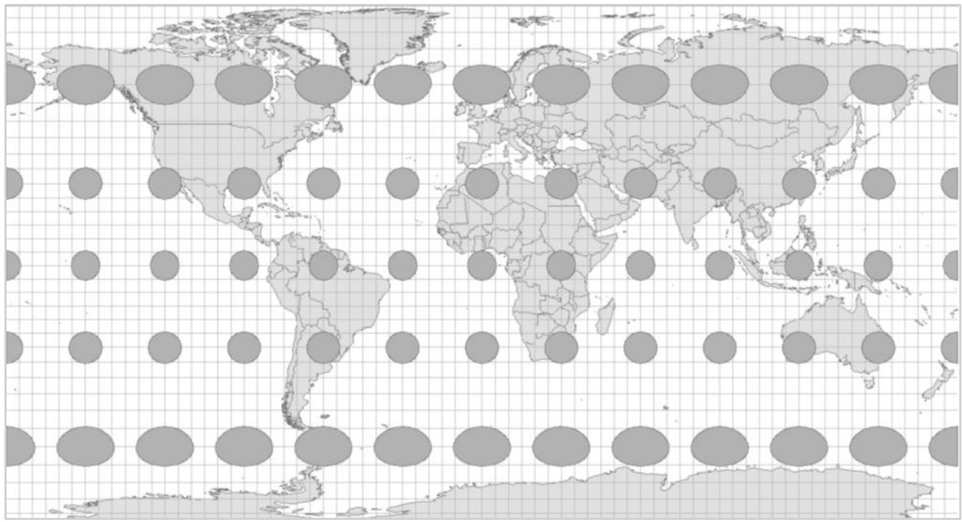
Map Generated by Michele Abee.

Two of the most recent alternatives to the Mercator Projection have been developed by Tom Patterson and his research team (Bernhard Jenny and Bojan Šavrič). (See Figure 2.16.) The first projection is a cylindrical projection combining aspects of the Plate Carree and Miller projections.[39] The Patterson Cylindrical projection with moderate aspect ratios has less extreme polar area distortion and more recognizable continental shapes than the Mercator or virtually any other cylindrical projection, and "fit the page well."[40] The Patterson Projection invokes the familiarity of the Mercator Projection and its labeling ease.

[39] Tom Patterson, Bojan Šavrič, and Bernhard Jenny, "Introducing the Patterson Cylindrical Projection," in *Cartographic Perspectives*, 78 (2014): 77.

[40] Tom Patterson, Bojan Šavrič, and Bernhard Jenny, "A compromise aspect-adaptive cylindrical projection for world maps," in *International Journal of Geographical Information Science* 29, no.6 (2015): 250-251.

Figure 2.16. The Patterson Cylindrical Projection.



Map Generated by Michele Abee.

Additionally, Patterson and his team created another alternative world map projection called the Equal Earth projection. (See Figure 2.17.) The Equal Earth projection is an equal area pseudocylindrical projection created specifically for world maps.[41] Patterson, Jenny and Šavrič mainly created the projection in response to the Boston Public Schools switching their classroom maps to the Gall-Peters Projection.[42] Their criteria for creating this new projection included that the projection had to be visually pleasing and the projection had to display the continents and countries at their true sizes relative to each other.[43] Other positive features of the projection include its

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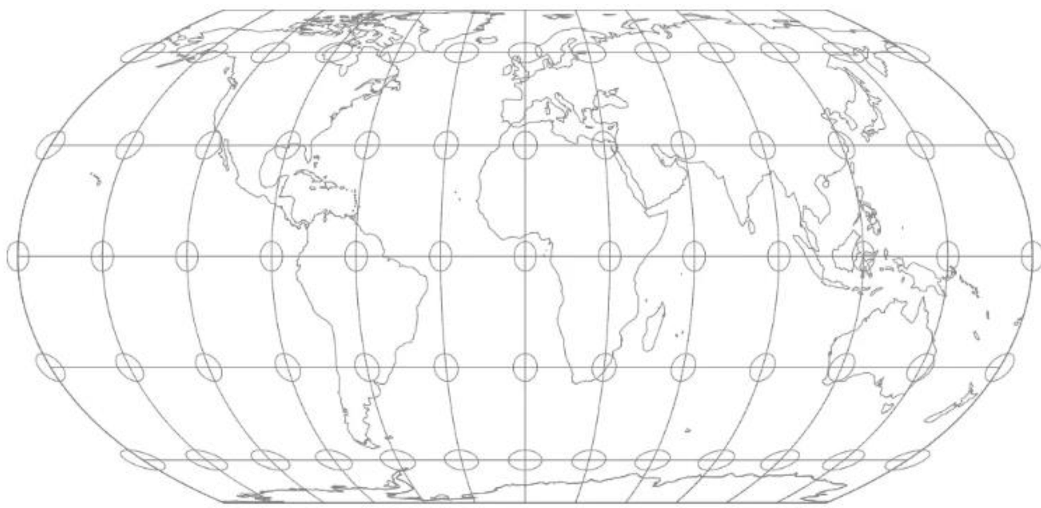
[41] Šavrič, Bojan, Tom Patterson, and Bernhard Jenny. "The Equal Earth Map Projection," 454.

[42] Tom Patterson, "Equal Earth Projection." *Shaded Relief,* January 24, 2019. http://shadedrelief.com/ee_proj/.

[43] Šavrič, Bojan, Tom Patterson, and Bernhard Jenny. "The Equal Earth Map Projection." 455-456.

curved sides suggesting the Earth's spherical form, the relatively modest shape distortion compared to other equal area projections and that the meridians are evenly spaced along any given line of latitude. NASA has already published a variety of maps on the Equal Earth projection.[44] (See Figure 2.18.)

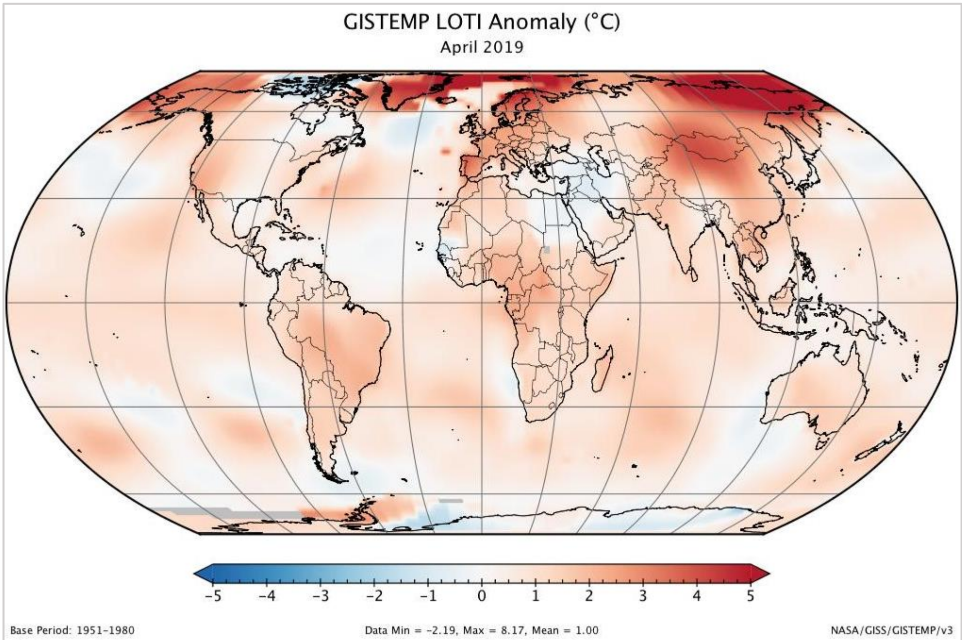
Figure 2.17. The Equal Earth Projection.



This is an example of the Equal Earth projection. (Source: Shaded Relief and Flex Projector)

[44] Tom Patterson, "Equal Earth Projection." *Shaded Relief*, January 24, 2019. http://shadedrelief.com/ee_proj/.

Figure 2.18. The Equal Earth Projection as Used by NASA.



This is a thematic map on the Equal Earth Projection, and it was created by the NASA Goddard Institute for Space Studies. (Source: Shaded Relief)

During the late twentieth century, a slightly transformed version of the Mercator Projection known as the Web Mercator Projection was introduced by Google Maps.[45] The Web Mercator Projection shifted the presence of the Mercator Projection from printed page to computer screen. Despite the distortions of the Mercator Projection being familiar to audiences, the creation of the Web Mercator Projection has created a resurgence in the projection's use.[46] According to Battersby and Montello, the Web

[45] Michael P. Peterson, *Mapping in the Cloud* (New York, New York: The Guilford Press, 2014), 29.

[46] Sarah E. Battersby, Michael P. Finn, E. Lynn Usery, Kristina H. Yamamoto, "Implications of Web Mercator and Its Use in Online Mapping," in *Cartographica: The International Journal for Geographic Information and Geovisulaization*, 49, no. 2 (2014): 86.

Mercator Projection poses several cognitive, educational and design issues. The Web Mercator Projection also has the potential to impact the perception of global scale spaces, particularly through the extreme distortion and areal exaggeration north and south of 47 degrees latitude because of its online platform. Battersby and Montello conclude the Web Mercator Projection's future is a concern because of its potential impacts on cartography, and its influence on the cognitive representations of the world in map readers' minds.[47] The cartographic community has created alternative projections to the Mercator Projection for world maps that most major mapping companies have adopted for their printed materials. There is continued use of the Mercator Projection by small graphic arts firms, who typically do not have a cartographer on staff, and more importantly by Google Maps and other online mapping services.

Gerard Mercator was the first cartographer to design a projection to address specific user needs. This approach to mapping was an important step in the development of the modern field of cartography. What makes the Mercator Projection an excellent projection for navigation does not make it applicable for other uses, and this is especially true for showing areas above the mid-latitudes where extreme areal distortions occur. The inappropriate use of the Mercator Projection for geovisualization on world maps has led numerous cartographers to advocate for its discontinued use on most world maps and spurred their efforts to develop alternative projections. In the following chapter, the

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[47] Sarah E. Battersby and Daniel R. Montello, "Area Estimation of World Regions and the Projection of the Global-Scale Cognitive Map," in *Annals of the Association of American Geographers* 99, no.2 (2009): 99.

creation and early development of the Mercator Projection will be traced including the role of portolan charts, the early use of rhumb lines by the Portuguese cartographer Pedro Nunez, and the influence of Gerard Mercator's scholastic network in the early development, dissemination and use of the Mercator Projection.

CHAPTER III

THE MERCATOR PROJECTION'S HISTORICAL BACKGROUND

Gerard Mercator created the Mercator Projection to solve a specific problem. How could mariners navigate across open oceans, away from known land? Before Mercator created his projection in 1569, mariners relied on portolan charts to navigate. A portolan chart is a navigational chart, typically produced on vellum, illustrating harbor cities around the Mediterranean Sea, Black Sea, and northern or western African coastline.[1] Since the thirteenth century, mariners had relied on portolan charts, the compass (which was either introduced from China at the end of the twelfth century, or perhaps developed independently in Europe), and first-hand experience to navigate within the Mediterranean, the western and northern coast of Africa, and the Black Sea.[2] Despite their detail and accuracy, portolan charts had limitations. See Figure 3.1, showing their range was geographically confined, they depicted little information

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[1] Eric H. Ash, "Navigation Techniques and Practice in the Renaissance," in *The History of Cartography, vol. 3, Cartography in the European Renaissance* (Chicago, Illinois; London, UK: University of Chicago Press, 2007), 510-514. Giancarlo Casale, *The Ottoman Age of Exploration* (Oxford, UK; New York, New York: Oxford University Press, 2010), 18. Patricia Seed, *The Oxford Map Companion: One Hundred Sources in World History* (Oxford, UK; New York, New York: Oxford University Press, 2014), 82.

[2] Giancarlo Casale, *The Ottoman Age of Exploration*, 18. Patricia Seed, *The Oxford Map Companion: One Hundred Sources in World History* (Oxford, UK; New York, New York: Oxford University Press, 2014), 82.

regarding terrestrial areas located inland from ports, and they relied heavily on the individual knowledge and capabilities of mariners and pilots.[3]

Figure 3.1. *Portolan Chart of the Western Mediterranean*, Portolan Chart, Naples, Italy, 1511.

This portolan chart illustrates typical features found on this type of map. The coastlines are identifiable and port cities are well marked, along with their political identities. The purpose of these maps was for water and port transportation. (Source: John Carter Brown Library).

In the 1400s and 1500s, as European mariners ventured farther from their familiar coastlines beyond the Mediterranean Sea and the coastlines of Africa, portolans became

[3] Patricia Seed, *The Oxford Map Companion: One Hundred Sources in World History*, 18-20. Giancarlo Casale, *The Ottoman Age of Exploration*, 78-82.

unreliable.[4] This was a time of aggressively rapid exploration, discovery and expansion into the Atlantic and Indian Ocean basins, the result of desires to directly connect with source markets in Asia.[5] This expansion, first by the Spanish and Portuguese, was followed by the Dutch, English and French. Nautical-based exploration needed both accurate maps and an easy method for plotting and following a course between distant places. J.H. Parry describes five resources a captain would need to safely navigate ships: first, the direction of his destination; second, how long it would take to sail there; third, means of knowing when he neared his destination; fourth, what the destination looked like; and finally, if he could reverse the process.[6] Thus, a problem and a need arose for western Europeans to increase accuracy and efficacy in navigation at sea.

The Mercator Projection was the culmination of years of early-modern western European mapmaking. It was a product of a remarkable individual with well-developed mathematical and cartographic skills and data collected from his extensive network of fellow cartographers, academics, explorers and working navigators.[7] Gerard Mercator

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[4] Thomas Benjamin, The *Atlantic World: Europeans, Africans, Indians and Their Shared History, 1400-1900,* 1 edition (Cambridge: Cambridge University Press, 2009), 2-5. Bernard Bailyn, *Atlantic History: Concept and Contours* (Cambridge, Mass: Harvard University Press, 2005), 59-62.

[5] J.H. Parry, *The Discovery of the Sea* (Berkeley and Los Angeles, California: University of California Press, 1981), xii.

[6] J.H. Parry, *The Discovery of the Sea*, 24-25.

[7] Nicholas Crane, *Mercator: The Man Who Mapped the Planet* (New York, New York: Henry Hold and Company, 2003), 204-207. Gerardus Mercator, "Atlas Sive Cosmographicae Meditationes de Fabrica Mundi et Fabricati Figura: Duisburg, 1595," trans. David Sullivan (CD-ROM (2 discs), 2000), 11-12, https://web.archive.org/web/20160310032427if_/http://mail.nysoclib.org/mercator_atlas/mcrats.pdf, Library of Congress.

represented what it meant to be a geographer during the early-modern era, at the forefront of the 'Golden Age' of Dutch cartography. The sixteenth century was a time of globalization, when both geography and cartography took a modernizing turn.[8] Newly acquired information from exploratory voyages not only expanded European geographical knowledge, but also propelled knowledge in a wide range of scientific disciplines. Among those individuals driving these advances in science were Gerard Mercator and his contemporaries.

Origins of the Mercator Projection and the Role of Mercator's Network

In summary, Mercator's skills as a mathematician, map and globe maker combined with his extensive web of contacts were essential for the development of his revolutionary projection. Mercator's education, as well as his network of scholastic relationships and his ties to working navigators and merchants influenced the development of his projection from rhumb lines. It is clear that Mercator realized the benefit of this network as he maintained extensive correspondence in six languages with prominent scholars, seamen, merchants, and travelers even though he traveled little during his lifetime.[9] His extensive correspondence and interviews with sea captains, traveling merchants and other explorers, as well as his voluminous collection of nautical

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[8] J.H. Parry, *The Age of Reconnaissance* (London, UK: Weidenfeld and Nicholson, 1963), vii. David N. Livingstone, *the Geographical Tradition: Episodes in the History of a Contested Enterprise* (Oxford, UK; Cambridge, Massachusetts: Blackwell Publishers, 1993), 51-52.

[9] Gerardus Mercator, "Atlas Sive Cosmographicae Meditationes de Fabrica Mundi et Fabricati Figura: Duisburg, 1595," 10-11.

and terrestrial maps and books, allowed Mercator to compile a comprehensive list of locations.[10] This network also aided in the initial spread of the Mercator Projection. Mercator built a solid foundation from his classical education but broke with it to experiment and push scholastic cartographic knowledge forward. His studies in Antwerp were under the mentoring of scholars Franciscus Monachus, Gemma Frisius and Gaspar van der Heyden.[11] Monachus taught Mercator Ptolemy's geographic works and globe making, Gamma Frisius taught him geometry, astronomy, mathematics and instrument making, and Gaspar van der Heyden taught him goldsmithing and engraving.[12] All of these men influenced Mercator's development into a well-rounded geographer capable of producing his own instruments for his works. The progression of Mercator's education reveals the skill, knowledge and ability it took for Mercator to become a philosopher, mathematician and constructor and engraver of maps. Map construction and engraving were professions that took skills and a certain level of intellect to master and were an advanced course of study.[13]

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[10] Gerardus Mercator, "Atlas Sive Cosmographicae Meditationes de Fabrica Mundi et Fabricati Figura : Duisburg, 1595," 11-12.

[11] Nicholas Crane, *Mercator: The Man Who Mapped the Planet*, 40. Jerry Brotton, *A History of the World in 12 Maps* (New York, New York: Penguin Books, 2012), 224-225.

[12] Jerry Brotton, *A History of the World in 12 Maps*, 225.

[13] Gerhard Mercator et al., *Historia Mundi: Or Mercator's Atlas: Containing His Cosmographicall Description of the Fabricke and Figure of the World. Lately Rectified in Divers Places, as Also Beautified and Enlarged with New Mappes and Tables; by the Studious Industry of Iudocus Hondy. Englished by W. S. Generosus, & Coll. Regin. Oxoniae* (London: Printed by T. Cotes, for Michael Sparke and Samuel Cartwright, 1635), 7-8, http://gateway.proquest.com/openurl?ctx_ver=Z39.88-2003&res_id=xri:eebo&rft_val_fmt=&rft_id=xri:eebo:image:14932.

Mercator's teachers and colleagues taught him how to create rhumb lines that followed a compass bearing, which he needed in order to create his projection. Since globes were used in navigation, one can see how Mercator might later flatten the gores and space lines of latitude to one another in an attempt to create the desired effect of a rhumb line being laid flat onto a two-dimensional developable planar surface. For the projection to work properly, Gerard Mercator realized that for travel across vast areas of ocean the projection had to develop true rhumb lines.[14] While the straight lines on portolan charts were not actual loxodromes (lines of constant compass bearings), they were useful approximations for navigating short distances across contained and known bodies of water.

Scholars believe that Mercator may have constructed his projection by using Pedro Nunez's concept to place rhumb lines on a terrestrial globe.[15] Portuguese mathematician Pedro Nunez was a contemporary of Mercator best known for creating the mathematics of rhumb lines, which would later be critical for the development of the Mercator projection.[16] In 1537, Nunez completed *Tratado da sphere,* which included a

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[14] Henrique Leitão and Joaquim Alves Gaspar, "Globes, Rhumb Tables, and the Pre-History of the Mercator Projection," *Imago Mundi* 66, no. 2 (July 3, 2014): 180.

[15] David Greenhood, *Mapping* (Chicago, Illinois: University of Chicago Press, 1964. John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections* (Chicago, Illinois: University of Chicago Press, 1993). Mark Monmonier, *Rhumb Lines and Map Wars: A Social History of the Mercator Projection* (Chicago, Illinois: University of Chicago Press, 2004). Patricia Seed, *The Oxford Map Companion: One Hundred Sources in World History*, 104-105.

[16] Henrique Leitão and Joaquim Alves Gaspar, "Globes, Rhumb Tables, and the Pre-History of the Mercator Projection,": 180–181.

Portuguese translation of Sacrobosco's *Tractatus de Sphaera (Treaty of the Sphere*); the chapters on the Sun and Moon from Peuerbach's *Theoricae nouae planetarum*; and Book I of Ptolemy's *Geographia*, which he combined with his own two new works entitled *Tratado sobre certas dúvidas da navegação* (Treatise on certain doubts of navigation) and *Tratado em defensam da carta de marear* (*Treatise in defense of the nautical chart*).[17] In these original works Nunez introduced the concept of the rhumb line and produced an introductory mathematical method for its calculations.[18] Scholars consider it probable that Nunez introduced the concept of utilizing rhumb lines to create a compass line for sailing. The method was later perfected through a series of revisions by Frisus. Mercator then incorporated the concept into the production of his terrestrial globe and, most importantly, into his famed projection.[19] Nunez thought the projection needed to be large enough to be expanded throughout various sheets for an atlas format.[20] This idea

[17] The titles and translations of Pedro Nunez's works are provided by the authors cited in this footnote. E.G.R. Taylor, *Tudor Geography*, 84. Henrique Leitão & Joaquim Alves Gaspar, "Globes, Rhumb Tables, and the Pre-History of the Mercator Projection,": 182-187.

[18] Henrique Leitão & Joaquim Alves Gaspar, "Globes, Rhumb Tables, and the Pre-History of the Mercator Projection,": 182-187.

[19] Frisius included a description of a rhumb line accompanied by a map in Peter Apian's Cosmographia. Mercator's first attempt at creating his own projection was on one of his 1541 terrestrial globes. On the globe, the rhumb lines naturally curve as they should to reflect the curvature of the Earth upon navigating the sea. These loxodromes would be expanded upon when Mercator created his projection. Henrique Leitão & Joaquim Alves Gaspar, "Globes, Rhumb Tables, and the Pre-History of the Mercator Projection,": 181-187.

[20] Henrique Leitão & Joaquim Alves Gaspar, "Globes, Rhumb Tables, and the Pre-History of the Mercator Projection,": 183.

became the reality when Gerard Mercator published the projection as a world map on eighteen sheets in twenty-one sections measuring 1.3 meters by 2 meters once mounted.[21]

Mercator's knowledge of Nunez's work was possible thanks to his friendship with John Dee. Dee was a scientist, mathematician, cartographer, and advisor to prominent figures in the Tudor and early Stuart courts, and was also a colleague of Nunez's and translated Nunez's work for Mercator.[22] While Monachus, Frisius and van der Heyden were training Mercator, Frisius also mentored Dee in 1548 and 1550.[23] During their studies together, Mercator and Dee read the works of Pedro Nunez. Dee also corresponded with Nunez throughout his time in Louvain.[24] The sharing of information between Mercator and Nunez was facilitated by the political ties between Iberia and the Netherlands.[25] The Netherlands had been a part of the Spanish Hapsburg Empire since

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[21] John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections* (Chicago, Illinois: University of Chicago Press, 1993), 45.

[22] E.G.R. Taylor, *Tudor Geography* (London, UK: Methuen and Co., 1930), 75-76. William H. Sherman, 'Dee, John – Oxford Reference,' *The Oxford Encyclopedia of Maritime History*, ed. John J. Hattendorf (Cambridge, UK: Oxford University Press, 2007), last modified 2007, accessed on October 19, 2017, http://www.oxfordreference.com/view/10.1093/acref/9780195130751.001.0001/acref-9780195130751-e-0228?rskey=mzUQ3X&result=2. E.G.R. Taylor, Tudor Geography (London, UK: Methuen and Co., 1930), 84. Henrique Leitao & Joaquim Alves Gaspar, "Globes, Rhumb Tables, and the Pre-History of the Mercator Projection,": 187-188. Henrique Leitao & Joaquim Alves Gaspar, "Globes, Rhumb Tables, and the Pre-History of the Mercator Projection,": 181-187.

[23] Steven Vanden Broecke, "Dee, Mercator, and Louvain Instrument Making: An Undescribed Astrological Disc by Gerard Mercator (1551)," *Annals of Science* 58, no. 3 (2001): 226-229. Nicholas H. Clulee, J*ohn Dee's Natural Philosophy: Between Science and Religion* (London, UK; New York, New York: Routledge, 1988), 26-30.

[24] E.G.R. Taylor, *Tudor Geography*, 84. Henrique Leitão & Joaquim Alves Gaspar, "Globes, Rhumb Tables, and the Pre-History of the Mercator Projection,": 187-188.

[25] C.R. Boxer, *The Dutch Seaborne Empire, 1600-1800* (London, UK: Hutchinson & Co, 1965), 2. Richard W Unger, "Dutch Nautical Sciences in the Golden Age: the Portuguese Influence," *e-Journal of*

1516.[26] But tensions increased during the second half of the sixteenth century while Mercator was studying in Louvain in the southern Netherlands.[27] The relationship between the Dutch and Spanish, particularly in the north, were strenuous due to complicated political, religious and economic grievances between the two parties. Economic and political tension in the Netherlands had been exacerbated by increased taxes levied to support Charles V's wars.[28] Political pressures intensified after Charles V abdicated, leaving the Netherlands to his son Philip, who ruled from Spain and centralized the Dutch government with the appointment of foreign politicians.[29] Religious strife between a Catholic king and rising Protestantism in the lower and middles classes added the final strain.[30]

Portuguese History 9, no. 2 (2011): 74-75, accessed October 9, 2017, https://digitalis-dsp.uc.pt/bitstream/10316.2/25281/1/EJPH9_2_artigo3.pdf?ln=en.

[26] C.R. Boxer, *The Dutch Seaborne Empire, 1600-1800* (London, UK: Hutchinson & Co, 1965), 2. Richard W Unger, "Dutch Nautical Sciences in the Golden Age: the Portuguese Influence," *e-Journal of Portuguese History* 9, no. 2 (2011): 74-75, accessed October 9, 2017, https://digitalis-dsp.uc.pt/bitstream/10316.2/25281/1/EJPH9_2_artigo3.pdf?ln=en. Paul Arblaster, A History of the Low Countries, 2nd edition., Palgrave Essential Histories (New York: Palgrave Macmillan, 2012), 113.

[27] Jonathan Israel, *Empires and Entrepots: Dutch, the Spanish Monarchy and the Jews, 1585-1713* (London, U.K.; Roncevert, WV, U.S.A: Bloomsbury Academic, 2003), ix-xiii.

[28] Maarten Prak, *The Dutch Republic in the Seventeenth Century: The Golden Age*, trans. Diane Webb, First edition (Cambridge, New York: Cambridge University Press, 2005), 14-15. Paul Arblaster, *A History of the Low Countries*, 2nd edition., Palgrave Essential Histories (New York: Palgrave Macmillan, 2012), 111-113.

[29] Maarten Prak, *The Dutch Republic in the Seventeenth Century: The Golden Age*, trans. Diane Webb, First edition (Cambridge, New York: Cambridge University Press, 2005), 15.

[30] Paul Arblaster, *A History of the Low Countries*, 2nd edition., Palgrave Essential Histories (New York: Palgrave Macmillan, 2012), 113-120.

The Mercator Projection in Dutch Atlas Production

The central role of the Dutch in atlas production provided a platform for the initial use and diffusion of the Mercator Projection. Until the sixteenth century, Spain and Portugal led Europe in map production. Spanish and Portuguese mapmaking created some of the most stunning portolan charts, among them *The Catalan Atlas* and other maritime portfolios that were bound and produced for royalty, aristocratic, religious, or wealthy owners.[31] Scholars have limited knowledge about Iberian map production compared to that of European centers of cartography, especially England, the Low Countries and France. David Buisseret argues this is because Iberian maps were closely guarded state secrets.[32] Patricia Seed notes that the destruction of Lisbon in 1755 by an earthquake, followed by a tsunami and fires, destroyed the royal archives and priceless libraries.[33] Both of these reasons explain the scarcity of sources. Regardless, Spanish and Portuguese influence on the map trade in Europe decreased as the Dutch influence grew.

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[31] Helen Wallis, "Sixteenth-Century Maritime Manuscript Atlases for Special Presentation," in *Images of the World: The Atlas Through History*, ed. John A. Wolter and Ronald E. Grim (Washington, DC: Library of Congress, 1997), 3.

[32] David Buisseret, *Monarchs, Ministers, and Maps: The Emergence of Cartography as a Tool of Government in Early Modern Europe* (Chicago, Illinois: University of Chicago Press, 1992), 124. This is also discussed by Helen Wallis, "Sixteenth-Century Maritime Manuscript Atlases for Special Presentation." Wallis discusses how maritime charts leading up to the 1550s were created by special request by a specific patron and were often considered state secrets as they detailed explorations, discoveries, and progress in colonial enterprises.

[33] Patricia Seed, "Magnetic Declination First Recognized on Maps of 1470s," paper presented at Annual Meeting for the American Association of Geographers, Washington, D.C., April 2019.

During the late sixteenth and into the seventeenth century, Italian, Dutch, and Germanic mapmakers challenged Iberian map production, accounting for eighty percent of total map output in Europe.[34] These three regions developed the core of map production, supplying maps for local consumption but also meeting demands across Europe.[35] The smaller regions of England, Spain, Eastern Europe, and Scandinavia produced a limited number of maps in comparison and most likely for their own local consumption, meaning that their initial influence on the map trade was limited.[36] Cartographic production developed in the Low Countries with much publication concentrated in Louvain and Antwerp.[37] By the close of the century, the most influential cartographers were Dutch. Maps and charts were familiar to the early-modern nautically trained and educated elites including monarchs, government officials, wealthy merchants and seamen, and others.[38] The influence of the Dutch school of cartography prior to and during the time of Ortelius-Mercator saw the reproduction of Dutch works across French, Italian, English and German markets.[39]

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[34] Robert Karrow, "Centers of Map Publishing in Europe, 1472-1600," in *The History of Cartography, Volume Three, Cartography in the European Renaissance*, ed. David Woodward (Chicago, Illinois; London, UK: University of Chicago Press, 2007), 620.

[35] Robert Karrow, "Centers of Map Publishing in Europe, 1472-1600," 620.

[36] Robert Karrow, "Centers of Map Publishing in Europe, 1472-1600," 620.

[37] Robert Karrow, "Centers of Map Publishing in Europe, 1472-1600," 617.

[38] David Buisseret, *Monarchs, Ministers, and Maps: The Emergence of Cartography as a Tool of Government in Early Modern Europe* (Chicago, Illinois: University of Chicago Press, 1992), 1-4.

[39] Cornelis Koeman, "Atlas Cartography in the Low Countries in the Sixteenth, Seventeenth and Eighteenth Centuries," 79-80.

Dutch atlas production influenced the initial spread of the Mercator Projection. The Dutch cartographer Abraham Ortelius, a friend of Mercator, created the modern atlas with his publication of *Theatrum Orbis Terrarum* in 1570. That, and the post-mortem publication of Mercator's *Atlas* in 1596 by his son Rumold, changed how maps were collected and sold. Ortelius's release of *Theatrum Orbis Terrarum* is also considered to be part of a shift in the progress of modern cartography, alongside the Mercator Projection.[40] The uniformity presented in *Theatrum* was a model followed for the sea atlases and piloting books in the late 1500s and 1600s, thus setting the stage for future Dutch cartographers Lucas Janszoon Waghenaer, Jansson Willem Blaeu, and Jodocus Hondius. Without this period of cartographic growth in the Low Countries, the influence of the Mercator Projection may not have spread so quickly following its initial publication.

Theatrum was a shift away from the traditional construction of cartographic volumes that relied on Ptolemaic replications, and it created a modernized, uniform atlas. An example of this shift is the opening world map for *Theatrum* compared to the opening map of a Ptolemaic atlas.[41] (See Figures 3.2 and 3.3.) As shown in Figure 3.2, Ortelius used the oval projection, a popular world projection, for *Theatrum.* Mercator later used

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[40] Cornelis Koeman, "Atlas Cartography in the Low Countries in the Sixteenth, Seventeenth and Eighteenth Centuries," in *Images of the World: The Atlas Through History,* ed. John A. Wolter and Ronald E. Grim (Washington, DC: Library of Congress, 1997), 73-78. David N. Livingstone, *The Geographical Tradition*, 52.

[41] Cornelis Koeman, "Atlas Cartography in the Low Countries in the Sixteenth, Seventeenth and Eighteenth Centuries," 73-75. David N. Livingstone, *The Geographical Tradition,* 52.

the same projection for his *Atlas*.[42] Ptolemaic atlases used one of the three world map projections whose construction Ptolemy had described in the *Geographia*; the two that appear most frequently showcase curved edges, or a trapezoidal nature.[43] Ptolemy's world map (Figure 3.3) is an example of his second projection and was commonly seen in Ptolemaic style atlases.[44] Now, cartographers were able to illustrate most of the world, whereas Ptolemy could only display the eastern Hemisphere. This shift in production and publication indicates that the new incoming information from European expansion provided an opportunity to experiment with and expand the cartographic field. It is important to note that neither Ortelius nor Mercator used the Mercator Projection for their atlases.

The atlas format was used for the publication of sea-atlases, pilot books, and supplemental navigational texts. These cartographic works and secondary texts were the initial platform for the diffusion of the Mercator Projection. Several later Dutch cartographers also made and published other cartographic products including globes, wall maps, and sea charts, which helped spread the Dutch style of cartography and the Mercator Projection.[45] Mercator's popular works, not only his projection, but also his other cartographic and publishing endeavors, allowed future cartographers to purchase

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[42] John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 10-14, 38.

[43] John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 10-14, 38.

[44] John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 10-14.
[45] Norman J.W. Thrower, *Maps & Civilization: Cartography in Culture and Society*, 84.

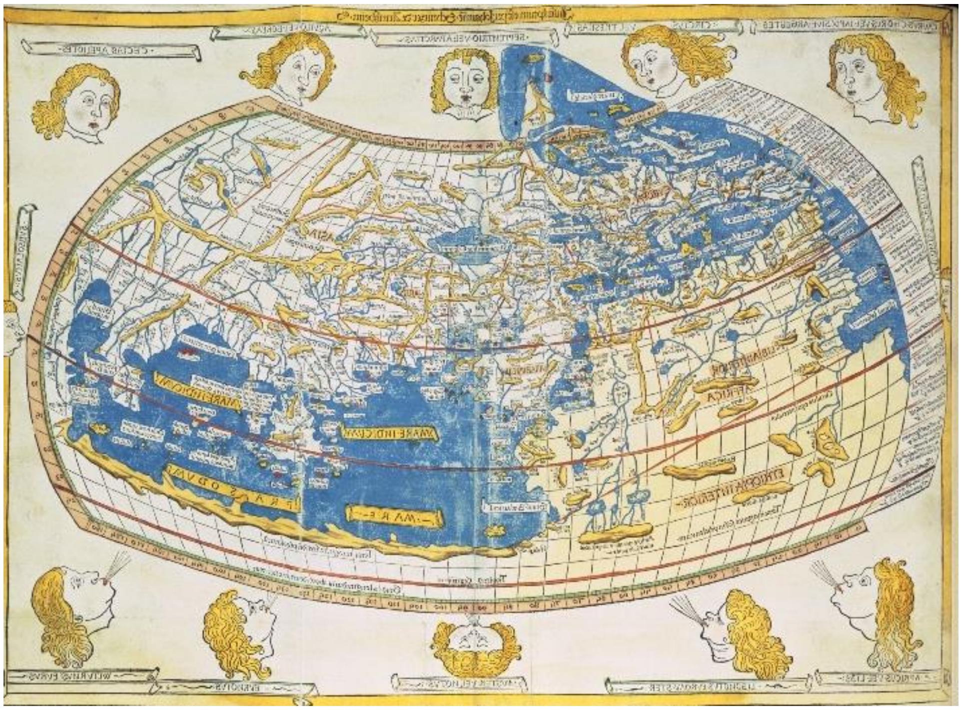
his works post-mortem and use them for the continued production of cartographic knowledge.[46]

Figure 3.2. 'Typus Orbis Terrarum,' Abraham Ortelius (Antwerp: Ex Officina Plantiniana, Abrah. Ortelij aere & cura, 1570).

(Source: Folger Shakespeare Library)

[46] Nicholas Crane, *Mercator: The Man Who Mapped the Planet*, 193-279.

Figure 3.3. *Ptolemy's World Map, 2nd Projection*, Claudius Ptolemy, Lienhart Holle, Beatissimo Patri Paulo Secundo Pontifici Maximo, Donis Nicolaus Germanus (1482).



(Source: British Library)

Mercator inspired a second generation of Dutch mapmakers to engage in this growing lucrative trade. These men were both colleagues and rivals.[47] Jodocus Hondius bought Mercator's works upon his death and reestablished his reputation. Johannes Jansson, Hondius's son-in-law, worked with the Hondius family to further enlarge the Mercator *Atlas* and replaced older maps with updated versions. Jansson Willem Blaeu dominated the pilot book trade and was a prolific mapmaker. Claes Janszoon Visscher

[47] Cornelis Koeman, "Atlas Cartography in the Low Countries in the Sixteenth, Seventeenth and Eighteenth Centuries," 80-92. Gunter Schilder, "Lucas Janszoon Waghenaer's Nautical Atlases and Pilot Books," in *Images of the World: The Atlas Through History* (Washington, D.C.: Library of Congress, 1997), 135-138.

published close to one hundred works, including the influential atlas *Belgium sive Germania Inferior*. Lucas Janszoon Waghenaer published sea-atlases and pilot books that safely instructed mariners.[48]

Hondius, Blaeu, and Waghenaer were the first mapmakers after Mercator and Ortelius to use the Mercator Projection for both navigation and world maps. Hondius later used the Mercator Projection for a general display of the world, and for a few new maps of places recently recorded by European explorers in his *Mercator-Hondius Atlas*.[49] Following Hondius, Blaeu likewise applied the Mercator Projection to maps in his atlases illustrating navigation at a regional and global scale.

This second generation of Dutch cartographers accelerated the integration of the Mercator Projection into atlases for an appropriate audience. The first atlas compiled with sea charts was *De Spieghel der Zeevaerdt* published in 1584 by Lucas Janszoon Waghenaer.[50] The maps in *Spieghel* are substantially more detailed than portolan charts. For example, the 'Holland sea chart' (Figure 3.4) illustrates the sand bars, channels, channel depths, canal ways, harbor cities, inland cities and topographic renderings of cityscapes, thus giving mariners all the information they would need to safely navigate

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[48] Cornelis Koeman, "Atlas Cartography in the Low Countries in the Sixteenth, Seventeenth and Eighteenth Centuries," 80-92. Norman J.W. Thrower, *Maps & Civilization: Cartography in Culture and Society*, 84.

[49] Cornelis Koeman, "Atlas Cartography in the Low Countries in the Sixteenth, Seventeenth and Eighteenth Centuries," 80-84. Cornelis Koeman, Günter Schilder, and Marco van Egmond, "Commercial Cartography and Map Production in the Low Countries, 1500 – ca. 1672," in *The History of Cartography, Volume 3, Cartography in the European Renaissance* (Chicago, Illinois: University of Chicago Press, 2007), 1299, 1324-1325.

[50] Norman J.W. Thrower, *Maps & Civilization: Cartography in Culture and Society*, 84-85.

and bring their vessels to port. This sea atlas was translated into English in 1588, only four years after its initial publication, by Sir Anthony Ashley, as *The Mariner's Mirrour*.[51] This work established the tradition and popularity of sea atlases, which continued into the seventeenth century. In 1658, Doncker published *Zee Atlas*, which used the Mercator Projection for its maps to aid in navigation. (The original author was Pieter Goos.)

Another interesting addition to the sea atlas market were the French productions of the Mercator Projection. The influence of Dutch mapmakers went beyond the Dutch Low Countries and England. Hondius's work also influenced French mapmaking, most notably Nicholas de Fer and Nicholas Sanson, who produced noteworthy world maps on the Mercator Projection with essential navigational details and information.[52] Sir Robert Dudley published *Dell' Arcano del Mare* in 1645, the first sea atlas in its entirety to use the Mercator Projection.[53] In 1693, Alex-Hubert Jaillot published *Le Neptune Francois* with the maps utilizing the Mercator Projection. It was commissioned by the Académie de Sciences, whose advising team included mathematicians, astronomers, and hydrographers of the French Navy. *Le Neptune Francois* is one of the earliest examples of the Mercator Projection use by the French. It indicated that the Mercator Projection

[51] Norman J.W. Thrower, *Maps & Civilization: Cartography in Culture and Society*, 84-85.

[52] Cornelis Koeman, "Atlas Cartography in the Low Countries in the Sixteenth, Seventeenth and Eighteenth Centuries," 78.

[53] Norman J.W. Thrower, *Maps & Civilization: Cartography in Culture and Society*, 84-85.

had become influential outside of the Dutch and English mapping houses. The string of cartographers and their works from Blaeu to Sanson cemented the use of the Mercator Projection following the publication of *Spieghel* in 1584, which was echoed in atlases published in the mid 1600's. This gave the Mercator Projection a dominant position in the sea atlas trade.

Figure 3.4. 'Holland Sea Chart,' Lucas Jansz Waghenaer, *Spieghel*, *Teerste Deel Vande Spieghel der Zeevaerdt, Vande Navigatie der Westersche Zee, Innehoudende Alle de Custen van Vranckrijck, Spaignen Ende 't Principaelste Deel van Engelandt, in Diversche Zee Caerten Begrepen* (Leiden: Ghedruct tot Leyden: by Christoffel Plantijn: 1584).

(Source: Universiteitsbibliotheek Utrecht)

Dutch sea atlas production flourished alongside the traditional mapmaking trade. Dutch hydrographic mapping was known as 'Waggoners' in reference to Waghenaer's original publication of *Spieghel* or variants of this term in other languages, which also aided in transitioning the Dutch map publishing trade from the southern to northern Low Countries.[54]

One type of sea-atlas became known as pilot books.[55] The reception of Dutch pilot books is marked by their frequent reprinted editions and their translations into other western European languages. Given the physical geography of the Low Countries, along with the growth of cities and trade, the need for updated and detailed charts of harbors was great. As Gunter Schilder has noted, sea atlases were one part of the Dutch atlas trade that brought in wealth, helped define the Low Countries in culture and politics, and increased their influence among neighboring European powers.[56]

As western European powers expanded, cartographic materials became a needed commodity. The rise of the atlas format provided the publication platform that integrated the Mercator Projection into sea atlases for mass production across Western Europe. However, one challenge faced the diffusion of the Mercator Projection. Mercator never revealed the method he used to space the lines of latitude for his projection. At a world scale, others could simply copy the spacings he used to create a similar looking

[54] Norman J.W. Thrower, *Maps & Civilization: Cartography in Culture and Society*, 84-85. Cornelis Koeman, "Atlas Cartography in the Low Countries in the Sixteenth, Seventeenth and Eighteenth Centuries," 82-83.

[55] Gunter Schilder, "Lucas Janszoon Waghenaer's Nautical Atlases and Pilot Books," in *Images of the World: The Atlas Through History*, ed. John A. Wolter and Ronald E. Grim (Washington, DC: Library of Congress, 1997), 135.

[56] Gunter Schilder, "Lucas Janszoon Waghenaer's Nautical Atlases and Pilot Books," 135-139.

projection. However, to serve as a useful navigational tool, detailed charts with latitudinal spacings that maintained rhumb lines as straight lines were needed with at least a minute of a degree precision.

The English Connection: John Dee and Edward Wright

After studying in Antwerp, John Dee brought the Mercator Projection to England and introduced it to his colleagues, who helped spread it (including significant revisions by Edward Wright) in English map publications. Dee brought back to England various instruments and Mercator's two globes on which he produced his first rhumb lines.[57] Dee had met Abraham Ortelius who knew Richard Hakluyt, an English geographer celebrated for his translation of Dutch works and narratives of voyages and travels relating to English political and economic interests overseas.[58] When Gerard Mercator's son, Rumold Mercator, lived in England between 1569 and 1575, he struck up a friendship with Dee and Hakluyt.[59] This network of scholars facilitated the spread of the Mercator Projection.

Dee developed domestic and international policy in the early British Empire, advocated for Queen Elizabeth's expansion into the seas, and created a strong national

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[57] E.G.R. Taylor, *Tudor Geography*, *1485-1583* (London, UK: Methuen & Co. LTD., 1930), 77-79, 85-86.

[58] Michael Zuckerman, "Identity in British America," in Nicholas Canny and Anthony Pagden, eds., *Colonial Identity in the Atlantic World, 1500-1800,* Reprint edition (Princeton, New Jersey: Princeton University Press, 1989), 120. Jerry Brotton, "Printing The Map, Making A Difference, Mapping the Cape of Good Hope, 1488-1652," in *Geography and Revolution*, ed. David N. Livingstone and Charles W. J. Withers (Chicago, Illinois; London, UK: The University of Chicago Press, 2005), 144-145.

[59] E.G.R. Taylor, *Tudor Geography*, 1485-1583 (London, UK: Methuen & Co. LTD., 1930), 87-88.

navy.[60] Dee expressed frustration that foreigners had better charts, which allowed their sailors to be more thoroughly acquainted with England's coastlines than English sailors. In response, Lord High Admiral Charles Howard encouraged Elizabeth I's Privy Council to translate and produce an English version of Waghenaer's *Spieghel der Zeevaerdt* so he might be better equipped for coastal defenses.[61] This advice aided England's rise as a world power and the diffusion of the Mercator Projection. The English had recognized their own cartographic and knowledge limitations between minimal production of accurate maps and charts, and their reliance on the Dutch for maps and geodetic information of their own country.

Although Dee brought the projection to England, he did not contribute any clarifications as to how to best use or replicate the projection. A major problem with using the projection was that a mariner could be anywhere from two to three compass

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[60] John Dee, *General and rare memorials pertayning to the Perfect Arte of nauigation*, Book, 1577, from British Library, Discovering Literature: Shakespeare and Renaissance writers, https://www.bl.uk/collection-items/john-dees-general-and-rare-memorials-bound-with-a-signed-manuscript (accessed on October 19, 2017). Glyn Parry, "John Dee and the Elizabethan British Empire in its European Context," in the *Historical Journal* 49, no. 3 (2006): 643-644, 674-675.

[61] David Buisseret, *Monarchs, Ministers, and Maps: The Emergence of Cartography as a Tool of Government in Early Modern Europe*, 65.

points off of his dead reckoning.[62] During a long voyage dead reckoning could only give a position relative to the last known point.[63]

This was corrected by the work of English mathematician Edward Wright. In 1599, Wright first published his *Certaine Errors of Navigation*, which provided a practical, useable and replicable method for constructing and using the Mercator Projection. In his corrected version of 1610, Wright included a 23-page table with figures for the correct spacing of parallels at one-minute intervals.[64] Before Wright, while the distortions of the Mercator projection were known, they could not be corrected by a map user. Because Mercator left no method for calculating these distortions, or for the projection's use, Wright had to devise his own mathematical calculations for practical replication. This is illustrated by comparing the Mercator Projection (Figure 3.5) and Edward Wright's corrected projection (Figure 3.6). Three thick red lines are drawn on each projection from the same dead reckoning point. The inconsistency of the points

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[62] Edward Wright, *Certaine errors in nauigation, arising either of the ordinarie erroneous making or vsing of the sea chart, compasse, crosse staffe, and tables of declination of the sunne, and fixed starres detected and corrected*, Book, Printed at London: By Valentine Sims [and W. White], 1599, from Early English Books Online, copy from British Library http://eebo.chadwyck.com/search/full_rec?SOURCE=pgthumbs.cfg&ACTION=ByID&ID=99837677&FILE=../session/1508339433_10560&SEARCHSCREEN=CITATIONS&SEARCHCONFIG=var_spell.cfg&DISPLAY=AUTHOR (accessed October 18, 2017), from 'The Preface to the Reader,' 4-5.

[63] J.H. Parry, *The Discovery of the Sea*, 145.

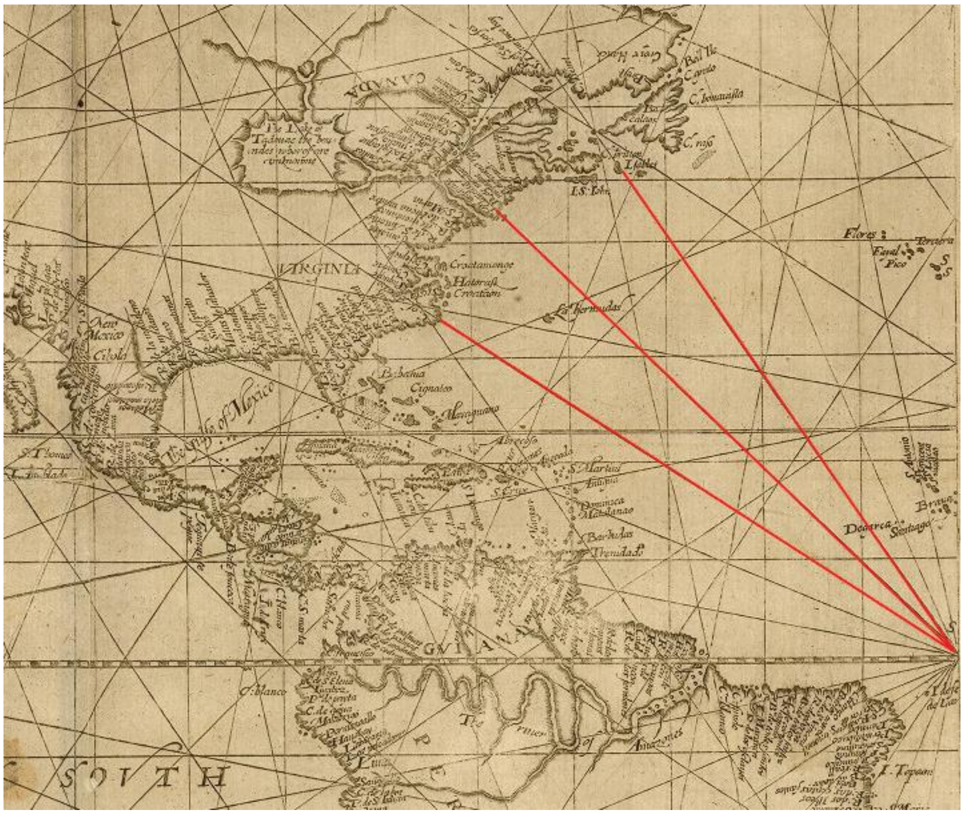
[64] Edward Wright, *Certaine errors in nauigation, arising either of the ordinarie erroneous making or vsing of the sea chart, compasse, crosse staffe, and tables of declination of the sunne, and fixed starres detected and corrected* (Printed at London: By Valentine Sims [and W. White], 1599), from Early English Books Online, Copy from British Library, http://eebo.chadwyck.com/search/full_rec?SOURCE=pgthumbs.cfg&ACTION=ByID&ID=99837677&FILE=../session/1508875825_7553&SEARCHSCREEN=CITATIONS&SEARCHCONFIG=var_spell.cfg&DISPLAY=AUTHOR (accessed on October 24, 2017).

highlight how the Mercator Projection was not always correct in getting a navigator into the correct port. Each line takes the navigator to a different city. After the publication of Edward Wright's corrections to the Mercator Projection, the mariner was able to accurately draw a line of sail and arrive at the same port on the map and in reality.

Figure 3.5. 'Nova et Aucta Orbis Terrae Description ad Usum Navigantium Emendate Accomodata,' Gerard Mercator (Duisburg: 1569).

(Source: Bibliothèque Nationale de France)

Figure 3.6. ‘A True Hydrographical Description of So Much of the World as Hath Beene Hitherto Discouered, and is Come to Our Knowledge,’ Edward Wright, *The Principal Nauigations* (London: By George Bishop, Ralph Newberie and Robert Barker, 1599).



(Source: John Carter Brown Library)

After Wright, the Mercator Projection became a fully functional, precise navigational device that could be used by any trained mariner. In the preface to *Certaine Errors in Navigation*, Wright states that while navigation had been practiced for thousands of years, the materials with which mariners were educated did not effectively communicate how to navigate. As a result, navigation had not been perfected and had numerous errors and gaps.[65] Wright identified four major errors in navigation, which his volume endeavored to correct. First, the sea charts traditionally published had faults in the grid layout of meridians and parallels, which caused the rhumb lines to be off, further causing the compass points used by a mariner to be one to three points off in trying to navigate to the desired destination. Second, compass variations would likewise be off by one or two points, or not rightly used, creating confusion on the chart by making it unclear as to which direction to follow on a plotted course. Third, the cross staff had been incorrectly used by mariners trying to "eye-ball" the correction height of observable altitude. Finally, all these instruments contributed to the inability for a mariner to find latitude, declination, or observations at sea.[66]

Wright explained how to use the compass and plot points using trigonometry and created what today would be called geographic coordinate conversion: degrees, minutes, and seconds. Figure 3.7 is a copy of Wright's three columns of tables for calculating lines of latitude. The first two tables listed the degrees and minutes of latitude for parallels spaced ten minutes apart on the sphere and the third reported the parallel's projected distance from the equator.[67] The map's rectangular grid stretched the parallels

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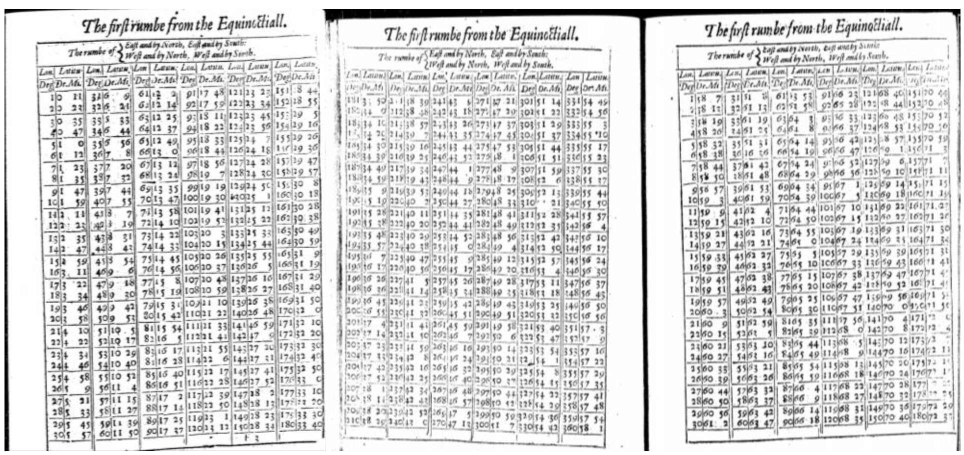
[65] Edward Wright, *Certaine errors in nauigation, arising either of the ordinarie erroneous making or vsing of the sea chart, compasse, crosse staffe, and tables of declination of the sunne, and fixed starres detected and corrected*, 4.

[66] Edward Wright, *Certaine errors in nauigation, arising either of the ordinarie erroneous making or vsing of the sea chart, compasse, crosse staffe, and tables of declination of the sunne, and fixed starres detected and corrected*, 4-5.

[67] Mark Monmonier, *Rhumb Lines and Map Wars*, 64.

to equal the equator in length, compensating for the increasing horizontal exaggeration by shifting the parallels farther apart vertically.[68] Mathematically, this gave the physical appearance of the exaggerated lines of latitude increasing towards the poles.

Figure 3.7. The First Three Tables from Edward Wright's *Certaine Errors* for 'The First Rumbe from the Equinoctiall,' Edward Wright, *Certaine Errors in Nauigation, Arising Either of the Ordinarie Erroneous Making or Vsing of the Sea Chart, Compasse, Crosse Staffe, and Tables of Declination of the Sunne, and Fixed Starres Detected and Corrected* (London: By Valentine Sims [and W. White], 1599).



(Source: Early English Books Online, copy from British Library)

To plot a course, Wright explained how to use the chart with the provided tables and supplemented with a draft exercise explaining how the mathematical information broke down into coordinate degrees. Wright began by representing the equator as a circle with 360 parts or degrees, with half the equator being 180 degrees. Wright's table runs from the equator to a pole at 90 degrees and since each degree was sixty minutes, Wright used an interval of ten minutes to divide each half meridian into 540. Wright then set to

[68] Mark Monmonier, *Rhumb Lines and Map Wars*, 65-66.

100 the distance of an arc of ten minutes at the equator.[69] To draw a course, he began at the equator, noting the first and tenth line proceeding north and south. Wright's tables note what the degrees are. Drawing the right lines through either part gave the sailor a parallel line course to follow.

The geographic coordinate conversion process was calculated by a similar method. A degree served as the measurement taken of a plane angle where a full rotation was 360 degrees. A minute was a unit of angular measurement equal to 1/60. Since one degree was 1/360 of a turn (or a complete rotation), one minute of arc was 1/21,600 of a turn. The turn in radians was calculated as pie/10,800. A second of arc was 1/60 of an arcminute, 1/3600 of a degree, 1/1,296,000 of a turn. This was degrees, minutes and seconds or geographic coordinate conversion as it is understood and practiced today. This trigonometric sequence is what Wright created. Wright produced a rudimentary, replicable trigonometric approach still taught in contemporary introductory cartographic courses. Wright provided a table illustrating this concept, with the table having three columns to represent the degrees from the equator, the tenth from the degree and the angle of seconds.

It is clear from Wright's introductions to *Certaine Errors* that he used his own experiences and frustrations to produce a better method for maritime navigation. The Wright-Mercator Projection was not only a revised version of the Mercator Projection, it

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[69] Edward Wright, *Certaine Errors in Navigation, arising either of the ordinarie erroneous making or vsing of the sea chart, compasse, crosse staffe, and tables of declination of the sunne, and fixed starres detected and corrected.*

also provided a means for its use, production and reproduction. For the first time at sea, a mariner could draw a course showing distance, latitude, and longitude that could be calculated and recalculated at any latitude. The map was well received and was included in Richard Hakluyt's *Principal Navigations* to show the results of Francis Drake's circumnavigation.[70] (See Figure 3.8.) Jodocus Hondius's 1595 *Christian-Knight Map* is one of the earliest examples of the use of the Mercator Projection for a general portrayal of the world using Edward Wright's mathematical corrections. Although Wright credited Mercator with the original projection, it was Wright who provided an updated and useful version for navigators. In the seventeenth century, if the Mercator Projection was used in an atlas it was one related to navigation. Edward Wright revised and produced an applicable mathematical method for navigators to use the Mercator Projection. It is the Wright-Mercator projection that rapidly spread on world maps.

[70] David Buisseret, *The Mapmakers Quest: Depicting New Worlds in Renaissance Europe* (Oxford, UK; New York: New York: Oxford University Press, 2003), 105. Norman Thrower, *Maps & Civilization: Cartography in Culture and Society*, 77.

Figure 3.8. ‘A True Hydrographical Description of So Much of the World as Hath Beene Hitherto Discouered, and is Come to Our Knowledge,’ Edward Wright (London: By George Bishop, Ralph Newberie and Robert Barker, 1598-1600).

(Source: John Carter Brown Library)

CHAPTER IV

LITERATURE, DATA, METHODS, AND RESULTS

Approaches to the Mercator Projection in Current Literature

The current literature contextualizes and explains the significance of Gerard Mercator and the Mercator Projection, notes the failings of the projection for general reference and thematic maps, and suggests that the wide use of the projection has serious implications for the general populace's development of mental images of the world. It fails to explain why and how it became a prevalent choice for world maps and atlases in reference and thematic mapping.

For the history of cartography, this study uses the biographies of Gerard Mercator and other previous works to contextualize Mercator and the Mercator Projection. Despite Gerard Mercator's significant contribution to cartography, few biographies have been written about him. His biographers present Mercator as a complete, well-versed and trained humanist scholar and practitioner geographer. Mark Monmonier stated that Mercator "distinguished himself at various times as a calligrapher, an engraver, a maker of scientific instruments, and a publisher. No less impressive were his discoveries in mathematics, astronomy, cosmography, terrestrial magnetism, history, philosophy, and theology."[1] Other biographers have expanded upon Mercator's life to portray him as an important voice in the scholastic socio-cultural times in the Spanish Dutch provinces.[2]

The history of cartography helps to explain the repeated choice of using the Mercator Projection. The foundation of the history of cartography is on temporal narratives that define the map, the evolution of the information and content displayed on the map, the science and technology of its production, and more recently the social and cultural deconstructive characterizations.[3] Due to the influence of J.B. Harley, the

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[1] Mark Monmonier, *Rhumb Lines and Map Wars: A Social History of the Mercator Projection*, 31.

[2] Crane and Taylor are two of the few biographies of Mercator written in English. Crane focuses on the achievements of Mercator as a modern scientific cartographer and lists his achievements: naming and mapping of America, creating a new map projection, constructing two globes, and helping to create Ortelius and his own Atlas. Crane touches on the political and religious events which shaped Mercator as both a human being and scholar. However, it is Taylor who focuses on contextualizing Mercator's life and scholastic achievements through the religious, political, and socio-cultural events of northern Europe that Mercator experienced and that occurred around him. Monmonier focuses more on the social consequences of the Mercator Projection along with the lead up and debate that surround both the Mercator and Peters projection in the 1980s. See Nicholas Crane, *Mercator: The Man Who Mapped the Planet*, xi-xiii. Andrew Taylor, *The world of Gerard Mercator: the mapmaker who revolutionized geography* (New York, New York: Walker & Co., 2004), 1-6. Mark Monmonier, *Rhumb Lines and Map Wars: A Social History of the Mercator Projection*, 1-16.

[3] The history of cartography explains the narrative, function and significance of maps. It is largely constructed from these key players: Leo Bagrow, R.A. Skelton, J.B Harley, David Woodward, Arthur Robinson, Barbara BartzPetchenik, Norman Thrower, Mark Monmonier, Patricia Seed, Anne Kelly Knowles and Matthew Edney. The volume series The History of Cartography is the most exhaustive synthesis of text within the field. The volumes and the scholars named above contextualize the history of cartography as standing in the center of a scholastic web where numerous disciplines intertwine for the purpose of explaining the narrative, function and significance of maps. They do this by defining the map, explaining the technological development in map production, discussing the storing, articulation, and communication of spatial concepts, and positioning cartography as one perspective to understand and know the world. Bagrow and Skelton are largely responsible for beginning the narratives in the history of cartography. Woodward emphasizes the methods and technological developments that create maps. Robinson and Bartz Petchenik advocate for the history of cartography to be dominated with techniques for perfecting data, symbolism and methods of production, and a shift where the map is valued for what it communicates to the audience in addition to how the map is created. Harley is the poststructuralist advocating for addressing the social construction and meaning throughout cartography. See Arthur Robinson and Barbara Bartz Petchenik, *The Nature of Maps : Essays toward Understanding Maps and Mapping* (Chicago, Illinois: University of California Press, 1976), 1-22. Arthur Howard Robinson, *Early*

discipline has shifted away from studying the technical history of maps to understand how humans use maps as tools to make sense of their surrounding environment at various scales.[4] In the 1980's, Harley created a epistemic break with the former narrative and objective-based study of maps. Foremost, Harley examined maps as social constructions, pushing for the writing of a relevant history of cartography that examined maps based on the context and policies that governed individuals and institutions in the content and production of maps throughout history.[5] Currently, the history of cartography is practiced throughout various fields. It's uniting scholastic core is that maps are

Thematic Mapping in the History of Cartography (Chicago: University of Chicago Press, 1982), 3. Leo Bagrow, *History of Cartography*, 2nd ed. (Chicago, Illinois: Precedent Publishing, Inc., 1985), 22. J.B. Harley, "The Map and the Development of the History of Cartography," in *The History of Cartography, vol. 1, Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean* (Chicago, Illinois; London, UK: University of Chicago Press, 1987), J.B. Harley, "The Map and the Development of the History of Cartography," in *The History of Cartography, vol. 1, Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean* (Chicago, Illinois; London, UK: University of Chicago Press, 1987), 1-5. J.B. Harley and David Woodward, eds., *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean, vol. The History of Cartography V.1* (Chicago, Illinois: University of Chicago Press, 1987), xv. Denis Wood, *The Power of Maps* (New York, New York: The Guilford Press, 1992), 1-3. J.B. Harley, *The New Nature of Maps*, ed. Paul Laxton (Baltimore, Maryland: Johns Hopkins University Press, 2001), 150-168. Mark Monmonier, *Rhumb Lines and Map Wars: A Social History of the Mercator Projection*, ix-xii. Norman J. W Thrower, *Maps & civilization: cartography in culture and society* (Chicago, Illinois; London, UK: University of Chicago Press, 2008), 1-3.

[4] J.B. Harley, "The Map and the Development of the History of Cartography," in *The History of Cartography, vol. 1, Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean* (Chicago, Illinois; London, UK: University of Chicago Press, 1987), 1.

[5] J.B. Harley, "Preface," in *The History of Cartography, vol. 1, Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean* (Chicago, Illinois; London, UK: University of Chicago Press, 1987), xv-xvi. J.B. Harley, "The Map and the Development of the History of Cartography," in *The History of Cartography, vol. 1, Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean* (Chicago, Illinois; London, UK: University of Chicago Press, 1987), 1-5.

intellectual constructions through which humans have organized, comprehended and manipulated spaces and places.[6]

The Mercator Projection is tied to the imperial map and it created realities of empires. Harley applied his theories for explanations of cartography to empires. Critical histories of imperial cartography tend to examine maps as texts within the context of nationalism and Western rationalism to expound upon how maps have contributed to meanings and configurations of identity within certain territorial entities.[7] Harley's aim was to explore the maps in the context of political power as they are not passive images of the world but rather objects that reflect a socially constructed world.[8] Harley worked to achieve this through three steps: maps as a language make political statements; symbolism as a form of political power created, communicated and experienced through maps; maps as a form of social knowledge replicating not just the environment, but a geopolitical system.[9] For Harley, maps were not only representations of empire, but they were instruments in the construction of empire.

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[6] Matthew Edney, "Cartography, history of" In Gregory, D., Johnston, R., Pratt, G., Watts, M.J., and Whatmore, S. [Eds.] *The Dictionary of Human Geography*, 5th Edition (Hoboken: John Wiley & Sons, Incorporated, 2009), 69–72.

[7] Matthew Edney, "Cartography, history of" In Gregory, D., Johnston, R., Pratt, G., Watts, M.J., and Whatmore, S. [Eds.] *The Dictionary of Human Geography*, 5th Edition (Hoboken: John Wiley & Sons, Incorporated, 2009), 71.

[8] J.B Harley, "Maps, Knowledge, and Power" in Paul Laxton (ed.) *The New Nature of Maps: Essays in the History of Cartography* (Baltimore, MD: Johns Hopkins University Press, 2001), 53.

[9] J.B Harley, "Maps, Knowledge, and Power" in Paul Laxton (ed.) *The New Nature of Maps: Essays in the History of Cartography* (Baltimore, MD: Johns Hopkins University Press, 2001), 53-55.

The agency of imperial maps underpinned what imperial governments believed their colonies should look like. From the eighteenth century into the twentieth century, western European empires used the map as a way to bring native polities into their political and economic control and administration.[10] In *Monarchs, Ministers and Maps*, David Buisseret edits a monograph that concentrates on the military and administrative purposes of mapping in Europe during the seventeenth century.[11] In *Mapping an Empire*, Edney investigates the role of the history of cartography with the British Empire through an examination of the Great Trigonometrical Survey of India.[12] Crampton claimed that a useful way to understand mapping in politics is as a technology of government.[13] This is because of the importance of knowledge. Crampton stated, "because it needed knowledge of its territories, and its peoples, we can now understand how mapping came to be such an important part of the political economy."[14] Scientists and surveyors worked alongside government and militaries. For many western European countries, the map

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[10] James R. Akerman (ed.), *The Imperial Map: Cartography and the Mastery of Empire*, The Kenneth Nebenzahl, Jr., Lectures in the History of Cartography (Chicago: University of Chicago Press, 2009), 1-4.

[11] David Buisseret (ed.), *Monarchs, Ministers, and Maps: The Emergence of Cartography As a Tool of Government in Early Modern Europe* The Kenneth Nebenzahl, Jr., Lectures in the History of Cartography (Chicago: University of Chicago Press, 1992), 1-4.

[12] Matthew Edney, *Mapping an Empire: The Geographical Construction of British India, 1765-1843* (Chicago, Ill.: University of Chicago Press, 1997), 1-3.

[13] Jeremy Crampton, *Mapping: A Critical Introduction to Cartography and GIS, Critical Introductions to Geography Series V. 11* (Chicester: John Wiley & Sons, Incorporated, 2010), 78.

[14] Jeremy Crampton, *Mapping: A Critical Introduction to Cartography and GIS, Critical Introductions to Geography Series V. 11* (Chicester: John Wiley & Sons, Incorporated, 2010), 68.

projection they were most familiar with, the Mercator Projection, became the map projection that was used to communicate scientific information as well as ownership.

The history of geography provides a two-part narrative link. First, it expounds upon how the Mercator Projection spread from navigation charts to reference and early thematic mapping through the founding and growth of geographic societies. Second, it identifies the impact that Sir Edmund Halley, Captain James Cook, Charles Darwin, and Alexander von Humboldt had on changes in the display of geographic data, and by association the validation of the Mercator Projection for the display of that data. The history of geography reflects how the use of the Mercator Projection permeated throughout western European and United States mapmaking. Maps reflect cultural perception, and the use of the Mercator Projection for general reference and thematic maps became a norm, an integral part of the mathematical and scientific methodologies used to visualize the world. [15]

Geographies of the book trace the circulation and reception of knowledge in print through the making and movement of texts to inform the diffusion and the reception of knowledge and ideas.[16] The publication record of the Mercator Projection reveals it as a tool and the map as a cultural artifact informing the wider story of why and how the Mercator Projection became a popular projection for world maps. In Keighren's (2010)

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[15] Norman J. W Thrower, *Maps & civilization: cartography in culture and society*, 1.

[16] Innes M. Keighren, "Geographies of the Book: Review and Prospect," *Geography Compass* 7, no. 11 (November 2013): 745.

Bringing Geography to Book, the author questions the appropriateness of scale when investigating certain topics. Keighren analyzed the reception of Ellen Semple's *Influences* by utilizing social networks and hermeneutic communities, and noting their spatial and temporal scales provided a meaningful balance that connected commonalities in the reception of the work.[17] This approach was applied to the Mercator Projection to convey how the adoption of the projection by the maritime community, and its progressive use by explorers, transitioned the Mercator Projection from navigation to reference and thematic mapping.

Maps were a commercial good which contributed to the economy of early modern Europe. The printing press provided an avenue for the increased publication and reception of maps. Thrower claims that the printing press facilitated the increase in scientific activity and interest.[18] The printing press changed the availability of maps and other printable resources.[19] Mukerji argues that maps were essential for European participation in overseas expansion and aided how the European states defined themselves as geopolitical units in an emerging world system.[20] Likewise, Benedict Anderson has argued that maps were a form of print capitalism illustrating a shared

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[17] Innes M. Keighren, *Bringing Geography to Book: Ellen Semple and the Reception of Geographical Knowledge* (New York, New York; London, UK: I.B. Tauris & Co Ltd, 2010), 46-49.

[18] Norman J.W. Thrower, *Maps and Civilization: Cartography in Culture and Society*, 91.

[19] Lucien Febvre and Henri-Jean Martin, *The Coming of the Book: The Impact of Printing 1450-1800* (London, UK: N.L.B., 1976), 78.

[20] Chandra Mukerji, *From Graven Images: Patterns of Modern Materialism* (New York, New York: Columbia University Press, 1983), 1-3, 18.

belonging and commonality between literate and economically powerful peoples.[21] Maps became an integral part of the inner workings of government and science, and simultaneously constructed a mental perception of power, dominance and ownership. Maps were not only a capital good but were decision-making artifacts for governments.

Critical cartography originates from J.B. Harley's postmodern concept of 'deconstructing the map' which partially examined mapping as a representation of the construction of knowledge and power.[22] Cresswell defined Harley's 'deconstructing the map' as postmodern because the map is a tool in a society's construction of knowledge.[23] Harley draws upon the social theory of Derrida and Foucault to argue that maps and mapmakers are created and interpreted by cultural norms, and reinforce that society's norms and values.[24] According to Cresswell, a postmodernist engages in looking at the process of representation. A map is often considered to be neutral. However, no map is neutral: maps are constructed by socio-cultural paradigms that typically reinforce norms.[25] While this study does not directly use deconstructionist theory, it does help interpret why the Mercator Projection was chosen to communicate data.

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[21] Benedict Anderson, *Imagined Communities: Reflections on the Origin and Spread of Nation*alism (London, UK; New York, New York: Verso, 2006), 167-168.

[22] J.B. Harley, *The New Nature of Maps*, ed. Paul Laxton (Baltimore, Maryland: Johns Hopkins University Press, 2001), 150-168. Tim Cresswell, *Geographic Thought: A Critical Introduction* (Chichester, West Sussex, UK: Wiley-Blackwell, 2013), 11-12.

[23] Tim Cresswell, *Geographic Thought: A Critical Introduction*, 186-187.

[24] J.B. Harley, *The New Nature of Maps*, 150-168.

[25] Tim Cresswell, *Geographic Thought: A Critical Introduction* (Chichester, West Sussex, UK: Wiley-Blackwell, 2013), 187.

Critical cartography analyzes social and cultural ideologies, and the production, circulation, and consultation of maps, linking how the map and its power are tied to political and cultural values.[26] Two different but fluid divisions within critical cartography arise: conceptual and contextual.[27] A conceptual approach to critical cartography is exemplified by Buisseret's application of how maps became tools of social and political power in early modern European empires.[28] A contextual approach is exemplified through Prior's dissertation. It focused on what maps were produced and by whom, when Britain was asserting imperial control over the 'Scramble for Africa.'[29] This study expands J.B. Harley's deconstructionist argument by focusing on how projection choice constructs the mental image, specifically of the world to a given audience. This dissertation also looked at how the map is constructed to be a tool that reflects collected information and knowledge.

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[26] Mark Monmonier, "Cartography: The Multidisciplinary Pluralism of Cartographic Art, Geospatial Technology, and Empirical Scholarship," *Progress in Human Geography* 31, no. 3 (June 2007): 374-375. Matthew H. Edney, "Academic Cartography, Internal Map History, and the Critical Study of Mapping Processes," *Imago Mundi* 66, no. sup1 (2014): 84.

[27] Catherine Delano Smith, "Selected Papers from the 16th International Conference on the History of Cartography: Theoretical Aspects of the History of Cartography: Why Theory in the History of Cartography?," *Imago Mundi* 48, no. 1 (January 1996): 198. Matthew H. Edney, "Putting 'Cartography' into the History of Cartography: Arthur H. Robinson, David Woodward, and the Creation of a Discipline," *Cartographic Perspectives* 51 (2005): 22-23. Amy Dawn Prior, "British Mapping of Africa: Publishing Histories of Imperial Cartography, c.1880-C1915" (Ph.D., The University of Edinburgh (United Kingdom), 2013), 37-38.

[28] David Buisseret, *Monarchs, Ministers, and Maps: The Emergence of Cartography as a Tool of Government in Early Modern Europe* (Chicago, Illinois: University of Chicago Press, 1992), 2.

[29] Amy Dawn Prior, "British Mapping of Africa: Publishing Histories of Imperial Cartography, c.1880-C1915" (Ph.D., The University of Edinburgh (United Kingdom), 2013), 37-38.

The methodological approach of the dissertation explains the adoption and reception of the Mercator Projection in western European and United States cartography. Archives provide the necessary source materials to construct a record of the reception of the Mercator Projection through its publication history on world maps and atlases. These primary sources were then combined with methodologies from the literature on geographies of the book to explain the diffusion of the Mercator Projection.

Data and Methods

Anne Knowles states,

> Scholars like to say that history is about time, geography about space. Tracing change through time leads to narrative, which is sequential, logical and verbal; geographical comparison over space produces maps, which are synoptic, simultaneous, and visual. The two ways of knowing, and the methods to which they have given rise, nest uncomfortably for many scholars.[30]

The data of this study are drawn from the cartographic publication record of world maps, and world maps in atlases, for content analysis. To trace the diffusion of the Mercator Projection, a total of five hundred and sixty-eight maps and atlases were reviewed for this study. The maps ranged in date from 1569, when Mercator published his projection, to 1900. They were found in archives located in the United States, and

[30] Knowles further discusses in this article how maps have either been neglected as primary artifacts or have been limited to critical cartography's deconstruction literature. How maps are used as evidence is typically reflective of whether the author is an historian, or historical geographer, or cartographer. Anne Kelly Knowles, "Historians and Cartography," in *The History of Cartography, vol. 6, Cartography in the Twentieth Century*, edited by Mark Monmonier (Chicago, Illinois; London, UK: University of Chicago Press, 2015), 597-601.

digital archives located in the United Kingdom, United States, Australia, New Zealand, the Netherlands, France and Germany. The maps selected to be reviewed were those at a global or near global scale and were available in high resolution through digital archives. The maps were analyzed individually and the data for each recorded into a spreadsheet database. In the case of atlases, all maps displaying global or near global coverage were included in the study. It is important to note that the maps collected from archives may not be completely representative of all the maps published during the time frame of this study. Maps may have been saved for their importance, rarity or ornate nature and not as representative of what was typical of the time period.[31] The earliest atlases were often quite elaborate and designed for the aristocracy, wealthy and educated elites.[32] While many atlases have survived, navigational charts and maritime atlases were more difficult to locate. This may be due to the nature of the navigational chart being a working document subjected to much greater wear and tear. Navigational maps and charts as tools or working documents would have been less ornate and may have been seen as less deserving of being saved, or less important, because they were functional. Fortunately, some excellent examples of early navigational charts were located and analyzed for this study.

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[31] Norman J. W Thrower, *Maps & civilization: cartography in culture and society*, 1-3.

[32] John Amadeus Wolter, Ronald E Grim, and Library of Congress, *Images of the World: The Atlas through History* (New York: McGraw-Hill, 1997), ix.

The framework for this study combines components of historical cartography's narrative with the record of map production as evidentiary artifacts, to illustrate how over a three-hundred-year period the Mercator Projection was utilized for general reference and thematic world maps. Multiple archives (including digital) were consulted for this study to trace the distribution and circulation of the Mercator Projection and its expanding realm of applications. Three hundred and thirty document entries with a total of five hundred and sixty-eight maps and maps in atlases were reviewed for this study.[33] Maps selected for review were based on the availability of resources in physical and digital archives. The selection is not exhaustive and undoubtedly not entirely representative of map production for the time periods in question, as antique maps were often saved either for their importance, rarity or ornateness, leaving more mundane examples underrepresented. After creating large ornate maps or atlases, many publishers would then produce less expensive versions that were much smaller and less elaborate for a more general audience. However, publishers seldom changed the projection used for the ornate version on the simplified maps, as that would have added expense. It was standard publishing practice to produce both a high-end and cost-effective product.[34]

The maps surveyed ranged in date from 1569, the date Gerard Mercator published his projection, to 1900, and were found in physical archives located in the United States

[33] The study's dataset can be viewed in Appendix.

[34] Robert Karrow, "Centers of Map Publishing in Europe, 1472-1600," in *The History of Cartography, ed. David Woodward, vol. 3, Cartography in the European Renaissance* (Chicago, Illinois; London, UK: University of Chicago Press, 2007), 611-612, 621.

and in digital archives located in the United Kingdom, the United States, Australia, New Zealand, the Netherlands, France and Germany. All of the maps reviewed were categorized into three time periods: 1569-1699; 1700-1799; and 1800-1900. The 1569 to 1699 period was selected as it covered the period of early reception of the Mercator Projection through Edward Wright's corrections, ending just before the publication of Edmund Halley's first thematic maps. The second time period, 1700 to 1799, covers early thematic cartography and the rise of cartography as a tool of science and government. The period 1800 to 1849 represents the rise of educational and popular cartography. The final period, 1850 to 1900, was the time when mass map production became dominated by large commercial cartographic firms like Rand McNally.[35]

The maps analyzed in this study were selected because they were available, were at a global or near global scale, and if in a digital archive were obtainable in high resolution. Once selected, the maps were then categorized as Navigational, Reference or Thematic, based on what appeared to be their primary function. They were analyzed one at a time and the data for each recorded into a spreadsheet database. In the case of atlases, all maps displaying global or near global coverage in the atlas were included in the study. The recorded data included both bibliographic information and cartographic based information. The bibliographical information included Title, Year, Author, Place of Publication, Language, Archive and Location in Archive. The cartographic

[35] By 1800, the Mercator Projection had been accepted by navigators as the best projection for navigation. This is reflected in the data and is confirmed by sources such as the British Admiralty, Ordnance Surveys and USGS.

information included whether it was a single sheet map or found in an atlas, geographical coverage, scale, was it identified as a map or chart, projection used, map type, if thematic the type of data displayed and the cartographic symbology used to display the data, printing process and technique and any additional archival information to locate or further understand the document. (See Figure 4.1.)

Figure 4.1. Two Examples of Data Entry.

Title	Year	Author	Place of Publication	Place of Author	Language	Atlas	World, Continent, Region
Theatrum Orbin Terrarum	1570	Ortelius, Abraham	Antwerp	Low Countries	Latin	Atlas	all world
Atlas of Physical Geography	1850	Petermann, Augustus; Milner, Thomas	London	England, GB	English	Atlas	all world

Coverage (physical)	Map or Chart	Projection	Scale	Nautical Miles or Scale	Purpose	Thematic Data Shown
all world	Typus, 'plan'	Oval	n/a	n/a	1st atlas of the world	n/a
all world	World	2 Globular; 9 Mercator	n/a	n/a	Thematic - Science based	Physical Geography

Decoration	Printing Process	Printing Technique	Archive	ID Number
ornate	n/a	n/a	David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?q =pub_list_no%3D%2210000.000 %22&sort=Pub_List_No_InitialS ort%2CPub_Date%2CPub_List_ No%2CSeries_No&pgs=250&res=1
color	n/a	n/a	David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?q=+Pub_List_ No%3D%272486.000%20%27%22%20LIMIT:RUMSEY~8~1&sort=Pub_List_ No_InitialSort,Pub_Date

Archive Comments	My Comments
First edition of the first atlas of the world. From Koeman: "The unique position held by Ortelius' Theatrum in the history of cartography is to be attributed primarily to its qualification as 'the world's first regularly produced atlas.' Its great commercial success 'enabled it to make so great a contribution to geographical culture throughout Europe in the later 16th century.' (Skelton). Shape and contents set the standards for later atlases, when the centre of the map-trade moved from Antwerp to Amsterdam. The characteristic feature of the Theatrum is, that it consists of two elements, forming a unitary whole: text and maps. This concept for a "Theatre of the world" was followed through the 17th century. Before Ortelius, no one and done this and thus, the chorus of praise which arose as a result of this - and the excellent text - was far from slight... Another important aspect of the Theatrum is that it was the first undertaking of its kind to reduce the best available maps to a uniform format. To that end, maps of various formats and styles had to be generalized just like the modern atlas-publisher of today would do. In selecting maps for his compilation, Ortelius was guided by his critical spirit and his encyclopaedic knowledge of maps. But Ortelius did more that the atlas-makers of today: he mentioned the names of the authors of the original maps and added a great many names of other cartographers and geographers to it... Abraham Ortelius drew all his maps in manuscript before passing them to the engravers... Ortelius stated that nearly all the plates were cut by Frans Hogenberg and his assistants." The Theatrum went through many editions in Latin, German, French, Dutch, Spanish, English, and Italian. Van der Krogt lists 37 editions, with the last edition published in 1641, long after Ortelius' death in 1598. Uncolored. Text in Latin.	Arranged: Title, Catalog, Contents, World Map, Europe, Asia Americas (sets the standard layout publication style of the atlases to follow)
(Title Page) The Atlas Of Physical Geography: Constructed By Augustus Petermann, F.R.G.S. ... With Descriptive Letter- **Press, Embracing A General View Of The Physical Phenomena Of The Globe.** By The Rev. Thomas Milner, M.A., F.R.G.S. ... **Illustrated by One Hundred and Thirty Vignettes on Wood.** London: Wm. S. Orr And Co., Amen-Corner, Paternoster-Row. MDCCCL	Quote from Humboldt: "That which has especially promoted the progress of knoweldge in the nineteenth century, and has formed the chief character of the age, is the general and highly useful endeavour, not to limit our regards to that which has just been achieved, but to test rigidly, by weight and measure, all earlier as well as more recent discoveries."

This is an example of all the bibliographic information collected on two entries from the data collected on maps and atlases.

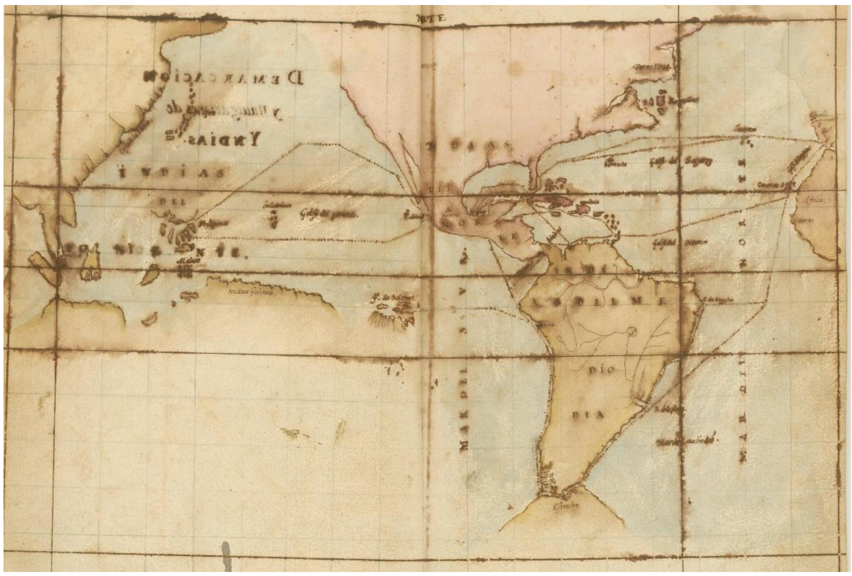
Results of the Survey

At its creation in 1569, navigators were the intended audience for the Mercator Projection. Navigators were a highly skilled set of users whose sole purpose for using the Mercator Projection was to improve their ability to plan and follow routes at sea utilizing the nautical compass. From 1569 to 1900, the application of the Mercator Projection expanded from this specialized audience and function to the broader realm of general reference and thematic maps and atlases. The data present clear temporal trends in the purpose and intended audiences of maps and atlases utilizing the Mercator Projection.

As expected, after its development in 1569 and until 1699, the Mercator Projection was widely used in the production of navigational charts. However, a small handful of general reference maps utilizing the Mercator Projection were found for this time period. The data show that in 1575, the Spanish first used the Mercator Projection to illustrate voyages to the Pacific Ocean. (See Figure 4.2.a.) In 1582, the English used the Mercator Projection to arouse English interest in overseas enterprises. (See Figure 4.2.b.) In Cologne, in 1600, the Mercator Projection was used in an atlas published by Matthias Quad as a less expensive alternative to the Ortelius or Mercator *Atlas*. (See Figure 4.2.c.) In 1606, Blaeu published a hydrographic world map on the Mercator Projection in Amsterdam. (See Figure 4.2.d.) Pierre Moullart-Sanson, in 1695, published a sea chart with an early crude theory for calculating longitude. (See Figure 4.2.e.) In the Americas, the first example of a Mercator Projection was a 1791 hand drawn chart by a Boston schoolgirl from a pre-existing pattern. (See Figure 4.2.f.) This indicates that the Mercator Projection was present before this data; however, there was no data found for an earlier date.

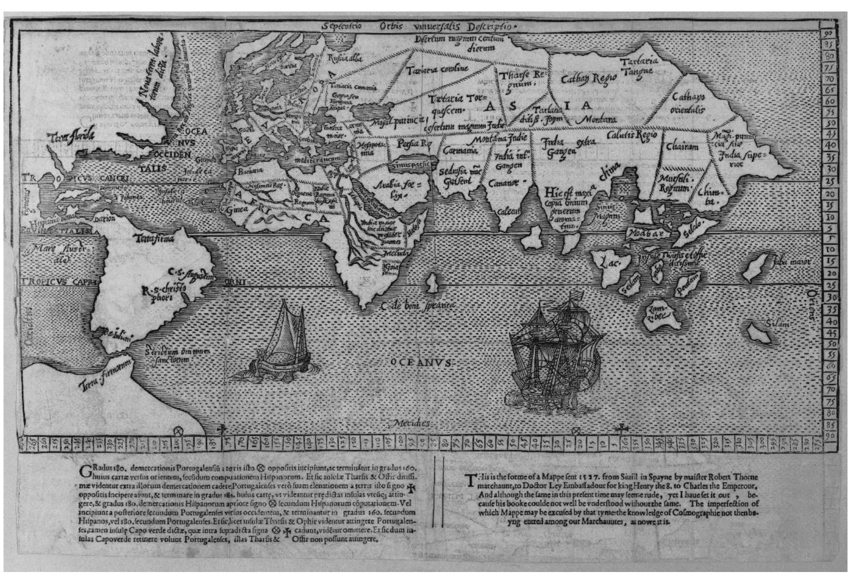
Figure 4.2. The First Use of the Mercator Projection by a Country from This Study's Data.

a. Démarcation y Nauegaciones de Yndias (Madrid, 1575).



This map illustrates Spanish voyages into the Pacific Ocean. It also shows the Line of Demarcation marked by the Treaty of Tordesillas. Source: John Carter Brown Library.

b. 'Orbis Vniuersalis Descriptio,' Thomas Woodcock (London: Thomas Woodcock, 1582).

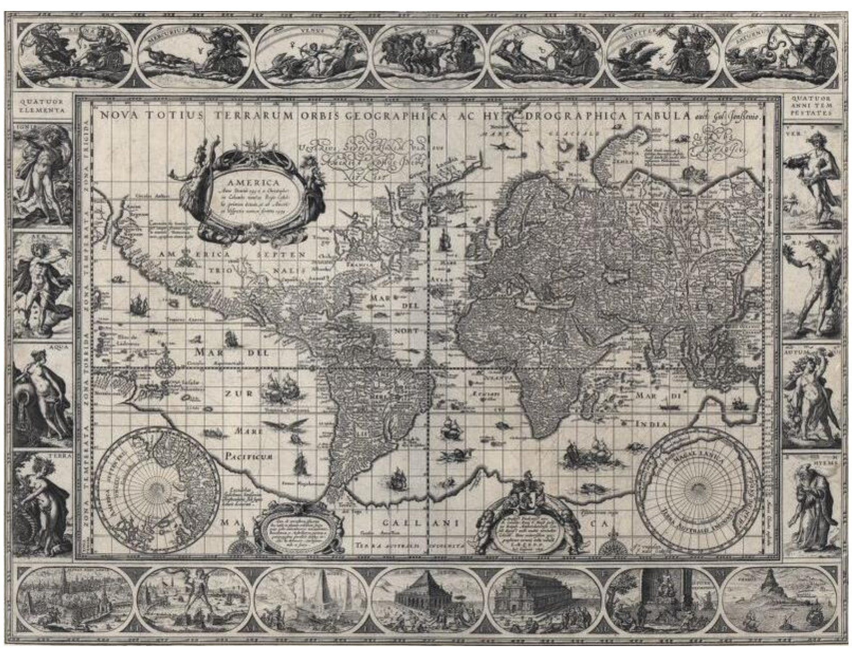


(Source: John Carter Brown Library)

c. 'Typvs Orbis Terrarum, ad Imitationem Universalis Gerhardi Mercatoris,' Matthias Quad (Cologne: Iohan Buxemacher, 1600).

(Source: David Rumsey Map Collection)

d. 'Nova Totius Terrarium Orbis Geographica ac Hydrographica Tabula,' Willem Janszoon Blaeu (Amsterdam: Excudebat G. Ianssonius, 1606).

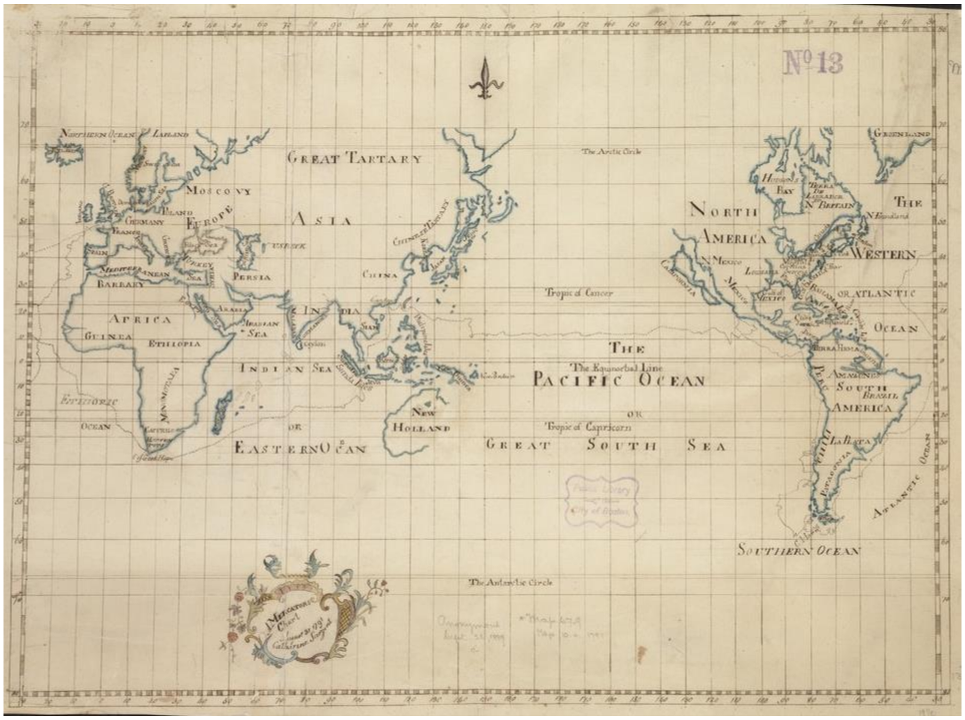


(Source: Library of Congress)

e. ‘Mappe Monde ou Carte Marine Universelle Réduite, ou Sont l’Asie, l’Afrique, l’Europe, l’Amérique Septentrionale, l’Amérique Méridionale,’ Pierre Moullart-Sanson Géographe du Roi (A Paris: Aux Galléries du Louvre vis-à-vis St. Nicolas, 1695).

(Source: National Library of Australia)

f. ‘A Mercator’s Chart,’ Catharine Sargent (Boston: 1791).



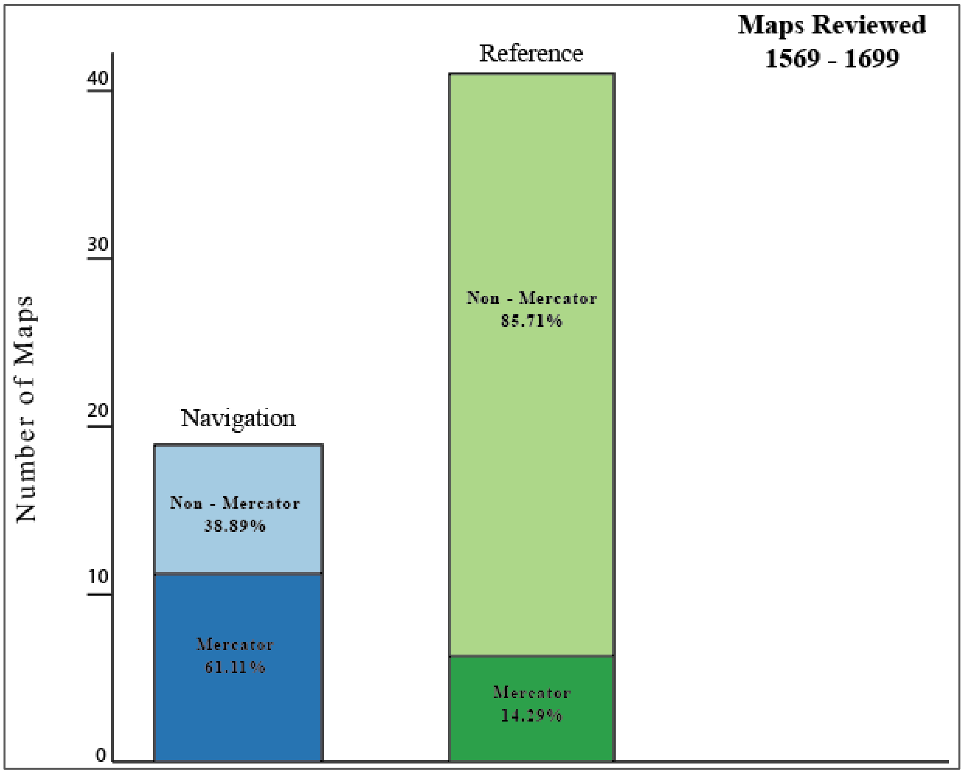
This map was created by a Boston schoolgirl and most likely represents a geography project. From the mid-eighteenth to the nineteenth century it was common practice for American and British female students to create maps from patterned samples. (Source: Norman B. Leventhal Map & Education Center at the Boston Public Library)

Surprisingly, by 1700, the Mercator Projection had become the most commonly used projection for reference maps accounting for roughly half of the maps reviewed in this study. In addition, the Mercator Projection dominated use in early thematic mapping. This may well have been because the earliest thematic maps portrayed wind patterns, magnetic declination and ocean currents, or other information directly of use to navigators. Unfortunately, in the nineteenth century the Mercator Projection became widely used for thematic mapping of all types of data, much of which was aimed at the general public and school children. In the nineteenth century many of the thematic maps, originally produced by academics, scientists and geographical institutions, were repackaged for a mass market. The information on these popular maps and atlases was not aimed at improving navigation but rather to illustrate what places were like: the crops grown, languages spoken, how much rainfall occurred, the type of government and a myriad of other phenomena. By 1900, the highly and unevenly distorted view of the world presented by the Mercator Projection may well have influenced the consciousness of ‘what the world looks like’ for millions.

1569 – 1699

The data shows that the Mercator Projection was quickly adopted by navigators. By the end of the seventeenth century it had become the dominant projection used for navigation. From 1569 to 1699, based on a review of sixty maps and atlases, 61% of navigational maps were created on the Mercator Projection. (Figure 4.3.) The 39% of navigational maps that did not use the Mercator Projection were either portolan in style, or they were on an unidentifiable rectangular projection. General world reference maps during this time period also began to employ the Mercator Projection. Forty-three of the sixty maps reviewed from this time frame were reference maps found as individual sheets or in atlases, of which 85.71% applied a non-Mercator Projection while14.29% used the Mercator Projection. The most common non-Mercator Projection used for reference maps at this time was the Ptolemaic, followed by the Globular.

Figure 4.3. Graph of Data Maps Reviewed, 1569 – 1699.



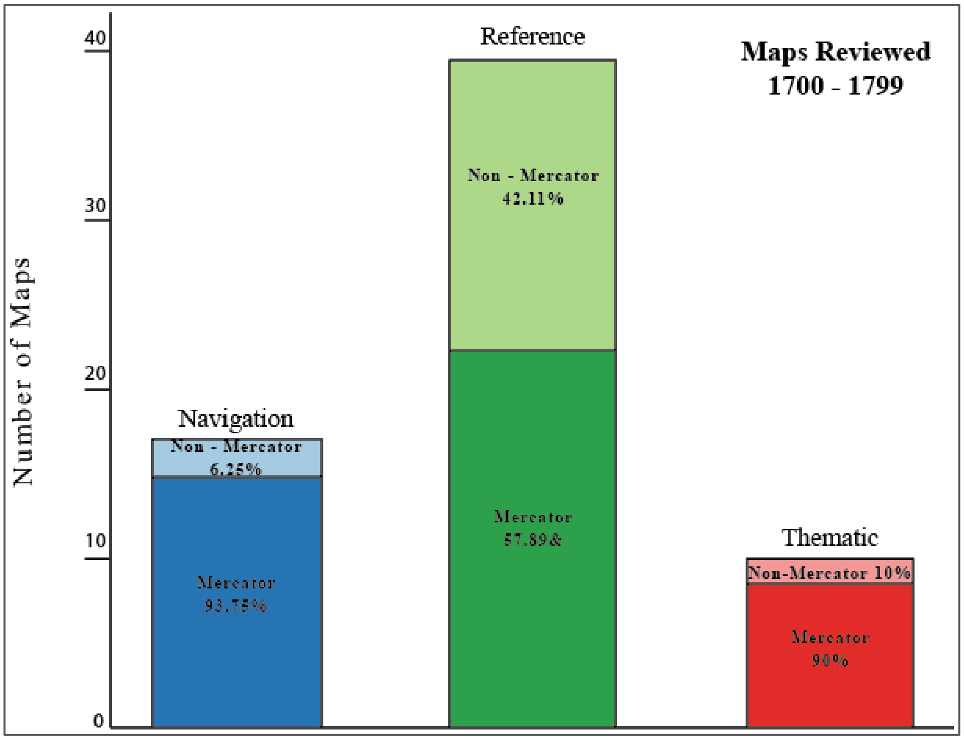
From 1569 to 1600, the percentages of the Navigation, Reference and Thematic type maps reviewed in this study.

1700 – 1799

Based on the data, the 1700 to 1799 period appears to be a critical time frame for the dissemination of the Mercator Projection. During this period the Mercator Projection was virtually the only projection used for navigational purposes. Its widespread acceptance by the nautical community was undoubtedly the result of its superior usefulness in comparison to all other projections for navigation used at this time. It is also the time period when the Mercator Projection began to be used more frequently for reference and thematic maps. In reference mapping, 58% of thirty-eight maps and atlases used the Mercator Projection for world maps, with 42% using non-Mercator Projections, most notably the Globular Projection. (See Figure 4.4.) Having roughly half, or slightly more than half, of reference maps and atlases utilizing the Mercator Projection is a trend in the data that continues to the twentieth century.

The high use of the Mercator Projection for thematic data is undoubtedly related to early thematic mapping being tied to efforts at improving navigation. While the thematic map sample was small, it was heavily weighted toward the Mercator Projection, with nine of ten maps using the that projection. The period of 1700 to 1799 saw the first identifiable thematic maps. Most of these maps were created by navigators or by scientists recording and then portraying physical data, useful for sailing. It is not surprising that these maps of ocean currents, wind directions and compass magnetic variations would be plotted on a Mercator Projection. Unfortunately, the precedent of using the Mercator Projection for navigational based thematic maps became the norm in the nineteenth century for all thematic maps.

Figure 4.4. Graph of Data Maps Reviewed, 1700 – 1799.



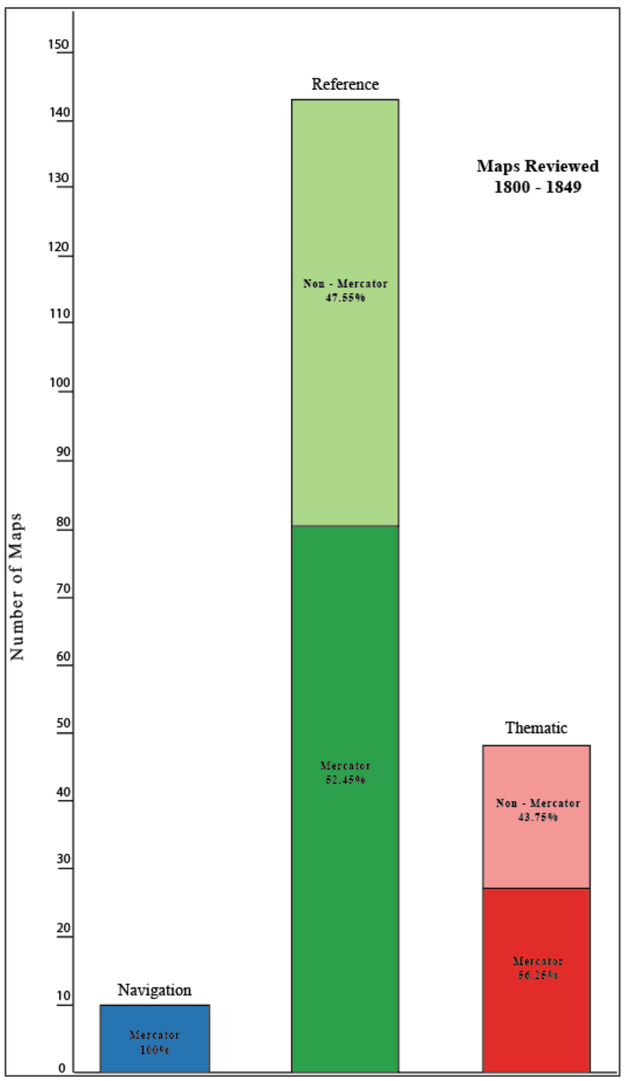
From 1700 – 1799, the percentages of the Navigation, Reference and Thematic type maps reviewed in this study.

1800 – 1849

From 1800 to 1849, the data show the tendency to use the Mercator Projection remained for thematic and general reference mapping. In reference mapping, 52% of one hundred and forty-three maps and atlases used the Mercator Projection for world maps, with 48% using non-Mercator projections (Figure 4.5.) The most frequently used non-Mercator projection used was the Globular Projection. The same trend is reflected in the data for thematic maps, with 56% of forty-eight thematic maps and atlases using the Mercator Projection for world maps and 44% using a non-Mercator projection. The non-

Mercator projections were typically the Globular and were often jointly published with the Mercator Projection map. (See Figure 4.6.) This phenomenon indicates there were other projections to pick from and there was a popular secondary alternative, but the Mercator Projection was a clear preference over other projections to display world maps.

Figure 4.5. Graph of Data Maps Reviewed, 1800 – 1849.



From 1800 to 1849, the percentages of the Navigation, Reference and Thematic type maps reviewed in this study.

Figure 4.6. An Example of the Mercator Projection and Globular Projection Published Together in the Same Atlas.

a. ‘A New Chart of the World on Wright’s or Mercator’s Projection,’ Jean Baptiste Bourguignon d’Anville, Samuel Dunn, Giovanni Battista Riccioli, Robert Laurie, and James Whittle, *A New Universal Atlas, Exhibiting All the Empires, Kingdoms, States, Republics, &c. &c. in the Whole World; Being a Complete Collection of the Most Approved Maps Extant; Corrected with the Greatest Care, and Augmented from the Last Edition of D’Anville and Robert (de Vaugondy) with Many Improvements by Major James Rennel, and Other Eminent Geographers, Including All the Tracks and New Discoveries of the British Circumnavigators, Biron, Wallis, Carteret, Captain James Cook, Vancouver, Perouse, &c. &c. 6th Ed. ...* (London: R. Laurie & J. Whittle, 1802).

(Source: David Rumsey Map Collection)

b. ‘A General Map of the World or Terraqueous Globe,’ Jean Baptiste Bourguignon d’Anville, Samuel Dunn, Giovanni Battista Riccioli, Robert Laurie, and James Whittle, *A New Universal Atlas, Exhibiting All the Empires, Kingdoms, States, Republics, &c. &c. in the Whole World; Being a Complete Collection of the Most Approved Maps Extant; Corrected with the Greatest Care, and Augmented from the Last Edition of D’Anville and Robert (de Vaugondy) with Many Improvements by Major James Rennel, and Other Eminent Geographers, Including All the Tracks and New Discoveries of the British Circumnavigators, Biron, Wallis, Carteret, Captain James Cook, Vancouver, Perouse, &c. &c. 6th Ed. ...* (London: R. Laurie & J. Whittle, 1802).

(Source: David Rumsey Map Collection)

The early nineteenth century saw a dramatic rise in the number of maps designed for school age children from the primary level to the university. From 1800 to 1849, forty-one maps and atlases created for education-based purposes were reviewed. Of the forty-one maps, 53.66% used the Mercator Projection and 46.34% used a non-Mercator projection. This reflects the same trend seen for all reference maps. School maps and atlases were created for specific age audiences to communicate general geographic and thematic information. The increase in school maps coincides with the institutionalization of tax supported education in the United States and many European nations. In the United States, in 1796, the *Act to Establish Public Schools* was passed by Congress at the urging of Thomas Jefferson and led to greater access to education, at least for white males.[36] Schools for young women followed, but these "academies" seldom had taxpayer support. By the mid-nineteenth century, compulsory education laws for both boys and girls were being enacted on a state by state basis. The rise in student numbers was met with an increase in available textbooks and school atlases.[37] Early in the nineteenth century, texts were created by individual authors who wrote, printed and marketed their

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[36] "79. A Bill for the More General Diffusion of Knowledge, 18 June 1779," Founders Online, National Archives, version of January 18, 2019, https://founders.archives.gov/documents/Jefferson/01-02-02-0132-0004-0079. [Original source: The Papers of Thomas Jefferson, vol. 2, 1777–18 June 1779, ed. Julian P. Boyd. Princeton: Princeton University Press, 1950, pp. 526–535.] "Thomas Jefferson's Draft Bill to Create Central College and Amend the 1796 Public Schools Act, [ca. 18 November 1814]," Founders Online, National Archives, version of January 18, 2019, https://founders.archives.gov/documents/Jefferson/03-08-02-0075. [Original source: The Papers of Thomas Jefferson, Retirement Series, vol. 8, 1 October 1814 to 31 August 1815, ed. J. Jefferson Looney. Princeton: Princeton University Press, 2011, pp. 90–94.]

[37] Susan Schulten, *The Geographical Imagination in America, 1880-1950* (Chicago: University of Chicago Press, 2001), 101-106.

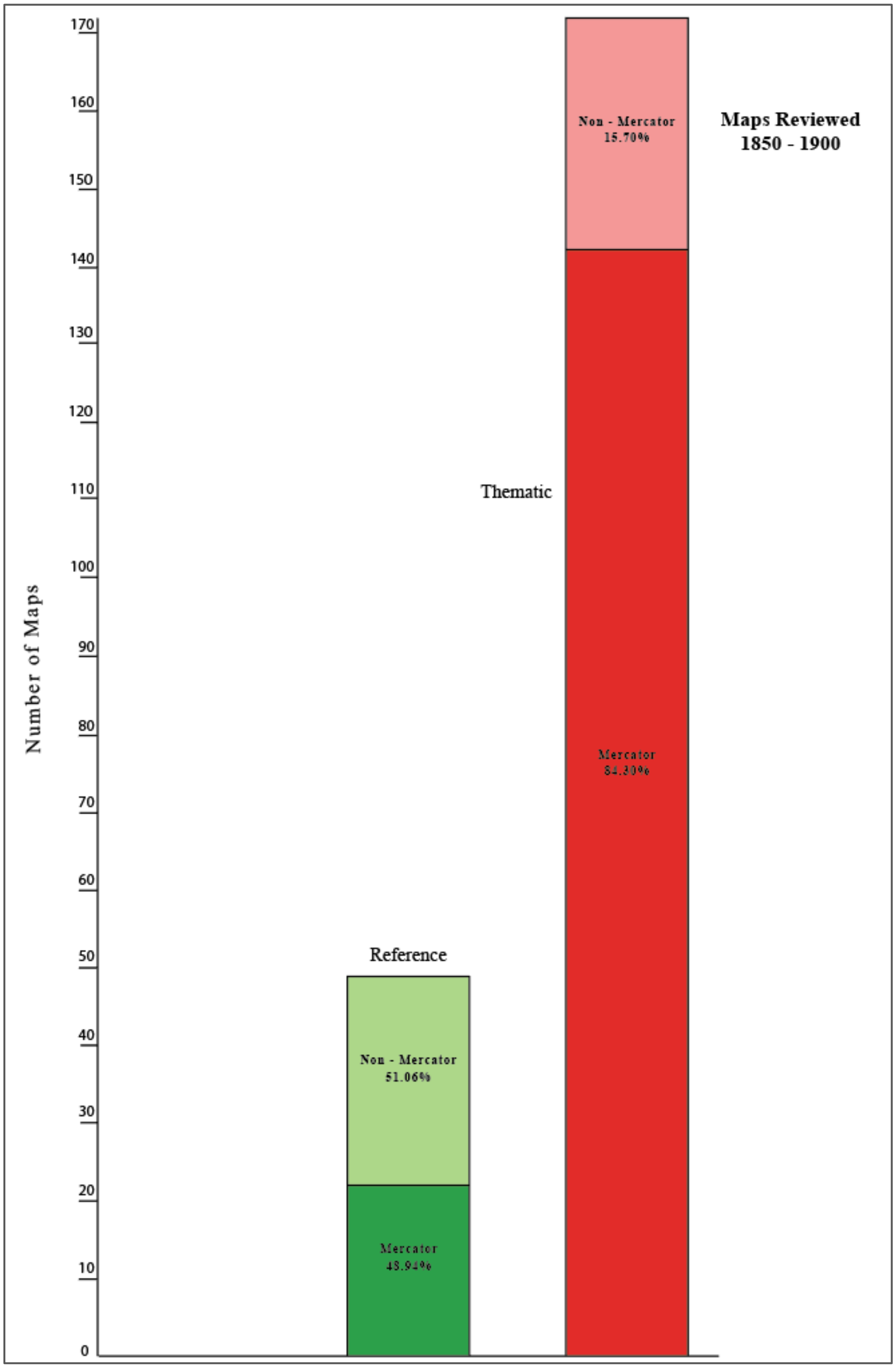
work, but by the mid-century large publishing houses such as Rand McNally, Mitchell and the American Book Company began to dominate the market.[38] The Mercator Projection being shown to audiences early in their educational careers may have been instrumental in shaping their image of what the world looked like and, significantly, what a world map should look like.

1850 – 1900

The 1850 to 1900 period was the final time frame reviewed for this study. The majority of maps and atlases found for review during this time were thematic rather than reference, reflecting what many cartographers have called the 'Golden Age of Thematic Mapping.'[39] This has significant implications in that, not only were thematic maps becoming a widespread form of popular cartography, but the Mercator Projection was the leading projection used for these maps and atlases. The data shows, of the one hundred and seventy-two thematic maps surveyed in this time frame, 84.30% of them used the Mercator Projection. (See Figure 4.8.) In reference mapping, the same trend persisted, as was established in the eighteenth century, with nearly half using the Mercator Projection: 48.94%. (See Figure 4.8.)

[38] Jeffrey C. Patton, "The American School Atlas: 1784-1900," *Cartographic Perspectives* 33 (1999): 9.
[39] Norman J.W. Thrower, *Maps & Civilization: Cartography in Culture and Society*, third (Chicago, Illinois: University of Chicago Press, 2007), 125.

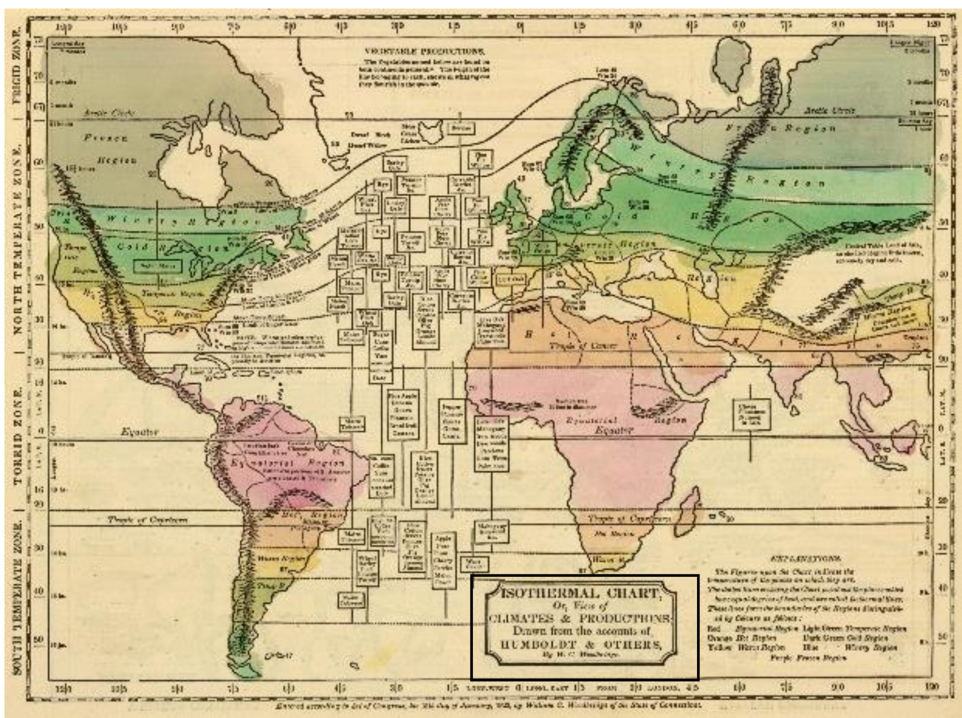
Figure 4.7. Graph of Data Maps Reviewed, 1850 – 1900.

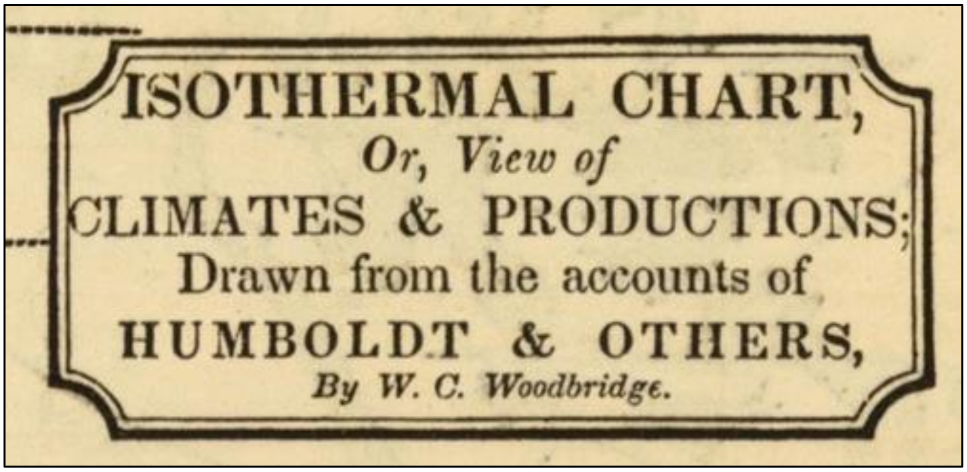


From 1850 – 1900, the percentages of the Navigation, Reference and Thematic type maps reviewed in this study.

The second most popular projection was, again, the Globular Projection. Many of these maps and atlases were created by geographical institutions that noted scientific explorers or university faculty as the "authority" behind the map. For example, William Woodbridge cited the work of Alexander von Humboldt and others as the source for his maps in his publication *Universal Geography*. (See Figure 4.8.) This connection between scientists, university faculty and geographical institutions, noted frequently on educational thematic maps, may have helped cement the perception that the Mercator Projection was superior to others as it was the projection of choice of the scientific elite.

Figure 4.8. 'Isothermal Chart, or, View of Climates & Productions,' William Woodbridge, *Universal Geography* (Hartford: Belknap & Hamersley, 1837).





(Source: David Rumsey Map Collection)

The data reflect several forces driving the dissemination of the Mercator Projection, from navigational mapping into general use for thematic and reference mapping. The expanded use of the Mercator Projection followed a series of steps, beginning with its widespread utilization in navigation, then in use for plotting data during scientific explorations and subsequent reports to sponsoring governments or scientific societies. These reports were then published in scientific and geographic society journals. Finally, maps used in the academic journals became the basis and the authority for many maps and atlases marketed to schools and other general public audiences. In each instance, the Mercator Projection used in the earlier marketing or publication was retained.

The association with highly skilled navigators, scientific exploration, prestigious scientific societies and academic educators provided the Mercator Projection with a validity that no other projection carried. The association of the Mercator Projection with thematic mapping can be partially explained by its association with the individuals who created the earliest thematic maps. The first thematic maps were created by explorers and scientists—most notably English scientist Edmund Halley, German scholar Athanasius Kircher and English explorer and navigator Captain William Dampier. As trained navigators, they were steeped in the use of the Mercator Projection. These scientists and explorers, and others, wanted to make navigation more efficient for sailing and displaying relevant data on a map, with a projection navigators were most familiar with that could easily have been justified. This close relationship of the Mercator Projection to thematic maps and thematic maps to science would be further strengthened by the publications of noted naturalists and early geographers such as Alexander Von Humboldt, Charles Darwin, Alfred Russel Wallace and James Cook.

The following chapter expands and discusses how the Mercator Projection became a familiar projection for the publication of reference and thematic mapping. The Age of Discovery paved the way for a series of European and American scientific and exploratory voyages. During the Age of Discovery, expeditions were a means of expanding trade routes and colonial empires. During the Age of Enlightenment, scientific curiosity became a new impetus for global exploration. On state-sponsored explorations, scientists were often embedded aboard naval ships in order to bring back samples of flora and fauna as well as hydrological, meteorological and astronomical data. The most famous, perhaps, was Charles Darwin, who served as the official naturalist aboard the HMS Beagle on its five-year trip around the world.[40] Artists were also frequent members of these expeditions, working with the scientists and charged with drawing landscapes and indigenous peoples as accurately as possible. Scientists also worked with the ship's navigator to plot their findings on these government-sponsored explorations.[41] Using the Mercator Projection to record scientific data collected during these explorations was undoubtedly both the simplest and most accurate method available, as the scientist could work closely with the ship's navigator whose official charts were on the Mercator Projection. The field maps created during these expeditions would later be redrawn for the reports and maps presented to and then published by geographic societies, academic journals and government reports. This translation of field notes to published maps appears to be a critical step in the tightening relationship between the Mercator Projection and scientific research.

[40] P.P. King, P. Stokes and R. Fitz-Roy, "Sketch of the Surveying Voyages of His Majesty's Ships Adventure and Beagle, 1825-1836,' In *The Journal of the Royal Geographical Society of London* 6 (1836): 311-343.

[41] Cook, James, J. C Beaglehole, and R. A Skelton, and Hakluyt Society, *The Journals of Captain James Cook on His Voyages of Discovery*, Hakluyt Society, Extra Series, No. 34-37 (Cambridge: Published for the Hakluyt Society at the University Press, 1955), 511-517,599-600.

CHAPTER V

THE SPREAD OF THE MERCATOR PROJECTION

The late sixteenth century to seventeenth century was the initial spread of the Mercator Projection. Edward Wright's corrections to the Mercator Projection were reprinted in many sources because they worked. After Wright's improvements, the spread of the Mercator Projection increased quickly, and it effectively set the stage for the Mercator Projection to be used in the eighteenth century's reference and thematic mapping.

The eighteenth century is at the crux of the spread of the Mercator Projection to visualize new scientific information in maps and atlases. Early thematic cartography evolved from efforts in the late seventeenth and early eighteenth centuries from scientific-based explorations co-sponsored by governments and scientific societies to improve navigation. The partnerships between science and government created an opportunity to expand knowledge, drive scientific discovery and reporting, create some of the earliest thematic maps, found geographical societies and introduce geography to universities.

The rise of geographical societies in the nineteenth century coincided with geography's rise as an academic discipline. Articles in the journals of geographic and other scholarly societies typically used the Mercator Projection for maps on a global or near global scale. By 1850, the Mercator Projection had solidified its dominance as the projection of choice for thematic and reference mapping.

Prussian explorer Alexander von Humboldt is a towering figure in the development of modern geography and his work contributed to the validation of the Mercator Projection as the projection of choice for science through his extensive use of it for his thematic maps. The early nineteenth century saw an unprecedented surge in the publication of thematic atlases and wall charts aimed at the general public and school children. Humboldt's techniques were widely copied by others. Map production grew in the nineteenth century through public education and the publication of family atlases. The thematic maps found on grade school wall maps, like the maps found in scientific journals, high school and university level atlases and popular "family" atlases were almost always on the Mercator Projection.

During the nineteenth century, the United States followed the Europeans lead on the presentation and distribution of geographic information in academic or school-based texts. In the 1800s, geography was considered an essential subject taught in virtually all US schools. Many popular school atlases were mirrored after the European atlases. In the nineteenth century, the use of the Mercator Projection in school atlases added legitimacy and a perception of accuracy to world maps. The Mercator Projection was not only being used in some of the most widely circulated books of the day, they were also texts that had the "official stamp" of the school system or of academia. By 1900, the Mercator Projection had become firmly entrenched as a popular choice for world maps.

Navigation, Corrections, and Initial Spread of the Mercator Projection

The Mercator Projection was ideally suited for navigation; however, its difficulty of construction limited its initial use. Edward Wright's publication of *Certaine Errors in Navigation* in 1599 removed this impediment, allowing for its widespread dissemination and its later use in reference and thematic mapping. This section traces the initial diffusion of the Mercator Projection by navigators and others publishing books and maps on instruction for navigation.

On the maps reviewed for the period 1500 to 1699, the Mercator Projection was variously identified as: "the Wright, commonly called Mercator's projection," and "Wrights' or Mercator's projection," "Mercator's chart," or simply "Mercator's projection." Of the sixteen maps found that labeled the projection, four, all English publications, included Wrights' name and twelve simply listed the Mercator Projection. By the end of the seventeenth century reference to Wright was dropped, leaving only Mercator's name.

The influence of Wright's corrections to the Mercator Projection can be partially measured in the number of reprints and unauthorized versions of Wright's work that circulated at the time. The multiple reprints and altered versions of Wright's work and maps, as well as pilot guides, navigation instruction books and merchant mariners' cartographic collections serve as indicator sources that reveal the rising popularity of the Mercator Projection.

Edward Wright's corrections to the Mercator Projection were reprinted in many sources because they worked. Noted examples of the reproduction of Wright's tables and maps, for the construction of the Mercator Projection published by his contemporaries, include Jodocus Hondius's *Christian-Knight* map, and charts by Abraham Kendall, a navigator for English nobleman Sir Robert Dudley.[1] Kendall's work was frequently the basis for other instructional books including Thomas Blundeville's *Exercises for Young Gentlemen* and Sir William Barlow's *The Navigator's Supply*. Blundeville was the only author found who directly acknowledged the corrections as the work of Wright.[2] The number of these publications attest to the value that Wright's corrections to the Mercator Projection held for the nautical community.

During the sixteenth and seventeenth centuries, the printing press connected cartography and geography to the masses. Historians Lucien Febvre and Henri-Jean Martin argue that the printed book "was one of the most effective means of mastery over the whole world."[3] The creation of the printing press was significant for the increased circulation of scientific material that followed.[4] From the sixteenth century onward, the

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[1] E.G.R. Taylor, *Late Tudor and Early Stuart Geography, 1583-1650: A Sequel to Tudor Geography, 1485-1583* (New York, New York: Octagon Books, Inc., 1968), 76-77.

[2] E.G.R. Taylor, *Late Tudor and Early Stuart Geography, 1583-1650: A Sequel to Tudor Geography, 1485-1583*, 76-77. Mark Monmonier, *Rhumb Lines and Map Wars: A Social History of the Mercator Projection* (Chicago, Illinois: University of Chicago Press, 2004), 69-70.

[3] Lucien Febvre and Henri-Jean Martin, *The Coming of the Book: The Impact of Printing, 1450-18*00, Third Edition (London: Verso, 2010), 10-11.

[4] Norman J. W Thrower, *Maps & civilization: cartography in culture and society* (Chicago, Illinois; London, UK: University of Chicago Press, 2008), 91.

rise of literacy and availability of printed resources created a more informed readership desiring information, which came increasingly from maps. Maps became, for scientists and academics, a visual means to communicate concepts and data patterns as well as the traditional geodetic information to readers.[5] Learning practical geometry from books was critical to mapmaking and navigation, and to the recording of the voyages of discovery as they expanded upon known European terrestrial space.[6] Geography, in the early modern period, represented expanding conceptions of terrestrial space.[7] The knowledge gained from the practical geographical and mathematical sciences resulted in new ideas about the size and diversity of the world. These new ideas were published in books and other manuscripts and effectively communicated through maps and atlases.[8] For example, the first author to use the Mercator Projection throughout his atlas was Englishman Sir

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[5] In the eighteenth century, the later years of the Scientific Revolution brought awareness to the geographic field as a field of scientific study. This turn used concepts of place and space to be "understood as a set of related practices by which the world has been encountered and represented, and with the language and concepts of geography as an aid to the explanation of revolutionary phenomena." According to Livingstone and Withers, the role of geography and revolution is missing from the literature and placing the role of geography in intellectual and technological revolutions like the Scientific, provides a better understanding of the knowledge and processes that created this turn. The spread of the Mercator Projection provides a glimpse into the spread of geographic as an academic discipline. David N. Livingstone and Charles W.J. Withers, *Geography and Revolution* (Chicago, Illinois: University of Chicago Press, 2005) 1-9.

[6] Charles W. J. Withers, "Geography, Science, and the Scientific Revolution," in *Geography and Revolution*, ed. David N. Livingstone and Charles W. J. Withers (Chicago: University of Chicago Press, 2005), 77-78.

[7] Charles W. J. Withers, "Geography, Science, and the Scientific Revolution," 77-78.

[8] Innes M. Keighren, "Geographies of the Book: Review and Prospect," *Geography Compass* 7, no. 11 (November 2013): 748–749.

Robert Dudley in his 1646 treatise *Dell'Arcano del Mare*.[9] Whereas previous charts and atlases only delineated European coastlines, *Dell'Arcano del Mare* covered the whole world.[10] The spread of the Mercator Projection was affected by the seventeenth century's craving for new knowledge. As more and more of the world became known to Europeans, the elite social classes, scientists, academics and the general public wanted to know what these far off places were like and not simply their location.

The seventeenth century saw the publication of a multitude of practical manuals on navigation, many of which explained how to use the Mercator Projection. These include Matthew Norwood's *System of Navigation* (1685), James Atkinson's *Epitome of the Art of Navigation* (1686) and multiple editions of Wright's *Certaine Errors*. In the 1657 edition of *Certaine Errors*, Wright's revisions of the Mercator Projection had become so popular that the chart was the first illustration and was located on the title page. (See Figure 5.1.)

[9] Norman J. W Thrower, *Maps & civilization: cartography in culture and society*, 84-85.

[10] Norman J. W Thrower, *Maps & civilization: cartography in culture and society*, 84-85.

Figure 5.1. Title Page, *Certaine Errors in Navigation*, Edward Wright (Cornhill: Printed by Joseph Moxon and Sold at His Shop at the Atlas on Cornhill, 1657).

(Source: John Carter Brown Library)

Arranged like a workbook, Norwood's *System of Navigation* and Atkinson's *Epitome of the Art of Navigation* first explain the material, followed by problems for the individual to complete. Both *Epitome* and *System* train their readers on how to use a 'Mercator's chart.'[11] Instructional guides on navigation sold well enough that publishers of these texts such as W. and J. Mount and T. Page & Son frequently sold ancillary

[11] James Atkinson, *Epitome of the art of navigation; or, A short, easy and methodical way to become a compleat navigator: containing, practical geometry, plain and spheric, superficial and solid; with its uses in all kinds of mensuration* (London: Printed for William Mount and Thomas Page, on Tower Hill, 1747), from John Carter Brown Library. Matthew Norwood, *System of Navigation: teaching the whole art, in a way more familiar, easie, and practical, than hath been hitherto done* (London: Printed for H. Sawbridge, T. Wall, T. Guy, T. Parkhurst, J. Robinson, H. White, T. Malthus, and C. Conyers, 1685), from Folger Shakespeare Library.

instructional products, maps, and charts as aids to learning navigation.[12] The preface to Norwood's *System of Navigation* yields a bibliography of other navigational texts and sea charts available to the mariner.[13] (See Figure 5.2.) Eric Ash states that there were two audiences for the pilot books: the explorer, who ventured into an area for the first time, and the pilot of an average merchant vessel, who followed familiar trade routes and standard navigational practices.[14] For Ash, this difference explains the purpose and use of navigational texts. Ash doubts the use of these texts by the average pilot. However, whether or not these volumes were heavily utilized by the average mariner does not dispel their importance to the advancement of cartography, science and mathematics.[15] Both helped to spread the Mercator Projection. These documents were working tools that were often used under harsh conditions and their scarcity may simply be a result of them being discarded as they either wore out or updated versions became available. Archival documents reviewed for this study were most likely collected and stored in private libraries for reference, rather than for use aboard ship. The publication and use of these additional texts begin to clarify how science and the production of scientific knowledge,

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[12] Eric H. Ash, 'Navigation Techniques and Practice in the Renaissance,' in *The History of Cartography, Volume Three, Cartography in the European Renaissance*, ed. David Woodward (Chicago, Illinois; London, UK: University of Chicago Press, 2007), 524.

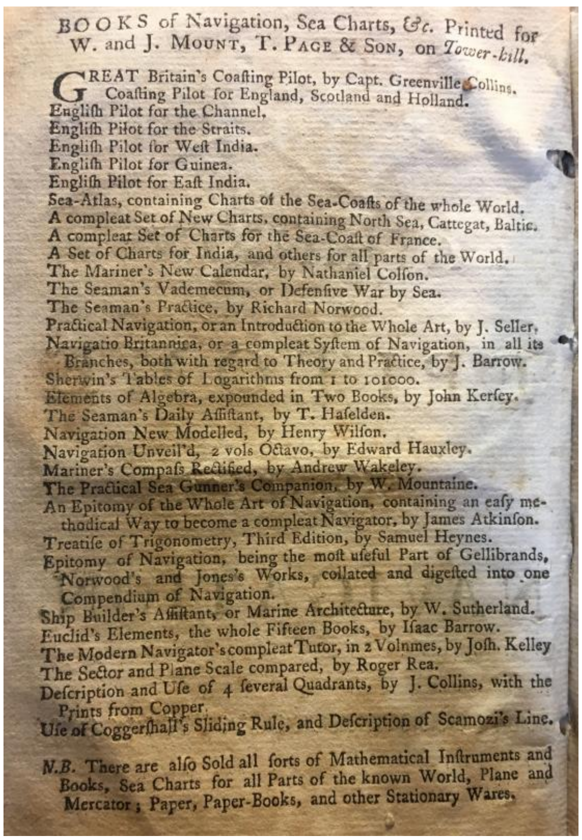
[13] Matthew Norwood, *System of Navigation: teaching the whole art, in a way more familiar, easie, and practical, than hath been hitherto done*, from Folger Shakespeare Library.

[14] Eric H. Ash, 'Navigation Techniques and Practice in the Renaissance,' 526.

[15] Eric H. Ash, 'Navigation Techniques and Practice in the Renaissance,' 527.

communicated through maps, helped propel the expanding use of the Mercator Projection.

Figure 5.2. 'Books of Navigation, Sea Charts &c.,' James Atkinson, *Epitome of the Art of Navigation; or, A Short, Easy and Methodical Way to Become a Compleat Navigator: Containing, Practical Geometry, Plain and Spheric, Superficial and Solid; With its Uses in All Kinds of Mensuration* (London: Printed for William Mount and Thomas Page, on Tower Hill, 1747).



BOOKS of Navigation, Sea Charts, &c. Printed for W. and J. MOUNT, T. PAGE & SON, on *Tower-hill.*

GREAT Britain's Coaſting Pilot, by Capt. Greenville Collins.
Coaſting Pilot for England, Scotland and Holland.
Engliſh Pilot for the Channel.
Engliſh Pilot for the Straits.
Engliſh Pilot for Weſt India.
Engliſh Pilot for Guinea.
Engliſh Pilot for Eaſt India.
Sea-Atlas, containing Charts of the Sea-Coaſts of the whole World.
A compleat Set of New Charts, containing North Sea, Cattegat, Baltic.
A compleat Set of Charts for the Sea-Coaſt of France.
A Set of Charts for India, and others for all parts of the World.
The Mariner's New Calendar, by Nathaniel Colſon.
The Seaman's Vademecum, or Defenſive War by Sea.
The Seaman's Practice, by Richard Norwood.
Practical Navigation, or an Introduction to the Whole Art, by J. Seller.
Navigatio Britannica, or a compleat Syſtem of Navigation, in all its Branches, both with regard to Theory and Practice, by J. Barrow.
Sherwin's Tables of Logarithms from 1 to 101000.
Elements of Algebra, expounded in Two Books, by John Kerſey.
The Seaman's Daily Aſſiſtant, by T. Haſelden.
Navigation New Modelled, by Henry Wilſon.
Navigation Unveil'd, 2 vols Octavo, by Edward Hauxley.
Mariner's Compaſs Rectified, by Andrew Wakeley.
The Practical Sea Gunner's Companion, by W. Mountaine.
An Epitomy of the Whole Art of Navigation, containing an eaſy methodical Way to become a compleat Navigator, by James Atkinſon.
Treatiſe of Trigonometry, Third Edition, by Samuel Heynes.
Epitomy of Navigation, being the moſt uſeful Part of Gellibrands, Norwood's and Jones's Works, collated and digeſted into one Compendium of Navigation.
Ship Builder's Aſſiſtant, or Marine Architecture, by W. Sutherland.
Euclid's Elements, the whole Fifteen Books, by Iſaac Barrow.
The Modern Navigator's compleat Tutor, in 2 Volnmes, by Joſh. Kelley
The Sector and Plane Scale compared, by Roger Rea.
Deſcription and Uſe of 4 ſeveral Quadrants, by J. Collins, with the Prints from Copper.
Uſe of Coggerſhall's Sliding Rule, and Deſcription of Scamozi's Line.

N.B. There are alſo Sold all ſorts of Mathematical Inſtruments and Books, Sea Charts for all Parts of the known World, Plane and Mercator; Paper, Paper-Books, and other Stationary Wares.

(Source: John Carter Brown Library)

The spread of the Mercator Projection, and its increased use after Wright's 1599 revisions, ushered the Mercator Projection onto a larger scientific, economic and political platform. Miles Ogborn and Charles Withers reinforce the value and role of geographic knowledge in the facilitation and commercial colonial ventures of various empires, making empires an intellectual construct as well as a physical one.[16] Ogborn and Withers further claim that the geographical distribution of the book was initially set to the production and mobility of cartography.[17] Production, circulation and consumption needed to be considered together.[18] A book cannot be understood outside of its geography.[19] The book's history, context and dissemination highlighted the importance of place for its local and national meaning and reception. Historians Tamar Herzog, Barrie Crosbie and Christian Koot demonstrate how empires and their peripheries used maps or surveying as a means to reinforce the political concept of a core and periphery imperial network.[20] After Wright's improvements, the spread of the Mercator Projection increased quickly, especially among English resources, and it effectively set the stage for the Mercator Projection to be used in the eighteenth century's reference and thematic mapping.

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[16] Daniel Hopkins, 'Books, Geography and Denmark's colonial Undertaking in West Africa, 1790-1850,' in *Geographies of the Book*, eds. Miles Ogborn and Charles W.J. Withers (London, UK; New York, New York: Routledge, 2010), 221-222.

[17] Miles Ogborn and Charles W.J. Withers, 'Introduction: Book Geography, Book History,' in *Geographies of the Book*, eds. Miles Ogborn and Charles W.J. Withers (London, UK; New York, New York: Routledge, 2010), 2.

[18] Miles Ogborn and Charles W.J. Withers, 'Introduction: Book Geography, Book History,' 23.

[19] Miles Ogborn and Charles W.J. Withers, 'Introduction: Book Geography, Book History,' 25.

[20] Barry Crosbie, 'Ireland, Colonial Science, and the Geographical Construction of British Rule in India, c. 1820-1870,' in *The Historical Journal* 52, no. 4 (December 2009): 963-965. Christian J. Koot, 'The Merchant, the Map, and Empire: Augustine Herrman's Chesapeake and Interimperial Trade, 1644–73,': 604, 643-644. Tamar Herzog, *Frontiers of Possession: Spain and Portugal in Europe and the Americas* (Cambridge, Massachusetts: Harvard University Press, 2015), 8.

Early Thematic Mapping and the Rise of the Geographic Discipline

From its inception, thematic cartography was intertwined with the Mercator Projection. Mercator developed his projection to meet the clear shortcomings of other projections used for navigation. However, there was no similar attempt made to create a projection specifically for the visualization of scientific data. Perhaps this was because the mapmakers of the time did not see areal distortion as a particularly egregious problem, or a problem with a solution, or they believed that their readers would be aware of the level of distortion and compensate for it. It was not until the twentieth century that there would be serious attempts to create a projection well suited for global thematic data. In the interim the Mercator Projection, the projection used on the first thematic maps, would dominate thematic mapping for nearly two hundred years.

Thematic cartography was the application of quantitative thinking to cartography and was accompanied by a rise in visualizing statistical information to make navigation more effective for western European discovery and exploration.[21] By the sixteenth century, techniques and instruments for precise observation and measurement of physical quantities were well-developed — the beginnings of visualization.[22] Friendly and Denis write, "the earliest seeds [for scientific visualization] arose in geometric diagrams and in the making of maps to aid in navigation and exploration. New data sources appeared at

[21] Norman J.W. Thrower, *Maps & Civilization: Cartography in Culture and Society*, 125.

[22] Michael Friendly and Daniel J. Denis, 'Milestones in the history of thematic cartography, statistical graphics, and data visualization,' Research Gate (2001): 1, Accessed in November 23, 2018, file:///Users/micheleabee/Downloads/Milestones_in_the_history_of_thematic_cartography_%20(1).pdf.

the same time as statistics was developing mathematical principles for the analysis, organization, interpretation and display of data."[23] Finally, the institutionalization of state funded public education, first by Prussia in 1763, and then spreading quickly through western Europe and United States, created a profitable market for maps.[24] A better educated general public became a major market for publishing houses. This early connection with navigation to thematic cartography, the rise of geography in the university as an academic subject, along with the establishment of scientific societies sponsored with government funds, helped to solidify the role of the Mercator Projection as a projection of choice for the reporting of scientific endeavors.

The eighteenth century is at the crux of the spread of the Mercator Projection to visualize new scientific information in maps and atlases. Early thematic cartography evolved from efforts in the late seventeenth and early eighteenth centuries from scientific-based explorations co-sponsored by governments and scientific societies to improve navigation. D.W. Waters (1990) claimed that the motivation for the Scientific Revolution in England, beginning in the last quarter of the seventeenth century, was nautical.[25] Driven to improve navigational practices, the English used scientific studies

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[23] Susan Schulten, "Thematic Cartography and Federal Science in Antebellum America," Essay, In *Thematic Cartography and Federal Science in Antebellum America* (Berlin, Heidelberg: Springer Berlin Heidelberg: Springer, 2012), 37-38.

[24] Francisco O. Ramirez and John Boli, "The Political Construction of Mass Schooling: European Origins and Worldwide Institutionalization," in *Sociology of Education* 60, no. 1 (1987): 3-4.

[25] D.W. Waters, "Captain Edmond Halley, F.R.S., Royal Navy and the Practice of Navigation," in *Standing on the Shoulders of Giants*, ed. Norman J.W. Thrower (Berkeley and Los Angeles, California; Oxford, England: University of California Press, 1990), 176.

to better understand magnetism in connection with the manufacturing and use of sea-compasses and founded the Royal Observatory ‘for perfecting the art of navigation.’[26] The most notable prize was the Longitude Act of 1714 which was passed by the British Parliament and authorized a system of inducement prizes to be offered for the development of a practical method for the precise determination of a ship's longitude at sea.[27] The partnerships between science and government created an opportunity to expand imperial knowledge, drive scientific discovery and reporting, create some of the earliest thematic maps, found geographical societies and introduce geography to universities. The use of the Mercator Projection for world maps connects these events. Individuals contributing to the dispersion of the Mercator Projection included English scientists and explorers Edmond Halley, John Harrison, Captain James Cook and German explorer Alexander von Humboldt.

Early Thematic Mapping and Edmund Halley

There were two earlier efforts at displaying thematic data and both utilized the Mercator Projection. In 1665, German cartographer Aphasias Bircher produced his *Tabula geographic hydrographical motus ocean currents,* and fellow German Edward Happelpublished in 1675 *Die Ebbed und Flush buff eider fleche Landt-Karten fürgestelt.* (See Figures 5.3 and 5.4.) Both maps attempted to rectify mariners’ observations of

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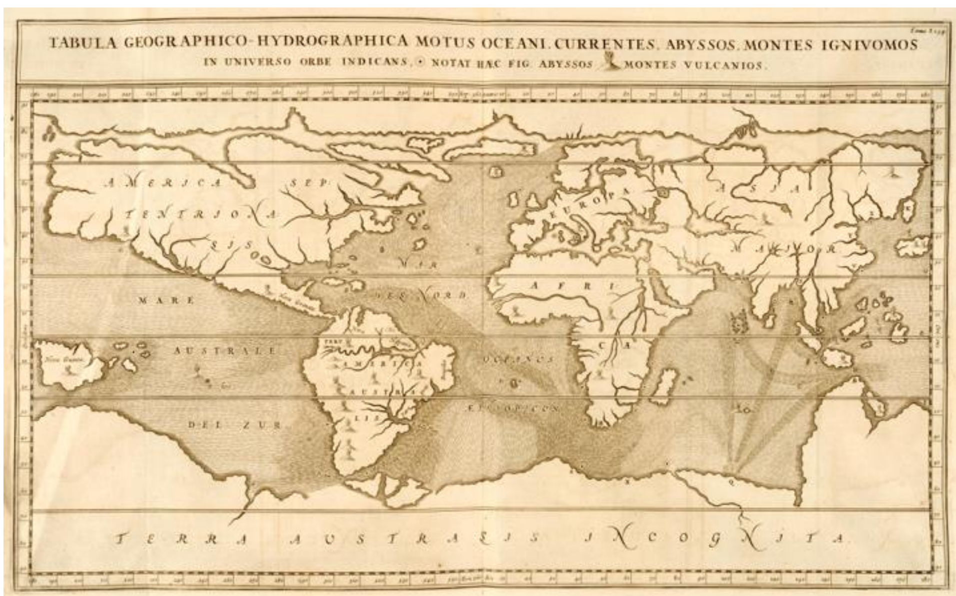
[26] D.W. Waters, “Captain Edmond Halley, F.R.S., Royal Navy and the Practice of Navigation,” 176.

[27] Dava Sobel, *Longitude: The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time* (New York, New York: Walker & Co., 2005), 51-53.

ocean currents with scientific theories of the day.[28] However, these maps did not prove useful for navigation practices. Although it is unclear if these maps influenced English scientist Edmund Halley, they illustrate a precedent to use the Mercator Projection to visualize data.

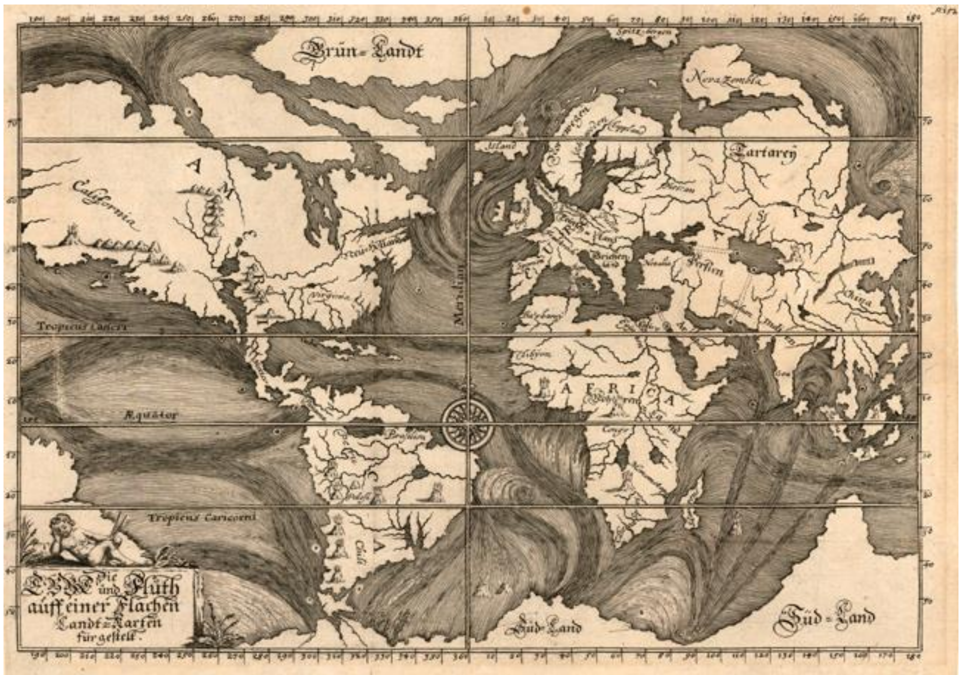
Figure 5.3. Athanasius Kircher, 'Tabula Geographico Hydrographica Motus Oceani Currents…' (Amsterdam: Kircher's *D'onder-aardse Weereld in Haar Goddelijk Maaksel en Wonderbare Uitwerkselen Aller Dinge, 2 Vols, in 1*, 1682).



(Source: Princeton University Library, Rare Books Division)

[28] Reference – "First X, Then Y, Now Z: Landmark Thematic Maps", Princeton University Library (http://libweb5.princeton.edu/visual_materials/maps/websites/thematic-maps/contents.html.

Figure 5.4. Eberhard Werner Happel, ‘Die Ebbe und Fluth Auff Einer Flachen Landt-Karten Furgestelt’ (1675).



(Source: Princeton University Library)

D.W. Waters claims, “the sea influenced English science profoundly,”[29] and no one more profoundly than English scientist Edmund Halley who was at the center of English efforts to improve navigation. Edmund Halley, the astronomer best known for the comet bearing his name, held several roles that influenced his cartography and relationship with the Mercator Projection. Halley was a fellow of the Royal Society, the Astronomer Royal and Captain of the Royal Navy.[30] Halley’s life was varied and wide

[29] D.W. Waters, “Captain Edmond Halley, F.R.S., Royal Navy and the Practice of Navigation,” 172.

[30] D.W. Waters, “Captain Edmond Halley, F.R.S., Royal Navy and the Practice of Navigation,” 171. Norman. J.W. Thrower, “The Royal Patrons of Halley,” in *Standing on the Shoulders of Giants,* ed.

ranging, specifically for cartography. He mapped scientific data that clarified wind currents and geomagnetism.

Halley's role in the early development of thematic cartography was pivotal in forming the connection between the Mercator Projection and thematic mapping. While Halley was at sea, if he was not previously introduced to the Mercator Projection, he became acquainted with it by reading the East Indiamen's pilot books. In D.W. Water's examination of Halley's naval and maritime navigation experience he notes, "it is virtually certain the East Indiamen's pilots used Mercator charts for the oceanic passages, as they had done for the past sixty years."[31] First, Halley began with wind currents. According to Halley, he collected data from navigators familiar with ocean transit and tied it to his own experiences in the tropics.[32] Halley stated,

> To help the conception of the reader in a manner of so much difficulty, I believed it necessary to adjoyn a Scheme, shewing at one view all the various Tracts and Courses of these Winds; whereby 'tis possible the thing may be better understood, then by any verbal description whatsoever.[33]

Norman J.W. Thrower (Berkeley and Los Angeles, California; Oxford, England: University of California Press, 1990), 208.

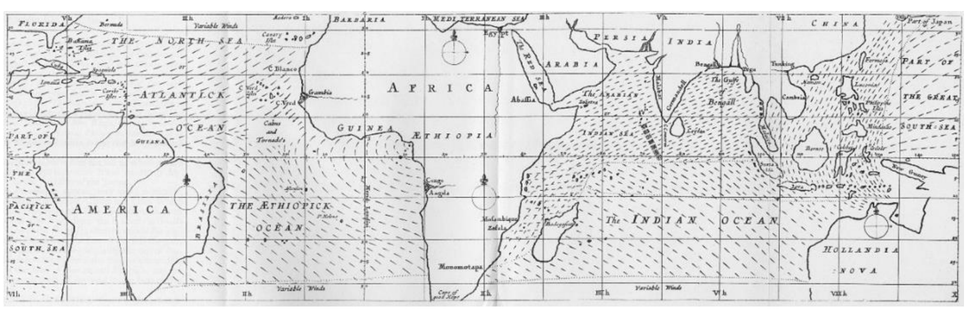
[31] D.W. Waters, "Captain Edmond Halley, F.R.S., Royal Navy and the Practice of Navigation," 179.

[32] E Halley, "An Historical Account of the Trade Winds, and Monsoons, Observable in the Seas between and Near the Tropicks, with an Attempt to Assign the Phisical Cause of the Said Winds, By E. Halley," in the *Philosophical Transactions of the Royal Society* (1683-1775) 16 (1686): 156.

[33] E Halley, "An Historical Account of the Trade Winds, and Monsoons, Observable in the Seas between and Near the Tropicks, with an Attempt to Assign the Phisical Cause of the Said Winds, By E. Halley,": 162-163.

Halley's account concerning his map is an affirmation of the value of thematic cartography. In 1686 Halley published "An Historical Account of the Trade Winds, and Monsoons, Observable in the Seas between and near the Tropicks, with an Attempt to Assign the Phisical Cause of the Said Wind," in the *Philosophical Transactions of the Royal Society*.[34] The article's thematic map shows prevailing wind direction and strength in the tropical region. (See Figure 5.5.) With Halley's reliance on navigators for the majority of his data, and his efforts for the map to make navigation more efficient, it is not surprising that the projection he chose to illustrate the data was the Mercator Projection. (See Figure 5.6.)

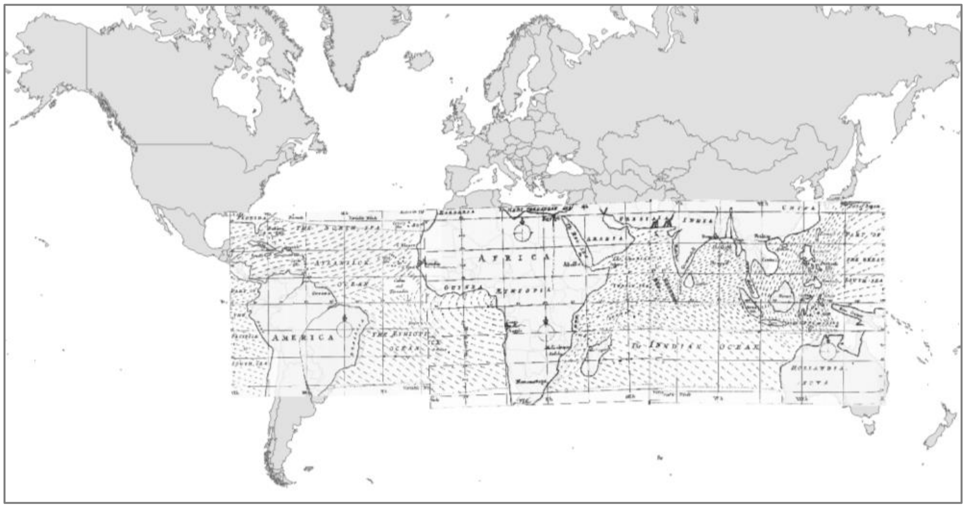
Figure 5.5. Halley's 1686 Map of Trade Winds, Edmund Halley, 'An Historical Account of the Trade Winds, and Monsoons, Observable in the Seas Between and Near the Tropicks, With an Attempt to Assign the Phisical Cause of the Said Winds' (London: 1686).



(Source: *The Philosophical Transactions of the Royal Society*)

[34] E Halley, "An Historical Account of the Trade Winds, and Monsoons, Observable in the Seas between and Near the Tropicks, with an Attempt to Assign the Phisical Cause of the Said Winds, By E. Halley,": 153–68.

Figure 5.6. Halley’s Wind Current Map Georeferenced to the Mercator Projection.



While the matching is crude the outlines of the countries are nearly identical. (Source: *The Philosophical Transactions of the Royal Society*, ESRI, Map Generated by Michele Abee).

In 1692, Halley published an article on geomagnetism in *Philosophical Transactions*, “A Theory of the Variation of the Magnetical Compass,” which included a map on the Mercator Projection illustrating magnetic declination. The article was Halley’s second attempt at determining geomagnetic variation. The article reports on the findings of his research at sea.[35] Halley’s article discussed how he took numerous measurements of compass variations from 1680 to 1683 at various locations throughout the eastern hemisphere.[36] Halley’s thematic maps were clearly designed as aids for

[35] Norman. J.W. Thrower, “The Royal Patrons of Halley,” in *Standing on the Shoulders of Giants*, ed. Norman J.W. Thrower (Berkeley and Los Angeles, California; Oxford, England: University of California Press, 1990), 203-207.

[36] Edmund Halley, “A Theory of the Variation of the Magnetical Compass, by Mr. Ed. Halley Fellow of the R.S.,” in *Philosophical Transaction* 13 (1683): 210-211.

navigation and so his choice of the Mercator Projection, with which he was quite familiar, was a practical decision. The tradition for using the Mercator Projection for displaying scientific data had begun.

In 1698, Halley was given command of *HMS Paramour*, so that he could carry out investigations in the South Atlantic into the laws governing the variation of the compass. The British Admiralty provided the ship and crew, but the Royal Society paid their wages. While seen as a scientific endeavor, the British Admiralty clearly knew the potential benefit such research would have for navigation.[37] Halley made a second voyage in the *Paramour* from 1699 to early 1700 to extend the area of his magnetic observations. To record his information on how the compass varied magnetically, Halley created a table of observed magnetic variations, documenting the longitude and latitude and the year taken for each measurement.[38] Once Halley had the data, he needed a method to represent that data that both scientists and navigators could understand. His solution was to create the isoline for a thematic map utilizing the Mercator Projection.

The immediate impact of Halley's map was to improve the ability of navigators to follow precise routes charted on the Mercator Projection. In 1701, Halley published two maps based on his discoveries on Earth's geomagnetic field, 'Nova & Accuratissima Totis Terrarum Orbis Tabula Nautica Variationum Magneticarum,' and 'A new and

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[37] Alan Gurney, *Below the Convergence: Voyages Toward Antarctica, 1699-1839*, 1st ed (New York: Norton, 1997).

[38] Edmund Halley, 'A Theory of the Variation of the Magnetical Compass, by Mr. Ed. Halley Fellows of the R.S.,': 21

correct chart shewing the variations of the compass in the Western & Southern Oceans as observed in the year 1700 by his Majesties command by Edm. Halley.' Both were displayed on the Mercator Projection. The latter (more widely known) was printed with the 'Description and Uses of a New and Correct Sea-Chart of the Western and Southern Ocean shewing the Variations of the Compass' presented on two informational side columns, which were added to the map to further explain its uses.[39] (See Figure 5.7.) In the 'Description' Halley explains why he chose to publish his Sea-Chart of the Mercator Projection. (See Figure 5.8.) Mariners knew the Mercator Projection and did not need instructions or explanations on how to use it, and it was the most sufficient chart for ships on long voyages to use at sea.[40]

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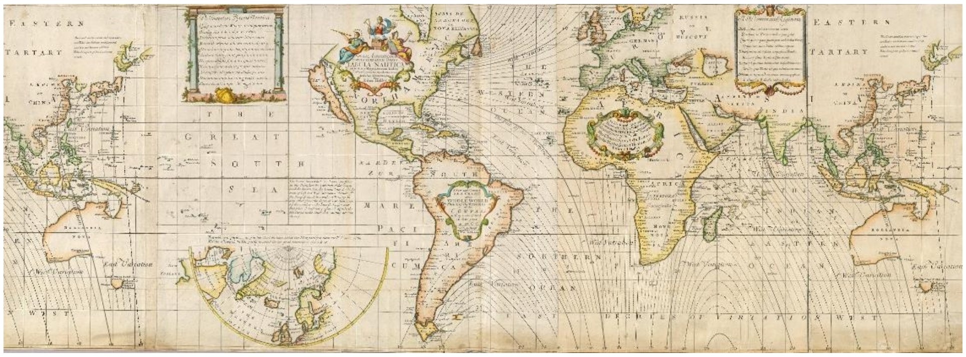
[39] Edmond Halley, 'A new and correct chart shewing the variations of the compass in the Western & Southern Oceans as observed in the year 1700 by his Majesties command by Edm. Halley,' Map, engraving, London: Sold by R. Mount and T. Page on Tower Hill, 1701, from John Carter Brown Library Map Collection (accessed November 29, 2017), https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~3537~101709:A-new-and-correct-chart-shewing-the.

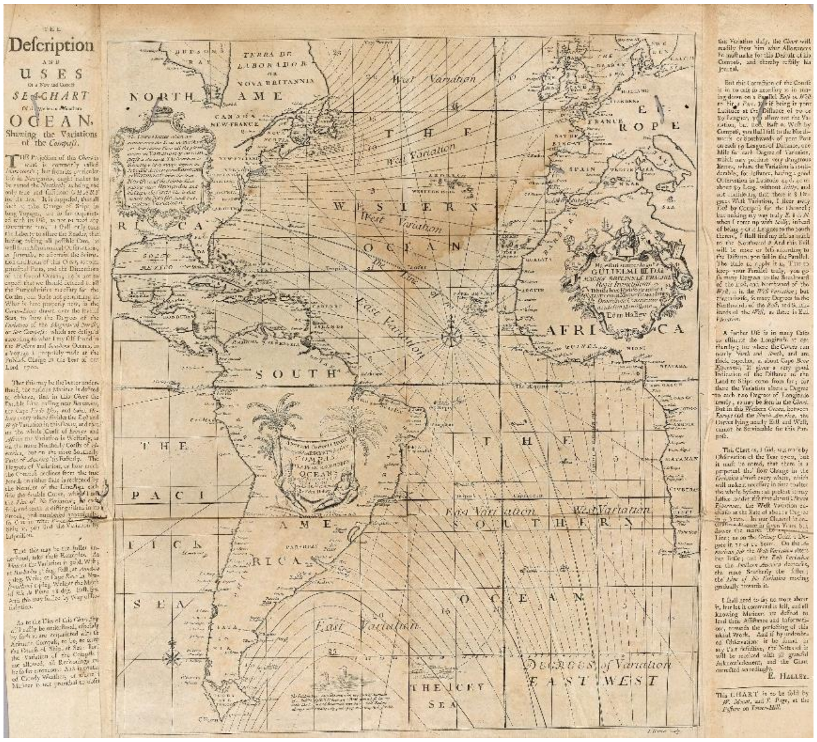
[40] Edmond Halley, 'The Description and uses of a new and correct sea chart of the western and southern ocean, shewing the variations of the compass,' in 'A new and correct chart shewing the variations of the compass in the Western & Southern Oceans as observed in the year 1700 by his Majesties command by Edm. Halley,' Map, engraving, London: Sold by R. Mount and T. Page on Tower Hill, 1701, from John Carter Brown Library Map Collection (accessed January 10, 2018), https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~3540~101701:A-new-and-correct-chart-shewing-the?qvq=q:Edmond%2BHalley&mi=1&trs=4#.

Figure 5.7. Nova & Accuratissima Totis Terrarum Orbis Tabula Nautica Variationum Magneticarum, Edmund Halley (London: Sold by R. Mount and T. Page on Great Tower Hill, 1701).



(Source: John Carter Brown Library)

Figure 5.8. 'A New and Correct Chart Shewing the Variations of the Compass in the Western & Southern Oceans as Observed in the Year 1700 by his Majesties Command by Edm. Halley', Edmund Halley (London: Sold by R. Mount and T. Page on Tower Hill, 1701).



(Source: John Carter Brown Library)

For his thematic map, Halley utilized isogones, lines of equal magnetic variation in degrees from the geographical north pole.[41] The map is a milestone in the history of cartography as it is the earliest example of the use of isolines of any form. Isolines became the standard method to portray data that occurs continuously across a surface. It remains the most common method used on thematic maps portraying a host of phenomena including elevation, temperature, precipitation and barometric pressure. Halley's development of the isoline was greatly praised by German polymath Alexander von Humboldt.[42] Humboldt later expanded upon Halley's work and followed Halley's lead by utilizing the Mercator Projection and isolines for the plotting of scientific data on the maps found in the field reports of his expeditions and in the subsequent publication of a series of popular/academic thematic atlases of the areas he explored.

Halley's charts were published by a popular English publishing house for nautical cartography, Mount and Page, while the scientific explanations were published in the Royal Society's *Philosophical Transactions*.[43] This established three distinct audiences for Halley's scientific discoveries: the practicing navigator, a relatively narrow academic

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[41] Norman Thrower, *Maps & Civilization: Cartography in Culture and Society*, 97-100.

[42] Norman. J.W. Thrower, "The Royal Patrons of Halley," in *Standing on the Shoulders of Giants*, ed. Norman J.W. Thrower (Berkeley and Los Angeles, California; Oxford, England: University of California Press, 1990), 212.

[43] Edmond Halley, 'A new and correct chart shewing the variations of the compass in the Western & Southern Oceans as observed in the year 1700 by his Majesties command by Edm. Halley,' Map, engraving, London: Sold by R. Mount and T. Page on Tower Hill, 1701, from John Carter Brown Library Map Collection (accessed January 10, 2018), https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~3540~101701:A-new-and-correct-chart-shewing-the?qvq=q:Edmond%2BHalley&mi=1&trs=4#.

audience, and a broader audience of the well-educated general public. Samuel Pepys, a contemporary of Halley's, best known for his famed *Diary* that gave a rich detail of a turbulent period in English history including the Great Plague and Great Fire of London, was also known as the "Father of the Royal Navy" and was instrumental in the formation of the Royal Society. In 1684, he was elected President of the Society.[44] In his *Diary,* Pepys spoke highly of Edmund Halley's scientific and navigational knowledge.[45] Halley was crucial to the spread of the Mercator Projection. He created thematic cartography and tied it to the Mercator Projection through science and also linked science with government support. This was repeated throughout the eighteenth century and is pivotal to the dispersion of the Mercator Projection.

An important contemporary of Edmund Halley was Captain William Dampier, an English explorer and navigator celebrated as the first British explorer of Australia. He has been described as one of the most important British explorers of the period between Sir Walter Raleigh and James Cook.[46] Like Halley, Dampier was also a renowned navigator and early thematic cartographer. To accompany his "A Discourse of Trade-Winds, Breezes, Storms, Tides, and Currents" in volume two of his *Voyages and Descriptions,* Dampier published a thematic map showing the ocean and wind currents he

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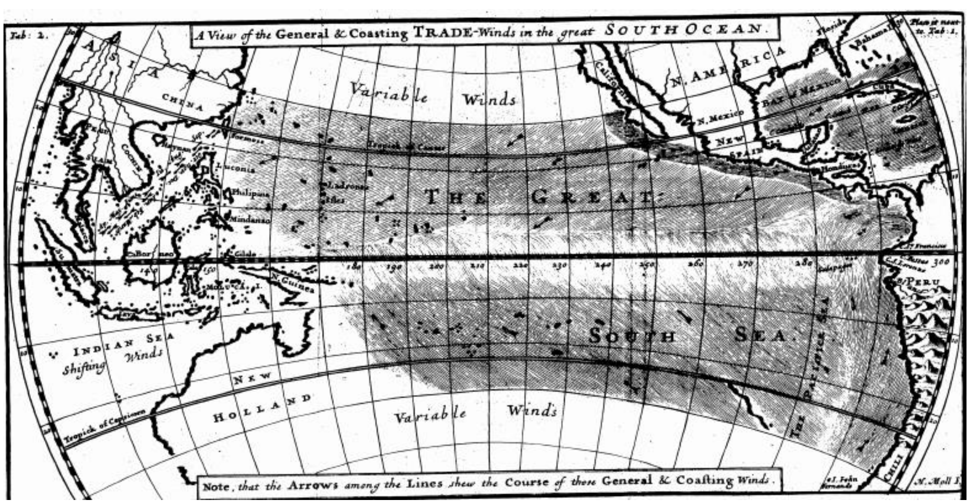
[44] David Wright, "The Astronomy in Pepys' Diary," *Astronomy & Geophysics* 41, no. 4 (2000): 4.23–4.24.

[45] David Wright, "The Astronomy in Pepys' Diary,": 4.26-4.27.

[46] Diana Preston and Michael Preston, *A Pirate of Exquisite Mind: The Life of William Dampier: Explorer, Naturalist, and Buccaneer* (New York, New York: The Berkley Publishing Group, 2004).

encountered in the Pacific Ocean, or Great South Sea.[47] (See Figure 5.9.) While not on the Mercator Projection, the map demonstrates the concept of using graphic variables to represent geospatial data, in this case currents in the Pacific Ocean. Dampier's map also demonstrates that there were other projections available to cartographers, indicating a clear choice in the cartographers' decision to keep with, or not to use the Mercator Projection.

Figure 5.9. 'A View of the General & Coasting Trade-Winds in the Great South Ocean' in His Voyages and Descriptions,' William Dampier, Voyages and Descriptions: In Three Parts: To Which is Added a General Index to Both Volumes, the 2nd ed. Vol. Vol. Ii (London: Printed for James Knapton, 1700).



(Source: Early English Books Online)

[47] William Dampier, V*oyages and Descriptions: In Three Parts: To Which Is Added a General Index to Both Volumes*, the 2nd ed. Vol. Vol. Ii, Early English Books Online, London: Printed for James Knapton, 1700. 1700, p. 466, accessed November 23, 2018, http://eebo.chadwyck.com.libproxy.uncg.edu/search/full_rec?SOURCE=pgthumbs.cfg&ACTION=ByID&ID=12643424&FILE=../session/1543025746_5639&SEARCHSCREEN=CITATIONS&VID=65067&PAGENO=&ZOOM=&VIEWPORT=&SEARCHCONFIG=config.cfg&DISPLAY=default&HIGHLIGHT_KEYWORD=&START=401.

Scientific Exploration and Thematic Mapping

In the eighteenth century, map accuracy increased "primarily due to the development and manufacture of new instruments and stringent training in how to use them."[48] The most notable instruments were the reflecting quadrant and the sextant, both of which enhanced the precision of the measurement of latitude at sea, and John Harrison's chronometer, an instrument that for the first time allowed for accurate determination of longitude at sea.[49] The chronometer was successfully tested on English explorer Captain James Cook's second voyage (1772-1775).[50] Scientists used cartographic tools to explain environmental patterns such as climate, geology and disease.[51] Mapping was being transformed from an art to a modern science by the work of navigators, scientists and governments.

During the late 1700s two cartographic endeavors that were closely linked to British imperial expansion propelled the use of the Mercator Projection into general thematic and reference mapping. The first was a detailed survey created by Samuel

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[48] Library and Archives Canada, "The Mapmakers: An Essay in Four Parts," June 10, 2015, accessed on November 26, 2018, http://www.bac-lac.gc.ca/eng/discover/exploration-settlement/pathfinders-passageways/Pages/mapmakers-essay.aspx.

[49] Library and Archives Canada, "The Mapmakers: An Essay in Four Parts," June 10, 2015, accessed on November 26, 2018, http://www.bac-lac.gc.ca/eng/discover/exploration-settlement/pathfinders-passageways/Pages/mapmakers-essay.aspx.

[50] Dava Sobel, *Longitude: The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time*, 138-139, 150-151.

[51] Susan Schulten, "Thematic Cartography and Federal Science in Antebellum America," in *History of Cartography* (Springer Berlin Heidelberg: Berlin, Heidelberg, 2012), 37–56.

Holland and Joseph Frederick Wallet Des Barres in North America. After the conclusion of the Seven Years War, at the Treaty of Paris, Britain acquired vast territories in South Asia, North America and the Caribbean. In an effort to understand these acquired lands, the British government instituted a series of coastal surveys, including the General Survey of the Northern District and the Survey of Nova Scotia.[52] These surveys were led by Holland and Des Barres and the product was the four-volume publication, *Atlantic Neptune*. The small scale charts used the Mercator Projection because it was the standard projection for the British Admiralty.[53] (See Figure 5.10). The larger scale maps were placed on simple grids or plane charts and were typically copied from sketch maps.[54] (See Figure 5.11.) The *Atlantic Neptune* was one of Britain's first attempts to systematically survey an extensive overseas area.[55] The Mercator Projection became so indispensable it became the favored projection for nautical surveys for the British Hydrologic Office and British Navy.[56] Holland and Des Barres chose the Mercator

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[52] Stephen J, Hornsby and Hope Stege, *Surveyors of Empire: Samuel Holland, J.W.F. Des Barres, and the Making of the Atlantic Neptune*, 3.

[53] Stephen J, Hornsby and Hope Stege, *Surveyors of Empire: Samuel Holland, J.W.F. Des Barres, and the Making of the Atlantic Neptune*, 179-180. John Blake, *The Sea Chart: The Illustrated History of Nautical Maps and Navigational Charts,* Second ed. (London: Conway, 2016), 21.

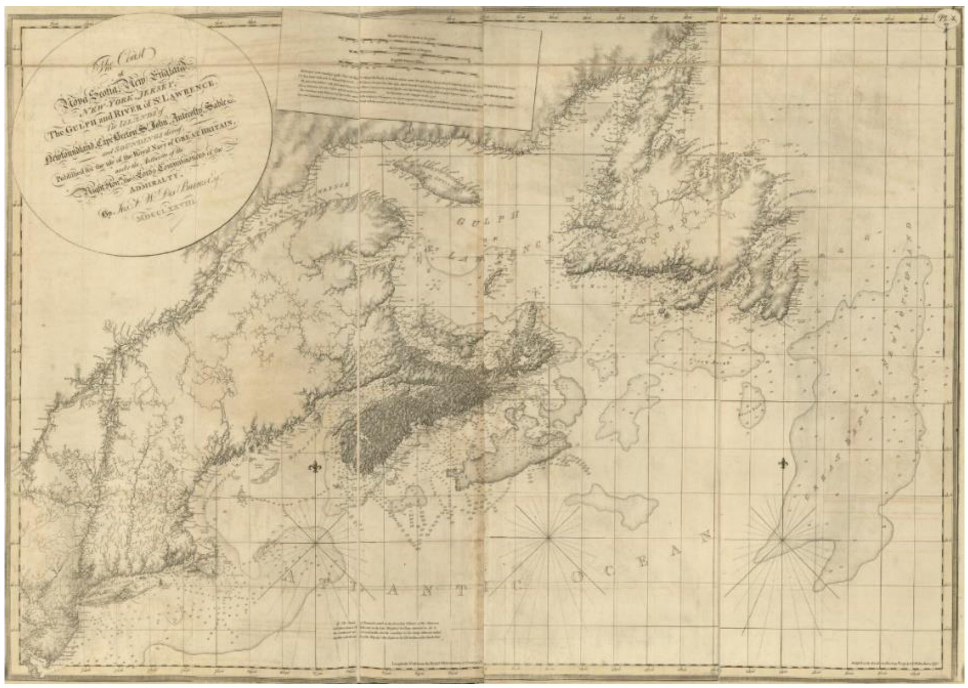
[54] Stephen J, Hornsby and Hope Stege, *Surveyors of Empire: Samuel Holland, J.W.F. Des Barres, and the Making of the Atlantic Neptune*, 179-180.

[55] Stephen J, Hornsby and Hope Stege, *Surveyors of Empire: Samuel Holland, J.W.F. Des Barres, and the Making of the Atlantic Neptune*, 3.

[56] John Blake, *The Sea Chart: The Illustrated History of Nautical Maps and Navigational Charts*, 21.

Projection as it was the customary choice for navigational charts, an indication of how important and familiar the Mercator Projection had become to sailors.

Figure 5.10. 'Coast of Nova Scotia, New England and New York,' Joseph F.W. Des Barres, *The Atlantic Neptune* (London: 1800).



(Source: Library of Congress)

Figure 5.11. Boston Harbor, Joseph F.W. Des Barres, *The Atlantic Neptune* (London: 1800).

(Source: Library of Congress)

Captain James Cook's three voyages for scientific exploration and acquisition of knowledge between 1768 and 1780 also helped promote the use of the Mercator Projection. Like Halley a generation before, these voyages were under the auspices of both the Royal Navy and the Royal Society.[57] Cook's voyages pushed the boundaries of nautical navigation, scientifically-based exploration and cartography. The world maps produced as official reports showing his journeys were on the Mercator Projection, as were the numerous versions that appeared shortly afterwards, aimed at a popular

[57] James Cook, *The Journals of Captain James Cook on His Voyages of Discovery*, ed. J. C Beaglehole (Cambridge : Published for the Hakluyt Society at the University Press, 1955), cclxxix-cclxxxiv.

readership fascinated by the tales of Cook's adventures. Public admiration and interest in Cook were intensified by his untimely death on his third voyage.

The purpose of Cook's voyages was reconnaissance of the Pacific and increasing scientific knowledge. Cook was chosen for these scientific missions because of his reputation as an excellent navigator. Cook acquired his cartographic skills in his early years with the British Royal Navy and he used these skills to test longitude methods and survey coastlines. Cook had joined the British Royal Navy in 1755 after sailing with merchants.[58] At the outbreak of the Seven Year's War, Cook acquired the necessary skills of an able surveyor. In 1763, after the Treaty of Paris was signed, Cook began working with the Lords Commissioners of Trade and Plantations as a surveyor of Newfoundland, along with Holland and Des Barres -- all of them charged to chart the newly acquired land as quickly as possible.[59] Scholars of Cook's life frequently mention these early years of training, his discipline, the accuracy of his work and the publication of detailed maps that helped provide Cook with notice in naval circles. Cook's surveys were increasing proof of his abilities as an able cartographer.[60] His maps and nautical directions were published in portfolios such as *The North American Pilot*. Rather than taking his surveys from previous materials and working with various French and native

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[58] J.C. Beaglehole, *The Life of Captain James Cook* (Stanford, California: Stanford University Press, 1974), 15.

[59] J.C. Beaglehole, *The Life of Captain James Cook*, 62-63.

[60] Nicholas Thomas, *Cook: The Extraordinary Voyages of Captain James Cook* (New York, New York: Walker & Co., 2003), 4-8.

sources, Cook relied on his instruments on land and at sea to complete his calculations.[61] Cook's 'A General Chart of the Island of Newfoundland' was drawn on the Mercator Projection in a style complemental to Dutch navigation maps. (See Figure 5.12.a.) The chart has a rectangular grid, rhumb lines, compass variations and fathoms dotting the coastline, with the coastline maintaining the greatest detail as opposed to the island's interior.[62] The French copy of Cook's chart adds a table of latitudes and longitudes, a table of the fathoms and illustrates sand bars and provides a more detailed rectangular grid used in the charting of the island. (See Figure 5.12.b.) While Cook was indebted to Halley and others for advancements in scientific instruments for better accuracy in charting and navigation, he also expanded discoveries and exploration in navigation and scientific knowledge.[63] Cook thus solidified the new scientific approach to surveying and increasing highly accurate geodetic knowledge that had begun with Halley.

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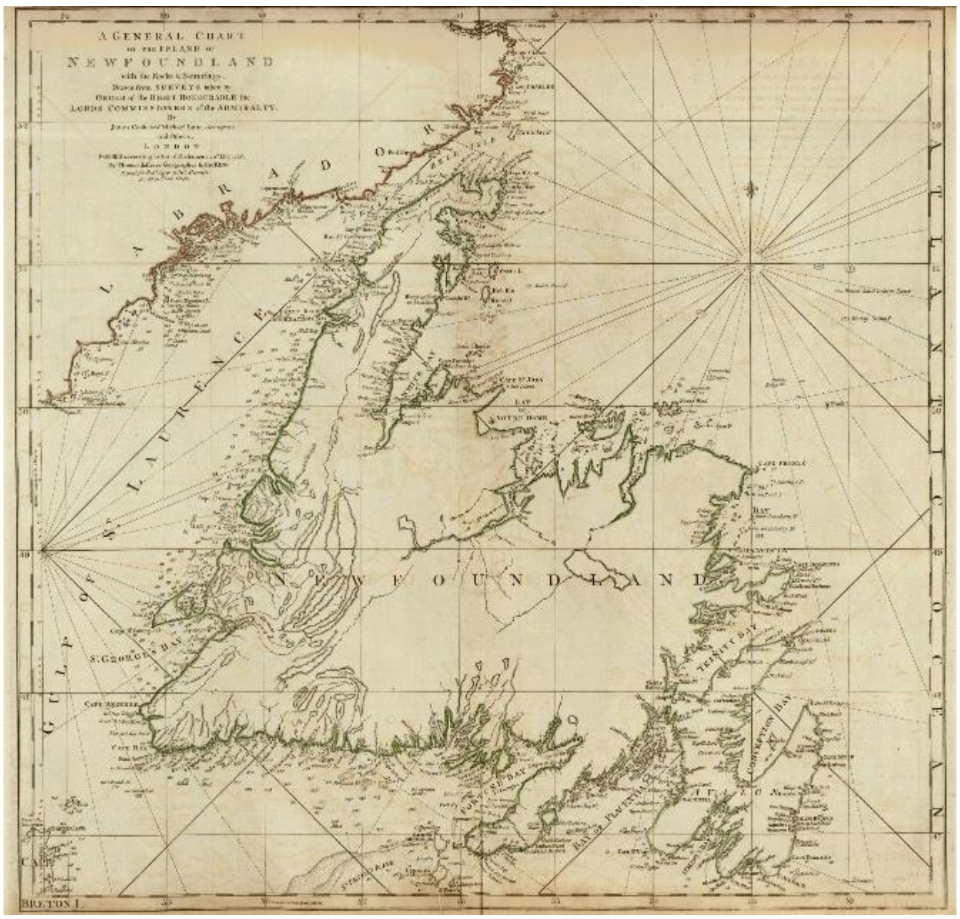
[61] Nicholas Thomas, *Cook: The Extraordinary Voyages of Captain James Cook*, 6-7.

[62] James Cook, 'A General Chart of the Island of Newfoundland,' Map, engraving, 1: 1,280,000, in The American Atlas: Or, A Geographical Description Of The Whole Continent Of America ... Engraved On Forty-Eight Copper Plates, By The Late Mr. Thomas Jefferys, Geographer to the King, and Others, London: Printed and Sold by R. Sayer and J. Bennett, Map and Print Sellers, No. 53, Fleet Street, 1776, From David Rumsey Map Collection (accessed January 15, 2018), https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~1907~120014:A-General-Chart-Of-The-Island-Of-Ne#. James Cook and Michael Lane, 'Carte réduite de l'Ile de Terre-Neuve,' [Mapp], https://www.loc.gov/item/73694675/. James Cook and Michael Lane, 'Carte réduite de l'Ile de Terre-Neuve,' Map, engraving, 1 : 1,160,000, Paris, France : Dépôt des cartes et plans de la marine, From Library of Congress (accessed on January 15, 2018), https://www.loc.gov/item/73694675/.

[63] John Hawkesworth, *an account of the voyages undertaken by the order of His Present Majesty for making discoveries in the southern hemisphere. And successively performed by Commodore Byron, Captain Wallis, Captain Carteret, and Captain Cook, in the Dolphin, the Swallow, and the Endeavour: drawn up from the journals which were kept by the several commanders, and from the papers of Sir Joseph Banks, Bart, the 3rd edition* (London: Printed for W. Strahan; and T. Cadell in the Strand, 1785), from Hathi Trust, https://babel.hathitrust.org/cgi/pt?id=nyp.33433066583521;view=1up;seq=17 (accessed on December 22, 2017), i-v.

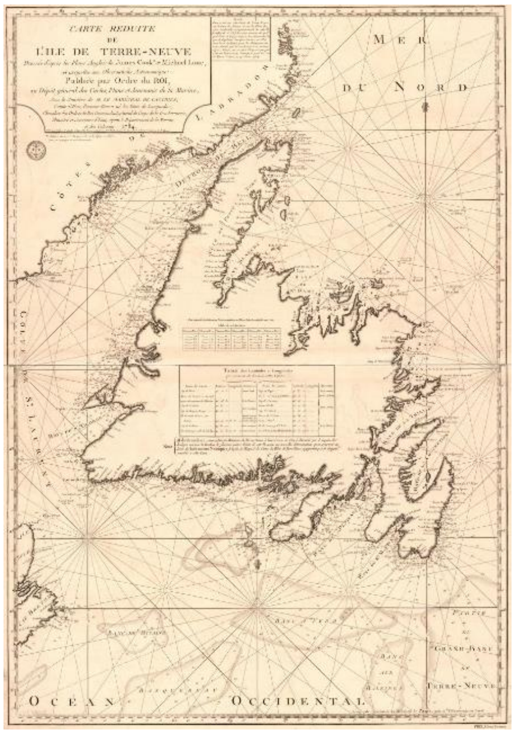
Figure 5.12. James Cook's 'A General Chart of the Island of Newfoundland,' English and French Example.

a. 'James Cook's Map of Newfoundland Published in English, James Cook, 'A General Chart of the Island of Newfoundland,' Map, Engraving, 1:1,280,000, in *The American Atlas: Or, a Geographical Description of the Whole Continent of America ... Engraved on Forty-Eight Copper Plates, by the Late Mr. Thomas Jefferys, Geographer to the King, and Others* (London: Printed and Sold by R. Sayer and J. Bennett, Map and Print Sellers, No. 53, Fleet Street, 1776).



(Source: David Rumsey Map Collection)

b. ‘James Cook’s Map of Newfoundland Published in French, James Cook and Michael Lane, ‘Carte Réduite de l’Ile de Terre-Neuve,’ Map, Engraving, 1:1,160,000 (Paris, France: Dépôt des Cartes et Plans de la Marine, 1776).



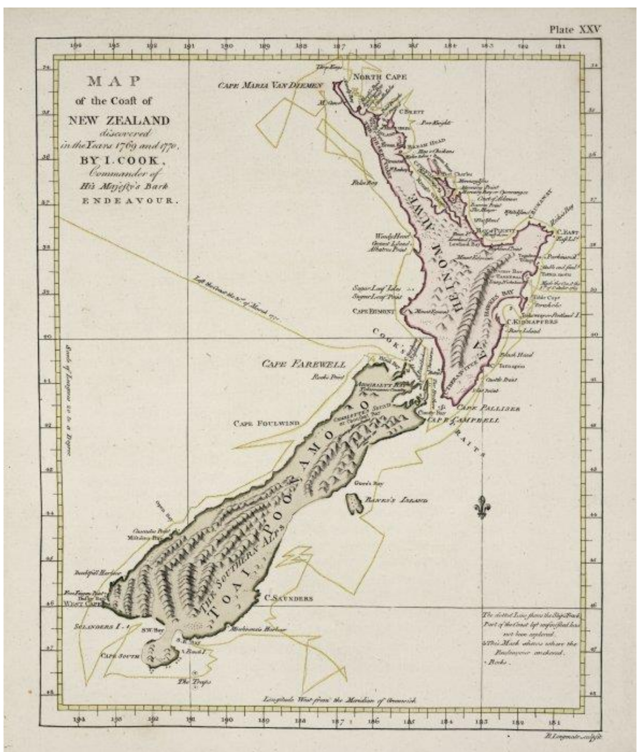
(Source: Library of Congress)

Cook’s voyages were instrumental in scientific reconnaissance and, in particular, for the acceptance of John Harrison’s sea watch as the method for recording longitude. Cook’s instructions for his first voyage on the *HMS Endeavour* reveal that the voyage was a joint operation between the Admiralty and the Royal Society to attain knowledge for the benefit of Great Britain as a maritime power.[64] Cook was charged with being diligent in his explorations while maintaining careful observation for the surveying and

[64] James Cook, J.C. Beaglehole (ed.), R.A. Skelton (ed.), *The journals of Captain James Cook on his voyages of discovery*, cclxxix-cclxxxii.

making of charts.[65] He was also told to thoroughly explore and map New Zealand, which he did on the Mercator Projection.[66] (See Figure 5.13.) Cook was to take notes on all discovered resources, native cultures and interactions and to claim uninhabited lands for Great Britain.

Figure 5.13. 'Map of the Coast of the New Zealand Discovered in the Years 1769 and 1770, By J. Cook, Commander of His Majesty's Bark Endeavour. B. Longmate Sculpsit', James Cook (London: 1773 – 1770).



This is an example of one of the seven maps printed from Cook's voyages on the Mercator Projection. The map also shows Cook's routes.
(Source: Alexander Turnbull Library)

[65] James Cook, J.C. Beaglehole (ed.), R.A. Skelton (ed.), *The journals of Captain James Cook on his voyages of discovery*, cclxxix-cclxxxii.

[66] James Cook, J.C. Beaglehole (ed.), R.A. Skelton (ed.), T*he journals of Captain James Cook on his voyages of discovery,* cclxxix-cclxxxii.

Cook's voyages are of significance for the use and distribution of the Mercator Projection. As a naval officer in the accompaniment of scientists, Cook and his fellow explorers maintained the use of the Mercator Projection for navigation and scientific purposes. Cook and his officers created their survey material and frequently used the projection to detail their charts and maps. Often, the maps contained a rectangular grid for geographical entities, with illustrations surrounding the feature. It was not the only projection they employed. Cook used polar and conical projections when appropriate, particularly during his second and third voyages.[67] Based on these actions, Cook clearly had the capability of projecting geographic information on a variety of projections, but it was the Mercator Projection he most consistently utilized to communicate his discoveries. Cook, his officers and Tupaia (a Polynesian priest and navigator whose skills and knowledge were utilized by Cook) created various charts, views and maps of his discoveries over his three voyages. Of the fifty-eight charts, views and maps printed by Cook, his officers and Tupaia, seven of them are labeled as the Mercator Projection, with one map being split between the Mercator Projection and a polar projection.[68] The charts printed on polar azimuthal or conical projections are mainly from Cook's second

[67] James Cook, J.C. Beaglehole, R.A. Skelton, *the journals of Captain James Cook on his voyages of discovery: charts & views* (Cambridge, UK: Published for the Hakluyt Society at the University Press, 1969).

[68] James Cook, J.C. Beaglehole, R.A. Skelton, *the journals of Captain James Cook on his voyages of discovery: charts & views*.

voyage where he was charged with discovering a Northern passage by sea.[69] Upon returning to Britain, all of Cook's information was collected from him, his officers, and crew and was submitted to the Royal Society for inspection.[70] The Admiralty then used their data to construct official charts from the voyage, which they then declared suitable for release.[71]

Captain James Cook's cartographic works furthered the tradition of using the Mercator Projection for the purpose of scientific knowledge. During the eighteenth century, new levels of detailed coastal charting, such as the voyage of the *Atlantic Neptune*, the mass of new geographic information provided by Cook's voyages, and the final improvements of John Harrison's chronometer tested on Cooks voyages, strengthen the British position as a major center of cartographic publication.[72] Cook's impact was profound, not only in the detailed charting of new lands but also through his role in the expansion of scientific societies. The output of maps portraying Cook's voyages utilizing the Mercator Projection and perhaps more importantly Cook's fame and prestige

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[69] James Cook, J.C. Beaglehole, R.A. Skelton, *the journals of Captain James Cook on his voyages of discovery: charts & views*.

[70] James Cook, J.C. Beaglehole (ed.), R.A. Skelton (ed.), *The journals of Captain James Cook on his voyages of discovery,* cclxxxii-cclxxxiv.

[71] Eóin Phillips, *Astronomical observations made during Captain Cook's last voya*ge (RGO 14/61), https://cudl.lib.cam.ac.uk/view/MS-RGO-00014-00061/5 (accessed December 14, 2017).

[72] Stephen J, Hornsby and Hope Stege, *Surveyors of Empire: Samuel Holland, J.W.F. Des Barres, and the Making of the Atlantic Neptune,* 221, 163. 'Charts and Maps,' Royal Museums Greenwich, http://collections.rmg.co.uk/collections.html#!csearch;collectionReference=subject-90232;authority=subject-90232 (accessed on January 31, 2019).

solidified the projections position as a favored choice for thematic and reference maps for generations to come.

Geographical Societies

The rise of geographical societies in the nineteenth century coincided with geography's rise as an academic discipline. Shortly after the founding of geographical societies, geography as an academic discipline appeared first in French, Prussian and German universities and by mid-century in English and United States Universities.[73] Geographical societies, the new discipline of geography, and cartographic publishing houses all flourished as they attempted to meet the demand for geographic knowledge.

The Royal Geographical Society (London), the Société de Géographie (Paris), and the Berlin Geographical Society are the three oldest European geographical societies and all are still operating today, attributable in part to Cook.[74] Founded in 1821 in Paris, the Société de Géographie was inspired by the success of the explorations of British naval officers and it prompted the French to expedite their own explorations.[75] The connection of Cook to the Berlin Geographical Society was through Alexander von Humboldt. Humboldt was influenced by Johann George Adam Forster, who accompanied his father, the naturalist Johann Reinhold Forster on Cook's second Pacific voyage.[76] Humboldt's

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[73] D.R. Stoddart, On Geography and its History (New York, New York: B. Blackwell, 1986), 59, 79.

[74] Norman J.W. Thrower, *Maps & Civilization: Cartography in Culture and Society*, 154.

[75] Norman J.W. Thrower, *Maps & Civilization: Cartography in Culture and Society*, 154.

[76] Norman J.W. Thrower, *Maps & Civilization: Cartography in Culture and Society*, 154.

work brought about a high standard in geography that emphasized careful measurement and the importance of quantification of geographical data.[77] Sir Joseph Banks, a botanist and cartographer on Cook's first Pacific voyage, was a leading figure in the founding of the Royal Geographical Society in London in 1831. Although Banks is not generally regarded as a cartographer, he was skilled in map making. Banks mapped the Society Islands and became a supporting patron for several cartographers during his presidency of the Royal Society from 1778 - 1820.[78] These geographical societies, in tandem with the growing role of geography in higher education, became a significant part of intellectual life in nineteenth century.[79]

Articles in the journals of geographic and other scholarly societies typically used the Mercator Projection for maps on a global or near global scale. The Royal Geographic Society (RGS) published the *Journal of the Royal Geographical Society of London* from 1831 to 1880. This journal was supported by the RGS, the British government, explorers and cartographers. John Murray and John Arrowsmith were the two most published cartographers in those early issues.[80] Arrowsmith was acknowledged as an expert of the

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[77] Tim Creswell, *Geographic Thought: A Critical Introduction*, 38-41.

[78] Norman J.W. Thrower, *Maps & Civilization: Cartography in Culture and Society*, 154.

[79] Tim Creswell, *Geographic Thought: A Critical Introduction*, 41.

[80] *The Journal of the Royal Geographical Society of London 1-26* (1831-1856). *Proceedings of the Royal Geographical Society of London* 27-50 (1857-1880). In 1857, the Journal is renamed Proceedings.

mapping trade and Murray was likewise highly respected for his cartography.[81] The Royal Geographic Society made an effort to create a map library and place maps in their publications. However, not all maps were included since there were many hand-made maps that were distributed in meetings.[82] A survey of *The Journal of the Royal Geographical Society*, volumes one through fifty, revealed the maps that did make it to publication were often referred to as "sketch maps," based off the official records of the exploration or voyage. Most of these sketch maps were drawn on a cylindrical projection (typically the Mercator Projection) and the others were drawn on a conical projection.[83] (See Figure 5.14.)

[81] Francis Herbert, 'The Royal Geographical Society's Membership, the Map Trade, and Geographical Publishing in Britain 1830 to ca 1930: An Introductory Essay with Listing of Some 250 Fellows in Related Professions,' *Imago Mundi*, Vol 35 (1983), 67.

[82] Francis Herbert, 'The Royal Geographical Society's Membership, the Map Trade, and Geographical Publishing in Britain 1830 to ca 1930: An Introductory Essay with Listing of Some 250 Fellows in Related Professions,' 67-69.

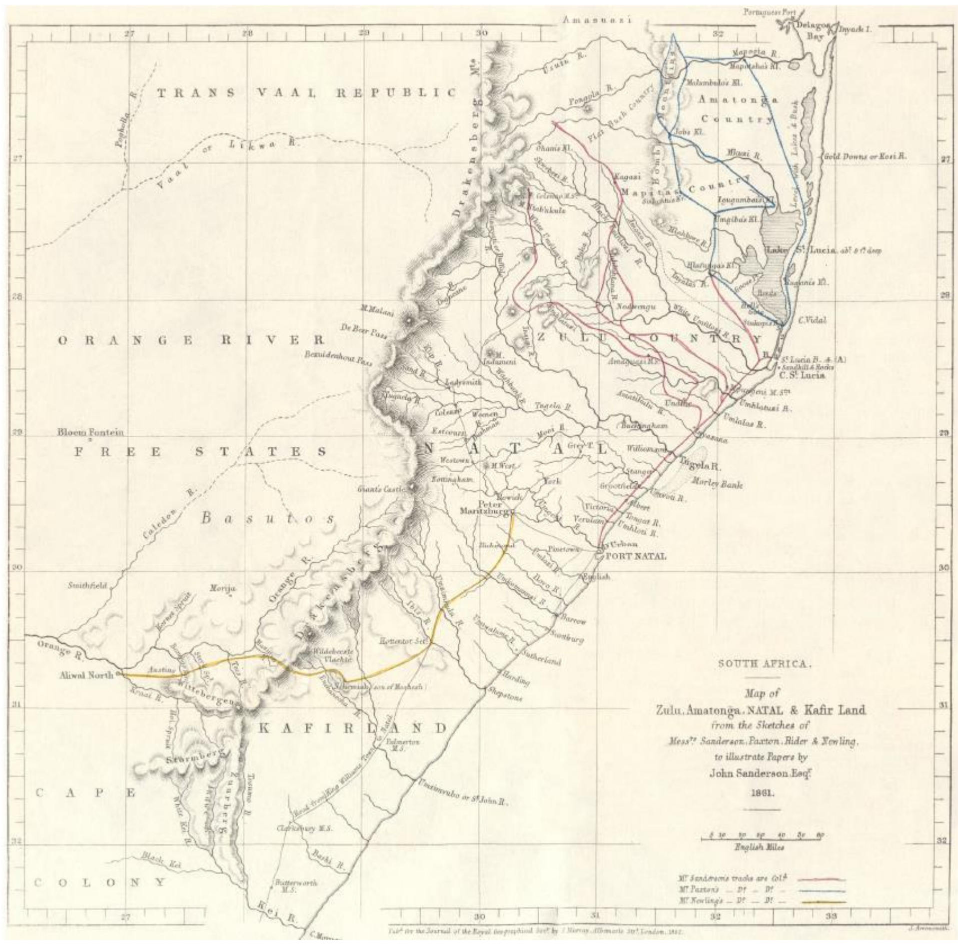
[83] *The Journal of the Royal Geographical Society of London 1-50* (1831-1880). *Proceedings of the Royal Geographical Society of London 27-50* (1857-1880). In 1857, the Journal is renamed Proceedings.

Figure 5.14. Sketch Maps Drawn on a Cylindrical Projection from *The Journal of the Royal Geographical Society*.

a. ‘Sketch Map of Siam & The Ancient States’, Harry Parkes, ‘Geographical Notes on Siam, with a New Map of the Lower Part of the Menam River,’ *The Journal of the Royal Geographical Society of London*, Vol 26 (1856), 71.

(Source: *The Journal of the Royal Geographical Society of London*)

b. ‘Map of Zulu, Amatonga, Natal & Kafir Land’, John Sanderson, ‘Notes to Accompany Sketch-Maps of the Zulu and Amatonga countries, and of the Country between Aliwal, North, and Natal,’ *The Journal of the Royal Geographical Society of London*, Vol 32 (1862), 335.

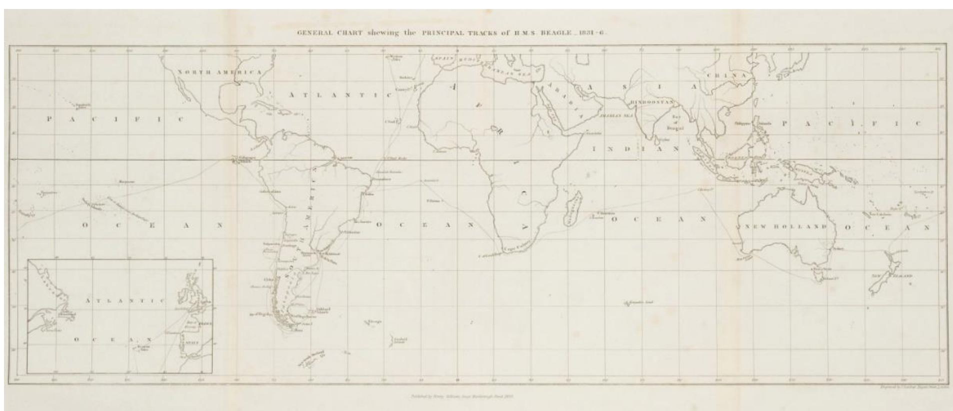


(Source: *The Journal of the Royal Geographical Society of London*)

One of the largest sets of volumes published by *The Journal of the Royal Geographical Society* reported the voyages of the *H.M.S. Adventure* and *H.M.S. Beagle.* From 1831 to 1836, Charles Darwin served as the ship’s geologist and naturalist on a naval exploration and mapping expedition of South America, including the Galapagos

Islands, all while aboard the *HMS Beagle*.[84] In 1839, from the information Darwin and others collected during the surveys, the captain of the *Beagle*, R. Fitzroy, later edited and published a map on the Mercator Projection in the *Appendix* of the voyage's published official narrative. (See Figure 5.15.) Fitzroy's *General chart* is one example of maps from state-sponsored scientific voyages where government and scientists met and the voyage itself was recorded on the Mercator Projection to visualize the voyage's route.

Figure 5.15. '*General Chart Showing the Principal Tracks of H.M.S Beagle 1831-1836,*' Robert Fitzroy, In *Appendix to Narrative of the Surveying Voyages of His Majesty's Ships Adventure and Beagle, Between the Years 1826 and 1836: Describing Their Examination of the Southern Shores of South American and the Beagle's Circumnavigation of the Globe, in Three Volumes* (London: Henry Colburn, Great Marlborough Street, 1839).



This chart was drawn on the Mercator Projection by Captain Fitzroy based on the collection of information from Charles Darwin. (Source: Rylands Collection, The University of Manchester)

[84] P.P. King, P. Stokes and R. Fitz-Roy, "Sketch of the Surveying Voyages of His Majesty's Ships Adventure and Beagle, 1825-1836,' In *The Journal of the Royal Geographical Society of London* 6 (1836): 312-313.

The geographical societies not only reported discoveries and explorations, but often sponsored them in partnership with the government. In 1854, the RGS published 'hints to travelers' explaining the instruments to take on trips to 'imperfectly known countries.'[85] The article includes instructions on how to draw a map in the field, and ends with an exhaustive list of geographic questions and a comprehensive dictionary of terms used to increase the society's awareness of what a place was like for records and later publications.[86] A vast array of geographical discoveries concerning height and extent of mountain ranges, degree of aridity and the extent of deserts, winds or ocean currents were recorded on sketch or reconnaissance maps and later reproduced in the cartographic record. This way, travelers could be participant observers and submit their discoveries to the RGS upon their return. Geographic societies' connections with the government further increased the use of the Mercator Projection when departments such as the British Admiralty and Hydrologic Office adopted the Mercator Projection as the official projection for their charts and maps.[87]

Furthermore, findings from voyages were presented to the society accompanied by maps of the new geographical and statistical data found on the voyage for publication

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[85] Henry Raper and Robert Fitz-Roy, "Hints to Travellers," In *The Journal of the Royal Geographical Society of London* 24 (1854): 328-329.

[86] Henry Raper and Robert Fitz-Roy, "Hints to Travellers,": 330-331, 353-358.

[87] 'Charts and Maps,' Royal Museums Greenwich, https://collections.rmg.co.uk/collections.html#!csearch;collectionReference=subject-90232;authority=subject-90232, accessed on February 8, 2019.

in the society's journal. Versions of the maps were often created by cartographers outside the societies and would appear as single sheets or in library or school atlases.[88]

The materials reviewed for this study showed that between 1800 and 1850 the Mercator Projection was the most commonly used projection for thematic maps, official reports of scientific expeditions, geographic society publications and for the school atlases. The remaining maps utilized a Globular Projection. The use of maps reporting findings of expeditions and other scientific treatises to societies strengthened the role of maps as both a depository of information and an analytic tool. As more of the world was being discovered and colonized by European powers at the end of the eighteenth and early nineteenth centuries, there was great interest among the population to know about these far-off lands. By 1850, the Mercator Projection had solidified its dominance as the projection of choice for thematic and reference mapping. (See Figure 5.16.)

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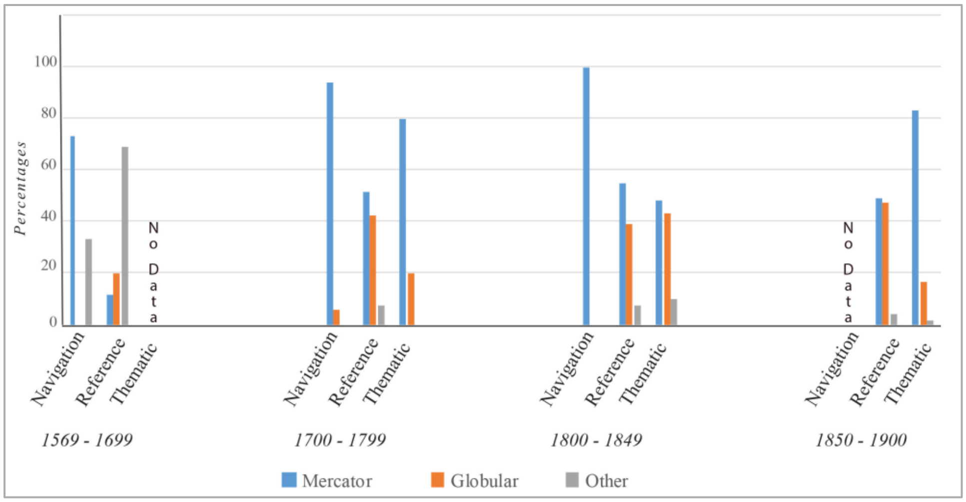
[88] Francis Herbert, 'The Royal Geographical Society's Membership, the Map Trade, and Geographical Publishing in Britain 1830 to ca 1930: An Introductory Essay with Listing of Some 250 Fellows in Related Professions,' *Imago Mundi,* Vol 35 (1983), 67-69.

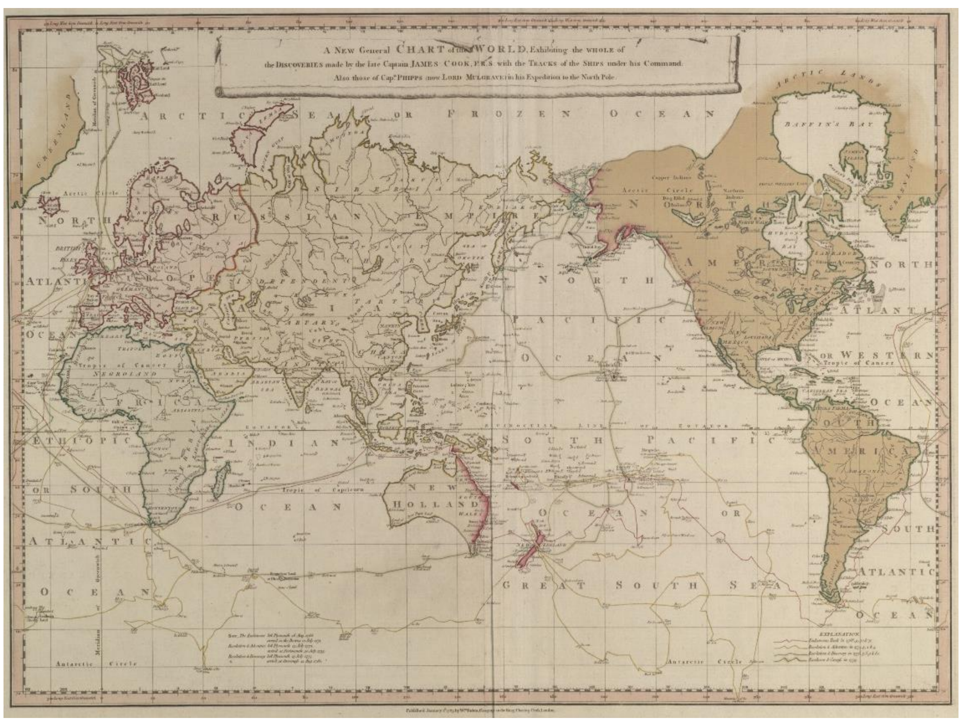
Figure 5.16. The Percentage of the Mercator, Globular and Other Projections According to Map Type, 1569 – 1900.



This figure shows the percentages of data in the study according to their projection and map type.

An interesting change in the attribution found on many maps occurred in the early nineteenth century. Maps of the late eighteenth century would often prominently include a phrase such as, “based on the Latest Discoveries” sometimes naming the explorer whose discoveries had altered the map, but often not. However, by the early nineteenth century, particularly on thematic maps, that notice had been replaced with “Based upon the Best Authorities.” As much of the world had come into European knowledge, fewer “new” additions were being added to maps. Thus, the validity of the map was not measured by how current were the inclusions of the latest discoveries. Rather, now the measure of map quality was the endorsement of scientists and educators, the learned authorities. From the endorsement of leading explorers, the Mercator Projection was being marked as the projection of choice on maps aimed at the general public. Maps created from the "new discoveries," such as those in the Atlantic Neptune and those of Cook, were commonly presented on a "Chart of the World on Mercator's Projection." These maps also had a common vocabulary: 'Chart;' 'World'; 'New Discoveries'; 'accurate'; or an explanation of why the reader could inherently trust the map. (See Figure 5.17.)

Figure 5.17. 'A New General Chart of the World: Exhibiting the Whole of the Discoveries Made by the Late Captain James Cook, F.R.S. With the Tracks of the Ships under His Command; Also, Those of Cap'n Phipps (Now Lord Mulgrave) in His Expedition to the North Pole', William Faden (London: Published by Wm. Faden, Geographer to the King, Charing Cross, 1787).



(Source: National Library of Australia)

Cartography for the General Public

Prussian explorer Alexander von Humboldt is a towering figure in the development of modern geography. His work contributed to the validation of the Mercator Projection as the projection of choice for science through his extensive use of it for his innovative thematic maps. Susan Schulten explains,

> central to Humboldt was the idea that spatial distribution might reveal the complex interdependence in the natural world, and he spent much of his life trying to redefine geography along those lines.[89]

Humboldt's work, including his thematic maps and other scientific visualizations, played a major role in transforming the nature of geography from a descriptive science to an explanation science.[90]

Humboldt's influence in cartography is tied to the rise of geography as a modern academic discipline. During the early nineteenth century, the modern geographic discipline was being formed in Prussian universities.[91] Alexander von Humboldt, though not an academic, was a critical figure in establishing modern geography at German

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[89] Susan Schulten, "Alexander von Humboldt: Master of Infographics," Mapping the Nation: A Companion Site to Mapping the Nation by Susan Schulten, accessed November 26, 2018, http://www.mappingthenation.com/blog/alexander-von-humboldt-master-of-infographics/.

[90] Susan Schulten, "Alexander von Humboldt: Master of Infographics," Mapping the Nation: A Companion Site to Mapping the Nation by Susan Schulten, accessed November 26, 2018, http://www.mappingthenation.com/blog/alexander-von-humboldt-master-of-infographics/.

[91] Tim Creswell, *Geographic Thought: A Critical Introduc*tion, 38.

universities with Carl Ritter.[92] Creswell claims that Humboldt grounded himself in the physical sciences, while Ritter focused on a human-centered philosophical approach. These are two of the major fields Geography still incorporates today: Physical and Human Geography. Humboldt's works significantly influenced English naturalist Darwin and American President Thomas Jefferson's westward explorations into the interior of the United States.[93]

Humboldt's travels to the Americas provided inspiration for cartographic innovations. Schulten writes that after 1804, Humboldt turned predominantly to geovisualization after his explorations in the Americas.[94] During his explorations, Humboldt noted the difference in average temperature based on different climatic zones according to latitude and altitude. On his Isothermal map Humboldt plotted these isotherms against the plane of the Mercator Projection's rectangular grid and included a graph to explain the difference in varying temperatures based on altitude and latitude. (See Figure 5.18.)

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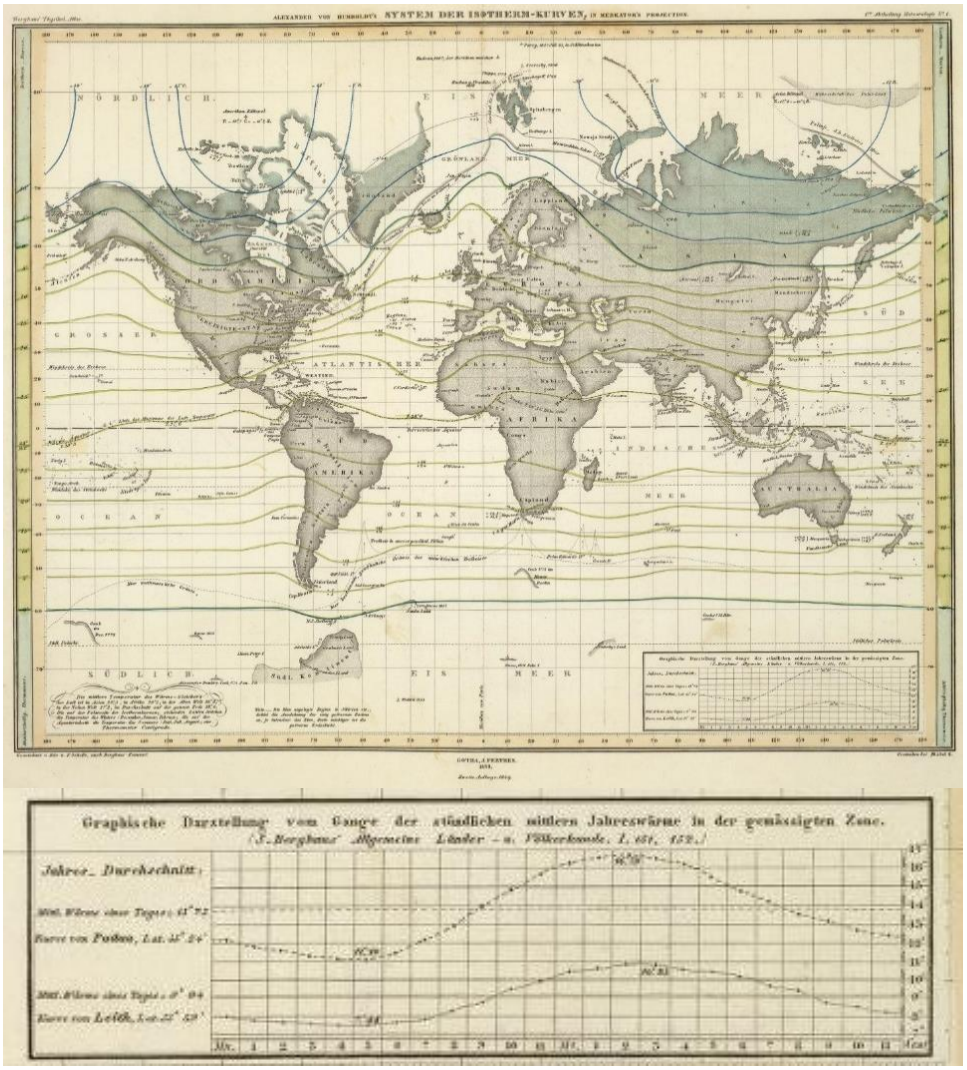
[92] Wolfgang Scharfe, "German Atlas Development during the Nineteenth Century," in I*mages of the World: The Atlas Through History*, ed. John A Wolter and Ronald E Grim (Washington, D.C.: Library of Congress, 1997), 207.

[93] Tim Creswell, *Geographic Thought: A Critical Introduction*, 39.

[94] Susan Schulten, "Alexander von Humboldt: Master of Infographics," Mapping the Nation: A Companion Site to Mapping the Nation by Susan Schulten, accessed November 26, 2018, http://www.mappingthenation.com/blog/alexander-von-humboldt-master-of-infographics/.

Figure 5.18. Humboldt's System Der Isotherm-Kurven and Graph, Alexander von Humboldt, *System Der Isotherm-Kurven*, Map, Engraving (Gotha: Justus Perthes, 1849).



(Source: David Rumsey Map Collection)

In reference to Humboldt's paper on isothermal lines, which he presented to the Paris Academy of Science, cartographic scholars Arthur Robinson and Helen Wallis consider, "this employment of the isarithm for spatial distribution by an outstanding natural scientist contributed largely to the widespread adoption of this technique in thematic cartography."[95] Humboldt acknowledged Halley's concept of isogones for the idea for isotherms.[96] Humboldt adapted Halley's concept of 'curve lines' of equal compass declinations to show the distribution of temperatures, and he created the isotherms on the Mercator Projection to maintain angle accuracy.[97] Humboldt continued using and perfecting plotting data on the Mercator Projection and used it in his *Atlas* to accompany his monumental work *Kosmos.* (See Figure 5.19.) The *Atlas zu Alexander von Humboldt's Kosmos* contains thirty maps, eighteen of which are on the Mercator Projection and display thematic data.[98] Not all of his thematic maps were on the Mercator Projection. Maps of individual countries, or those that were continental in scale, frequently used an alternative projection. However, if it was a world map and displayed thematic data, it was always on the Mercator Projection.[99] (See Figure 5.20.) An advantage of the Mercator Projection that Humboldt exploited was its cylindrical grid to maintain angles. Humboldt used this method to plot continuous spatial data.

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[95] A. H. Robinson and Helen M. Wallis, "Humboldt's Map of Isothermal Lines: A Milestone in Thematic Cartography," *Cartographic Journal*, The 4, no. 2 (1967): 119–123.

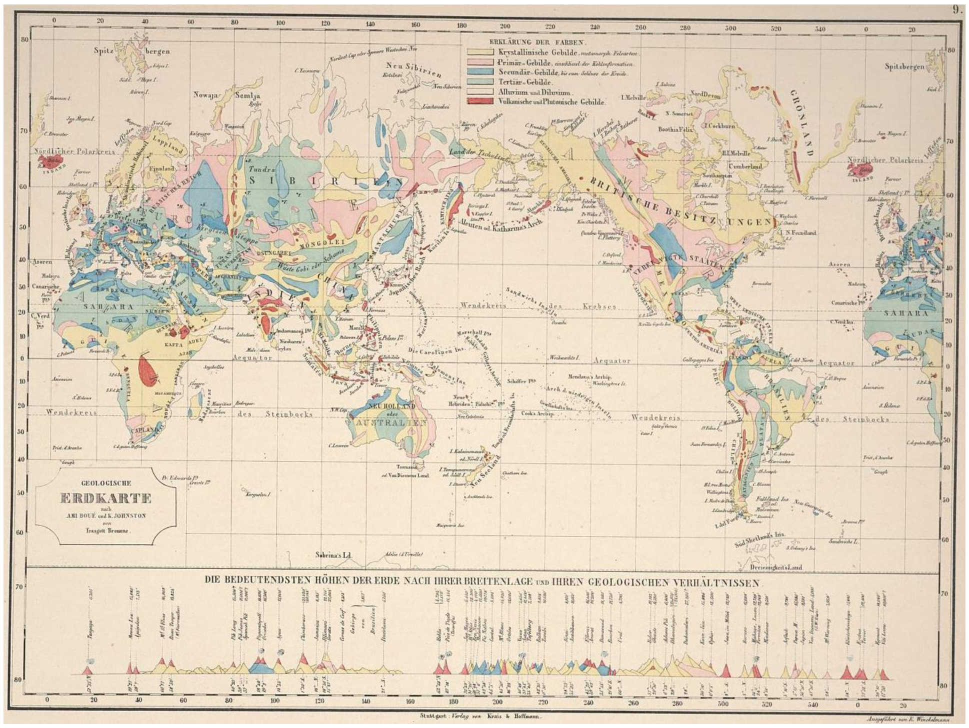
[96] Norman Thrower, *Maps & Civilization*, 130.

[97] Arthur Robinson, *Early thematic mapping in the history of cartography* (Chicago, Illinois: University of Chicago Press, 1982), 70-71.

[98] Alexander von Humboldt, and Traugott Bromme, At*las zu Alex. v. Humboldt's Kosmos in zweiundvierzig Tafeln mit erla¨uterndem texte* (Stuttgart: Krais & Hoffmann, 1851), from Biodiversity Heritage Library, https://www.biodiversitylibrary.org/item/89025.

[99] Alexander von Humboldt and Traugott Bromme, *Atlas Zu Alex. v. Humboldt's Kosmos in Zweiundvierzig Tafeln Mit Erläuterndem Texte /* (Stuttgart : Krais & Hoffmann, 1851), https://www.biodiversitylibrary.org/bibliography/39968.

Figure 5.19. ‘Geologische Erdkarte,’ Alexander von Humboldt, *Atlas zu Alex. v. Humboldt’s Kosmos in Zweiundvierzig Tafeln Mit Erla¨Uterndem Texte* (Stuttgart: Krais & Hoffmann, 1851).



This map is an example of Humboldt using the Mercator Projection to plot thematic data on a world map. (Source: Biodiversity Heritage Library)

Figure 5.20. 'Geologische Erdkarte,' Alexander von Humboldt, *Atlas zu Alex. v. Humboldt's Kosmos in Zweiundvierzig Tafeln Mit Erla¨Uterndem Texte* (Stuttgart: Krais & Hoffmann, 1851).

This map is an example of Humboldt not using the Mercator Projection for a thematic map and instead uses a suitable projection for Europe.
(Source: Biodiversity Heritage Library)

Humboldt's works indicate the transition science was undergoing. Part of this shift included not only state-sponsored scientific voyages, but also a rise in the role of the university in the distribution of scientific information. Stoddart explains that geography's growth as a discipline emerged from three distinct developments in the European scientific consciousness: the immensity of time, the importance of space and scale, and humankind's capabilities to interpret and modify the environment.[100] These new

[100] D.R. Stoddart, *On Geography and its History*, 30-31.

developments created a powerful framework for understanding the vast amount of information gained from the explorations and scientific discoveries of the day. To organize the influx of data, academics developed a series of classification and comparative measures.[101] Humboldt and Carl Ritter were two important voices at the forefront of this new understanding of the world brought about by combing the new explorations and methods and expanding upon preexisting knowledge.[102]

The early nineteenth century saw an unprecedented surge in the publication of thematic atlases and wall charts aimed at the general public and school children. Humboldt's employment of isotherms for the visualization of temperature data, based on Halley's technique of using isolines to show lines of equal magnetic declination, was widely copied by others, most notably by Woodbridge in the United States and by Henrich Berghaus in his *Physikalischer Atlas* and the English version, *The Physical Atlas.*[103] (See Figure 5.21.) Berghaus's *Physikalischer Atlas* was encouraged by Humboldt and despite its high price, was considered a scientific and economic success. The *Atlas* was another supplement to Humboldt's *Kosmos.* It was a challenge for cartographers as there were few examples of similar maps to draw upon and due to the vast amounts of data and the complexity of the spatial relationships that the maps were

[101] D.R. Stoddart, *On Geography and its History*, 34.

[102] D.R. Stoddart, *On Geography and its History*, 35-37.

[103] Wolfgang Scharfe, "German Atlas Development during the Nineteenth Century," in Ima*ges of the World: The Atlas Through History*, ed. John A Wolter and Ronald E Grim (Washington, D.C.: Library of Congress, 1997), 228.

intended to convey. Berghaus, like Humboldt, used the Mercator Projection throughout his *Atlas* if displaying thematic data on a world map. (See Figure 5.22.) The Mercator Projection is not the only projection in the *Atlas*; however, it is significant these two dominant atlases maintained the Mercator Projection for the display of thematic data on a world map. Berghaus and Humboldt's influence was immediate and continual throughout the cartographic and geographic fields. The *Atlas* became the model for other publications worldwide.[104] These atlases and those that quickly followed utilized Humboldt's isopleth technique as well as other thematic symbols that are still widely used today. These include, dot maps showing density, variable width flow lines showing the degree or amount of movement between places, and maps and choropleth shades for displaying classed sequential data by some geographic collection unit (i.e., population per state).[105]

[104] Wolfgang Scharfe, "German Atlas Development during the Nineteenth Century," 228.

[105] Arthur Robinson and Helen Wallis, *Cartographical innovations: an international handbook of mapping terms to 1900* (Tring, Herts: Published by Map Collector Publications in association with the International Cartographic Association, 1987), xiv-xv. Norman J.W. Thrower, *Maps & Civilization: Cartography in Culture and Society* (Chicago, Illinois; London, UK: University of Chicago Press, 2008), 145-154.

Figure 5.21. A Timeline of the Isoline Technique Developed by Halley (1701), Perfected by Humboldt (1817) and Referenced by Woodbridge (1837).

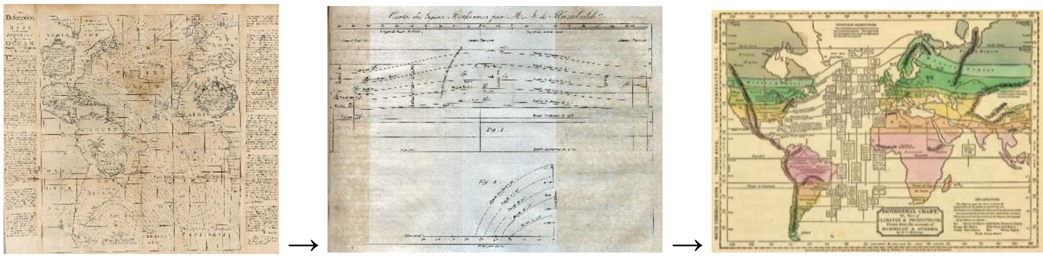
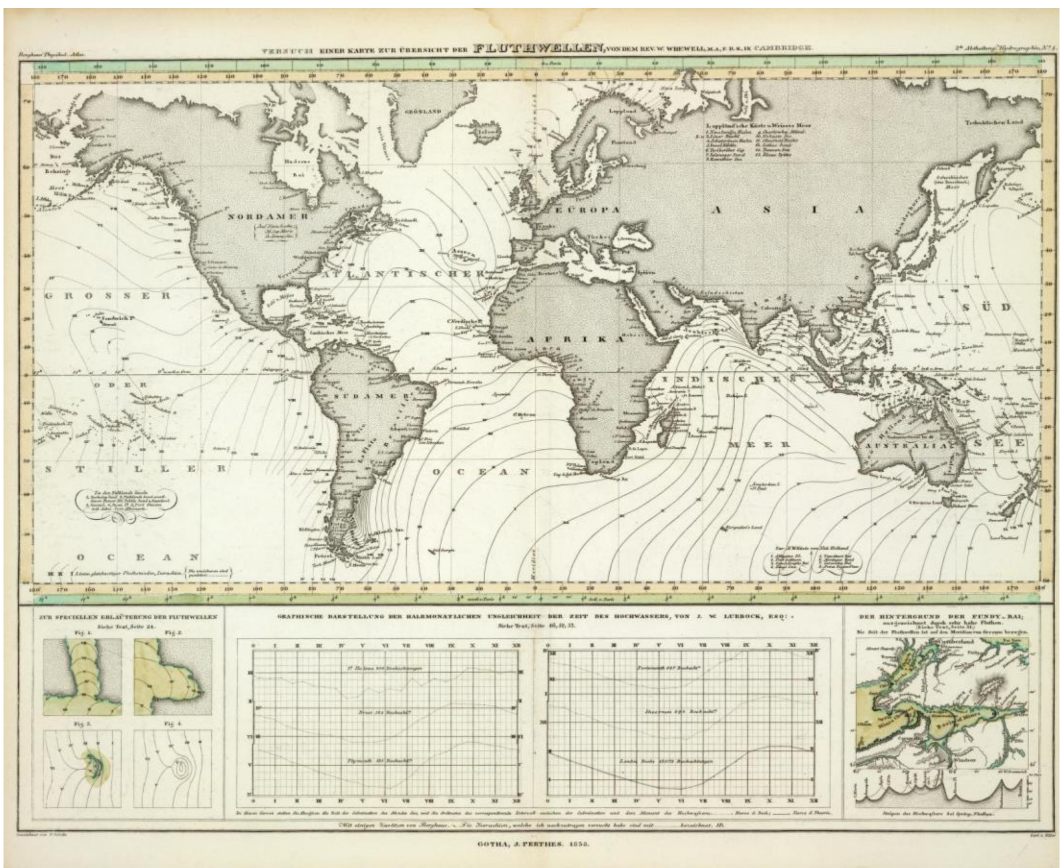


Figure 5.22. 'Versuch Einer Karte Zur †bersicht Der Fluthwellen,' Heinrich Berghaus, Physikalischer Atlas Oder Sammlung von Karten, Auf Denen die Hauptsachlichsten Erscheinungen der Anorganischen und Organischen Natur Nach Ihrer Geographischen Verbreitung und Vertheilung Bildlich Dargestellt Sind (Gotha: Verlag von Justus Perthes, 1848).



(Source: David Rumsey Map Collection)

Cartography was a significant part of geography's evolution from being primarily a descriptive field to a theory-based field adept at explaining the spatial distribution of natural and human induced phenomena. At the heart of this transformation was the thematic map. The climatological, geophysical and biological data brought back by the explorers of the eighteenth and early nineteenth century provided an impetus not only for thematic mapping but also for the development of the modern discipline of geography.[106] The intellectual, social, economic and technological developments that took place from the sixteenth century to the nineteenth century allowed for an expanded use and significance for the thematic map.[107] The rise of thematic cartography occurred at a critical time in the development of nations. The United States was expanding westward and at the same time Great Britain was expanding and solidifying its empire throughout the world.[108] Maps were part of a movement in the sciences where simple description of phenomena was evolving toward theory and explanation.

The most common alternative to the Mercator Projection on world maps was the Globular Projection. For the entire period studied in this dissertation, the Globular Projection was the second most commonly used projection for thematic and reference

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[106] Norman J.W. Thrower, *Maps & Civilization: Cartography in Culture and Society*, 123-125.

[107] Arthur Robinson, *Early Thematic Mapping in the History of Cartography*, 43.

[108] Susan Schulten, "Thematic Cartography and Federal Science in Antebellum America," Essay, In *Thematic Cartography and Federal Science in Antebellum America* (Berlin, Heidelberg: Springer Berlin Heidelberg: Springer, 2012). James Belich, Replenishing the Earth: The Settler Revolution and the Rise of the Anglo-World, 1783-1939 (Oxford, UK: Oxford University Press, 2009).

mapping. While the Globular served as a common alternative projection for reference mapping, the Mercator Projection was still the clear favorite for reference mapping and dominated thematic mapping.

From the nineteenth century onward, maps were widespread cultural artifacts associated with the distribution of general and scientific knowledge. The rise of thematic cartography coincides with a time of increased demand for maps and a large decrease in the cost of map production. Cost reductions resulted from new innovations in printing and the cost of paper. Perhaps the most important changes in the printing of maps was the process of lithography, which was invented in 1798 by Alois Senefelder of Bavaria, and wax engraving (cerography) developed by Sidney Morse. Sidney Morse was the son of Jedidiah Morse (who published the first geography book in the United States, *Geography Made Easy* in 1784), and brother of Samuel Morse, inventor of the telegraph.[109] Coupled with a precipitous drop in the cost of paper (which occurred with the introduction of cheap pulp paper), books and maps became far more available.[110] Map production grew in the nineteenth century through innovation and an expanding market resulting from an increasingly literate population along with the expansions of empire and public interests in frontiers and colonies.[111] Educational and family atlases

[109] Jeffrey C. Patton, "The American School Atlas: 1784-1900," *Cartographic Perspectives* 33 (1999): 9.

[110] Lucien Febvre and Henri-Jean Martin, *The Coming of the Book: The Impact of Printing, 1450-1800*, 39-44.

[111] Mead T. Cain, "The Maps of the Society for the Diffusion of Useful Knowledge: A Publishing History," 151.

provided a lucrative market. The thematic maps found on grade school wall maps, like the maps found in scientific journals, high school and university level atlases and popular "family" atlases, were almost always on the Mercator Projection. The rise of popular cartography and the widespread visibility it provided the Mercator Projection undoubtedly increased perception by the general public that the Mercator Projection was the 'accurate' map, and the choice of scientists, governments and educators.

From 1800 to 1849, the Mercator Projection was the dominant projection for thematic and reference mapping. The Globular Projection was commonly used for reference maps and could be found in the same atlas that utilized the Mercator Projection for displaying scientific or cultural data. After 1850, the Globular Projection was used as frequently as the Mercator Projection for general reference mapping. These results highlight the degree to which the Mercator Projection was being employed for purposes for which it was not intended and for which it was ill-suited. The Mercator Projection, which had once been used only by maritime navigators, was now being seen by a large mass market of the rising middle class in America and Europe. Rand McNally was a mapping house that applied the Mercator Projection to distribute information to the middle class through its original atlas published on and for the railroad, and for its many atlases and textbooks aimed at school children.[112]

[112] Rand McNally and Company, *New Official Railroad Map of the United States and Dominion of Canada. Compiled from the most reliable sources, and engraved by Rand, McNally & Co*. (Chicago, Illinois: Rand McNally & Co., 1898).

Publishers distributed geodetic data to the general public in other ways. Two examples include the Society for the Diffusion of Useful Knowledge (SDUK) and John Arrowsmith's *London Atlas of Universal Geography*. The SDUK was founded in 1826 in London as a nonprofit publishing house.[113] Its goal was the dissemination of "useful knowledge, to the masses of English society in language and formats that were understandable to the layman."[114] The SDUK adapted scientific and other academic materials for the people who could not obtain formal teaching, or preferred self-education, at a time when formal education in Britain was expensive and out of reach for the majority of its population.[115] The SDUK attracted a wide readership with publications that were authoritative and affordable. Their most popular publications were *the Penny Magazine* and the production of a series of maps that covered the entire globe.[116] Two world maps appear in the SDUK *Atlas*, one of which used the Mercator

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[113] Tim St. Onge, "Maps for the Masses: Geography in the Society for the Diffusion of Useful Knowledge," webpage, *Worlds Revealed: Geography & Maps at The Library of Congress*, July 13, 2016, accessed on November 26, 2018, //blogs.loc.gov/maps/2016/07/maps-for-the-masses-geography-in-the-society-for-the-diffusion-of-useful-knowledge/.

[114] Tim St. Onge, "Maps for the Masses: Geography in the Society for the Diffusion of Useful Knowledge," webpage, *Worlds Revealed: Geography & Maps at The Library of Congress*, July 13, 2016, accessed on November 26, 2018, //blogs.loc.gov/maps/2016/07/maps-for-the-masses-geography-in-the-society-for-the-diffusion-of-useful-knowledge/.

[115] Tim St. Onge, "Maps for the Masses: Geography in the Society for the Diffusion of Useful Knowledge," webpage, *Worlds Revealed: Geography & Maps at The Library of Congress*, July 13, 2016, accessed on November 26, 2018, //blogs.loc.gov/maps/2016/07/maps-for-the-masses-geography-in-the-society-for-the-diffusion-of-useful-knowledge/.

[116] Tim St. Onge, "Maps for the Masses: Geography in the Society for the Diffusion of Useful Knowledge," webpage, *Worlds Revealed: Geography & Maps at The Library of Congress*, July 13, 2016, accessed on November 26, 2018, //blogs.loc.gov/maps/2016/07/maps-for-the-masses-geography-in-the-society-for-the-diffusion-of-useful-knowledge/.

Projection, along with a few Pacific Ocean maps detailing the general geography of the 'Far East.'[117] (See Figures 5.23 and 5.24.) The other was a Globular Projection emphasizing the two hemispheres. It is not surprising that the atlas would include a world map and others covering extensive regions based on the Mercator Projection, as the cartographic efforts of the SDUK were under the auspices of Captain Francis Beaufort, the Hydrographer of the Navy and expert in nautical charting.

Figure 5.23. 'World, Mercator's Projection,' Society for the Diffusion of Useful Knowledge (London: Chapman and Hall, 1841).

(Source: David Rumsey Map Collection)

[117] Mead T. Cain, "The Maps of the Society for the Diffusion of Useful Knowledge: A Publishing History," 154-163.

Figure 5.24. 'Pacific Ocean,' Society for the Diffusion of Useful Knowledge (London: Chapman and Hall, 1840).

(Source: David Rumsey Map Collection)

John Arrowsmith describes how he compiled information for the *London Atlas of Universal Geography* by examining the available maps, charts, and plans already available, 'the most correct astronomical observations of latitude and longitude, the numerous surveys drawn by travelers, and geographical information scattered through numerous volumes of voyages, travels and histories.[118] The RGS called the atlas the

[118] John Arrowsmith, 'Preface to the London Atlas,' In *The London Atlas of Universal Geography* (London, UK: John Arrowsmith, 1838), 1, from David Rumsey Map Collection, https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~33901~1170053?qvq=q%3AThe%20London%20Atlas%20of%20Universal%20Geography%3Bsort%3APub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No%3Blc%3ARUMSEY~8~1&mi=5&trs=298 (retrieved on October 19, 2018).

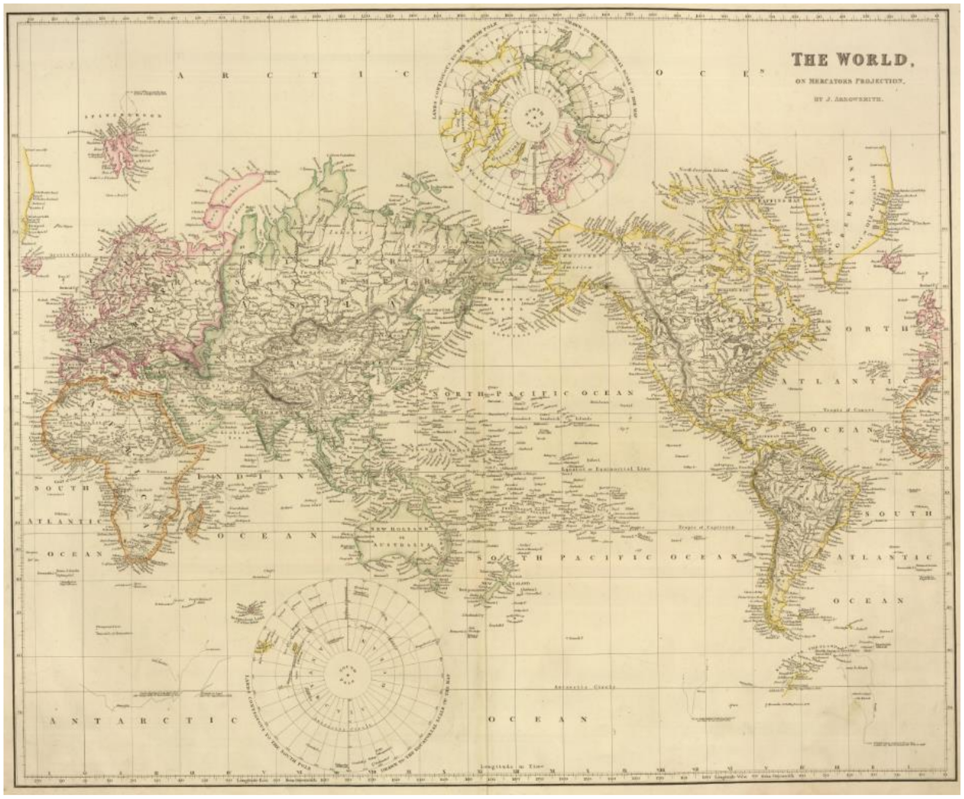
‘most acceptable present to the geographical public,’ and they marketed the atlas as having a convenient size with enhanced value from the detailed information, additions and minute accuracy.[119] Most likely due to public interest in the voyages and explorations of Cook, Darwin and others, Arrowsmith’s only world map for the *Atlas* was centered on the Pacific, on the Mercator Projection. (See Figure 5.25.) The atlas also has regional maps also on the Mercator Projection.[120] To emphasize their accuracy, the maps include a note that they were based on the latest discoveries and reports from explorers of the area.[121]

[119] Review, *the London Atlas of Universal Geography* by John Arrowsmith, In the Journal of the Royal Geographical Society of London 4 (1834): 320.

[120] John Arrowsmith, *The London Atlas of Universal Geography* (London, UK: John Arrowsmith, 1838), 1, from David Rumsey Map Collection, https://www.davidrumsey.com/luna/servlet/view/search?q=The%20London%20Atlas%20of%20Universal%20Geography&sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&os=0 (retrieved on October 19, 2018).

[121] John Arrowsmith, *The London Atlas of Universal Geography* (London, UK: John Arrowsmith, 1838), 1, from David Rumsey Map Collection, https://www.davidrumsey.com/luna/servlet/view/search?q=The%20London%20Atlas%20of%20Universal%20Geography&sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&os=0 (retrieved on October 19, 2018).

Figure 5.25. ‘The World on Mercator’s Projection,’ John Arrowsmith (London: John Arrowsmith, 1838).



(Source: David Rumsey Map Collection)

During the nineteenth century, the United States followed the Europeans lead on the presentation and distribution of geographic information in academic or school-based texts. In the 1800s, geography was considered an essential subject taught in virtually all US schools.[122] Many popular school atlases were mirrored after the European atlases, and prior to the American Revolution, geographical texts that circulated in the American

[122] Susan Schulten, *The Geographical Imagination in America, 1880-1950* (Chicago, Illinois and London, UK: University of Chicago Press, 2001), 93.

colonies were written and published in Europe.[123] The first United States geography text, *Geography Made Easy*, was published by Jedidiah Morse, in 1784.[124] The commercial success of Morse's geography text encouraged many others to write similar texts for school children. One of these was by William C. Woodbridge, whose text *Rudiments of Geography* relied heavily on an accompanying thematic atlas. Woodbridge had spent a year teaching in Switzerland. While in Europe he met Alexander von Humboldt. After returning to the United States, Woodbridge continued to correspond with Humboldt and incorporated many of Humboldt's ideas into his geographies.[125] In the introduction to his new geography text, Woodbridge thanked Humboldt and the Société de Géographie for their assistance.[126] Both Morse and Woodbridge used the Mercator Projection for their world maps. (See Figures 5.26 and 5.27.) Even though other projections were available, only the Mercator and the Globular Projections were widely used for school atlases, with the Globular Projection more commonly used for world reference maps and the Mercator Projection being used for world thematic maps. [127] The use of the Globular Projection for reference maps and the Mercator Projection for thematic data often occurred within the

[123] Jeffrey C. Patton, "The American School Atlas: 1784-1900,": 5.

[124] Jeffrey C. Patton, "The American School Atlas: 1784-1900,": 5.

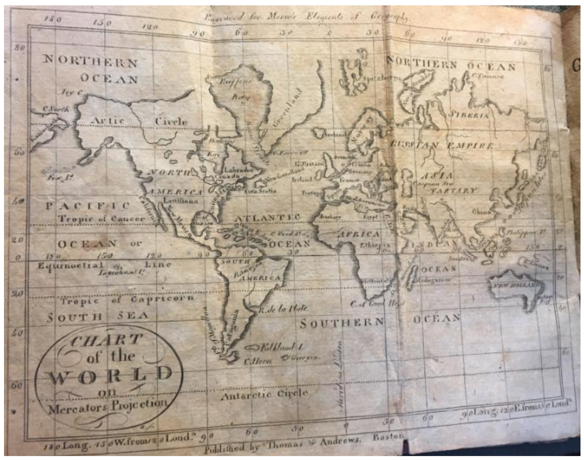
[125] Daniel H. Calhoun, "Eyes for the Jacksonian World: William C. Woodbridge and Emma Willard," in J*ournal of the Early Republic* 4, no. 1 (1984): 1–26.

[126] William C. Woodbridge, *A System of Universal Geography: On the Principles of Comparison and Classification*, 2nd ed. (Hartford, Connecticut: Oliver D. Cook & Co, 1827), accessed on November 26, 2018, https://babel.hathitrust.org/cgi/pt?id=hvd.32044097022131;view=1up;seq=9.

[127] John P. Snyder, *Flattening the Earth: Two Thousand Years of Map Projections*, 95.

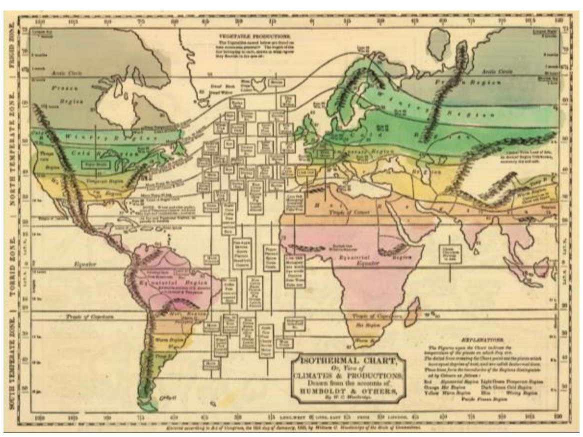
same atlas. This was a tacit acknowledgment from the atlas maker that they believed scientific data should be shown on the Mercator Projection.

Figure 5.26. ‘Chart of the World on Mercator’s Projection,’ Jedidiah Morse (Boston: I. Thomas and E.T. Andrews, 1795).



(Source: John Carter Brown Library)

Figure 5.27. ‘Isothermal Chart, or, View of Climates & Productions,’ William Woodbridge (Hartford: Belknap & Hamersley, 1837).



(Source: David Rumsey Map Collection)

In the nineteenth century, school maps became concerned with not only the 'accurate' delineation of territories and the location of places, but also in displaying data to convey what those places were like.[128] Particularly in the case of displaying scientific data, school atlases, geographies and atlases designed for a general public eager to learn of the far off places explored by Cook, Humboldt, Darwin and others, relied on the Mercator Projection to display the science of the day. As Schulten emphasizes, "textbooks were among the most commonly read books in the nineteenth century and had influence beyond the schoolroom."[129]

The use of the Mercator Projection in school atlases added legitimacy and a perception of accuracy to world maps. The Mercator Projection was not only being used in some of the most widely circulated books of the day, they were also texts that had the "official stamp" of the school system or of academia. The rectangular, gridded, highly distorted the Mercator Projection was now seen as the correct view. By 1900, the Mercator Projection had become firmly entrenched as a popular choice for world maps, even as academic cartographers began to argue against its use and suggested superior alternative projections. After 1900, academic cartographers began to create new projections to specifically address the shortcomings of the Mercator Projection for general use and to urge their use as replacements of the Mercator Projection. The continued widespread use of the Mercator Projection reveals the general lack of success

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[128] Jeffrey C. Patton, "The American School Atlas: 1784-1900,": 10-11.

[129] Susan Schulten, *The Geographical Imagination in America, 1880-1950*, 94.

that the academic cartographic community has had in limiting the influence of the Mercator Projection.

The Mercator Projection provides a glimpse into the complexities of mapping, the choice of map projection and why the Mercator Projection changed human's ability of moving from one place to another, or, their perception of spatial arrangement of the globe. After 1569 and until 1700, the Mercator Projection was appropriately used for navigation. The misuses of the Mercator Projection began after 1700, when it was connected to scientists working with navigators and the creation of thematic cartography. During the eighteenth century, the Mercator Projection was published in journals and reports for geographic societies that detailed state-sponsored explorations. Western Europeans used the Mercator Projection as a tool in a specific scientific sense and as a tool for building their empires. In the nineteenth century, the influence of well-known scientists using the Mercator Projection filtered into the publications for the general public. These publications created the erroneous depiction of the way western European empires wanted their subjects to perceive the empire in the world.

CHAPTER VI

CONCLUSION

From 1569 to 1900, the Mercator Projection has had various uses, both valuable and ill-suited. Gerard Mercator successfully created a projection to solve a critical navigational problem at a time that western Europeans were sailing and exploring increasingly further away from known waters. The data from this study illustrated that, while the Mercator Projection was used by navigators, it was not fully adopted by the nautical community until Edward Wright's corrections appeared in 1599. He provided latitudinal tables that could be employed by the average mariner to construct the projection at any scale.

At the end of the seventeenth century, scientists began to visualize the spatial distribution of scientific data on maps giving rise to the new field of thematic cartography. From the beginning, the Mercator Projection was often the projection utilized for thematic maps and included as part of reports and publications about European explorations that were funded by geographic societies and governments. The first thematic maps were created to make navigation more efficient and safer. Most notable of these early thematic maps were Edmund Halley's studies of wind currents and magnetic declination. Halley plotted his data on the Mercator Projection for a practical reason. Due to crustal variations and other environmental factors there are local variations between magnetic north and true north. As the compass points with local magnetic fields, the declination value is needed to obtain true north. Knowing the degree of local magnetic declination allowed far greater accuracy for a mariner using a compass to follow a course, a course most easily plotted and followed on the Mercator Projection. The early association of thematic data with improving navigation to the Mercator Projection would later expand to include all forms of data, for which much was ill suited.

After Halley, other state-sponsored scientific explorations stimulated the use of the Mercator Projection. Major British coastal surveys, such as the *Atlantic Neptune,* were designed to chart newly acquired North American colonies, and the scientific explorations of Captain James Cook and Captain Fitzroy were to explore, chart and document the Southern Seas. The small scale published maps resulting from these explorations were documented and published on the Mercator Projection, and distributed through the journals of sponsoring scientific societies including the *Philosophical Transactions of the Royal Society* and the *Proceedings of the Royal Geographic Society*. These maps were published for fellow professionals, academics and scientists who may well have been aware of the degree of the distortions of the Mercator Projection. However, subsequent versions of the maps were widely marketed to the general populace who were undoubtedly far less sophisticated in their understanding of map projection distortion.

The end of the eighteenth and beginning of the nineteenth centuries saw a growth in interest by the general public for knowing where places were and what they were like.

This curiosity was met by the distribution of information from government reports and geographical society journals as well as a multitude of popularized versions of those publications. Geographical societies in Paris, Berlin and London reported on activities by government, scientists, navigators, academics and explorers. The rise of interest in scientific exploration and the rising influence in geographical societies in the nineteenth century solidified geography as an academic discipline. The journals of geographic societies reported findings from expeditions and scientific treatises strengthening the role of maps as both repositories of information and as analytic tools for geographers and other scholars. Many of these maps were based on the Mercator Projection.

The maps reviewed for this study showed a significant increase in the use of the Mercator Projection between 1800 and 1850. The data shows the trend continuing between 1850 and 1900 to the point that the Mercator Projection had become the most popular choice for reference mapping and totally dominated thematic cartography. The wide-spread use in thematic cartography received considerable validation through the publications of the work of Alexander von Humboldt. Humboldt's contributions to thematic cartography were so influential that they inspired the works of major European atlas makers, Heinrich Berghaus, August Heinrich Petermann and George Philip & Son Ltd. who all published physical geography thematic atlases based on Humboldt's discoveries. In the United States Humboldt's influence was clearly evident in many of the school atlases that circulated in the nineteenth century such as that of William Woodbridge, who directly credits Humboldt on his world maps. All of these atlases utilized the Mercator Projection for their thematic maps. The Mercator Projection's widespread use in textbooks and atlases, distributed by major printing houses, solidified the validity of the Mercator Projection. After all, it was the projection that scientists, academics and professionals were using. By 1900, the Mercator Projection was well entrenched as a popular projection for general world reference or thematic maps, even though academic cartographers argued that it was ill suited for those purposes.

During the twentieth century academic cartographers including Eckert, Goode, Miller, Robinson and Patterson all developed far superior projections for general world maps. In the 1970s, the increasingly vocal condemnation of the use of the Mercator Projection culminated in the often bitter and highly public debate between Arno Peters and the cartographic community. Peter's allegations that the continued use of the Mercator Projection perpetuated a European bias of the nature of the world, or perhaps racism, as well as his marketing of what most practicing cartographers considered to be a highly flawed projection as the best alternative to the Mercator Projection, infuriated many cartographers and resulted in several cartographic societies formally condemning the use of the Peters Projection. The publicity of the openly acrimonious debate clearly brought the questions of map projection choice to the forefront as never before.

The popular media has at times entered the debate on map projection choice, unfortunately often without a clear understanding of the complexities in choosing an appropriate projection. For example, an episode of the television show, *The West Wing (1999-2006),* echoed Peters's argument against the Mercator Projection. In that episode, a committee reported to White House staffers that the Mercator Projection misled readers about the size and location of countries, claimed that the Peters Projection solved that problem, and requested that all world maps in the United States be changed.[1] In 2017, the stage design of the revised Broadway play, *Lonely Planet*, set in a small map shop, places the Mercator Projection beside the Peters Projection.[2] *Saturday Night Live* currently uses the Mercator Projection as the backdrop for the 'Weekend Update' segment.[3]

The Mercator Projection continues to be used today. As the availability of geospatial data has increased, open-source mapping services have made mapping available and accessible to the average user, using the Mercator Projection and the Web Mercator Projection. In the late twentieth century, NASA created the Space Oblique Mercator (SOM) projection, which calculated the necessary formulas to consider Earth's rotation in respect to the changing ground tracks of LANDSAT satellite orbits.[4] After its

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[1] *The West Wing*, season 2, episode 16, "Somebody's Going to Emergency, Somebody's Going to Jail," directed by Jessica Yu, aired February 28, 2001, on Warner Home DVD (Warner Bros. Entertainment, 2004), disc 3.

[2] "Lonely Planet," *West of Lenin*, accessed February 12, 2019, http://westoflenin.com/index.php?option=com_content&view=article&id=211:lonely-planet&utm_source=Lonely+planet+performance&utm_campaign=Lonely+Planet+Seattle&utm_medium=email.

[3] *Saturday Night Live*, season 42, episode 23, "Weekend Update Summer Edition," directed by Don Roy King, featuring Colin Jost, and Michael Che aired August 17, 2017, on NBC, accessed September 25, 2017, https://www.nbc.com/saturday-night-live/video/august-17-weekend-update-summer-edition/3567807.

[4] Jerry Brotton, *A History of the World in 12 Maps* (New York, New York: Penguin Books, 2012), 259. Norman J.W. Thrower, "Scientific Discovery and Cartography," in T*he History of Cartography, Volume 6: Cartography in the Twentieth Century*, ed. Mark Monmonier (Chicago, Illinois; London, UK: University of California Press, 2015), 1393-1394.

creation, the SOM became the projection that LANDSAT satellites used to map its orbits and collect satellite imagery.[5] NASA also used the SOM to map the solar system.[6] In 2005, Google introduced the Web Mercator Projection for Google Maps.[7] The Web Mercator Projection became popular for internet based mapping services. The popularity of the projection was exemplified when the Joint Chiefs of Staff announced the World Geodetic System 1984 (WGS 84) as the official coordinate systems for the Department of Defense.[8] However, the National Geospatial Intelligence Agency explained that the Web Mercator and other non-WGS 84 reference systems can cause errors of up to 40,000 meters, roughly 25 miles.[9]

Recently, Google Maps changed from the Web Mercator Projection, which it had invented, to a globe for maps at a world scale. However, when zooming from a small to large scale, Google continues to use the Web Mercator. Google's decision to change its world map projection has significant implications. Web mapping services like Map Quest, Yahoo, Bing and Google Maps create millions of maps a day, and billions over the

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[5] Norman J.W. Thrower, "Scientific Discovery and Cartography," 1394.

[6] Jerry Brotton, *A History of the World in 12 Maps*, 259.

[7] Michael P. Peterson, *Mapping in the Cloud* (New York, New York: The Guilford Press, 2014), 106-107.

[8] Joint Chiefs of Staff, Chairman of the Joint Chiefs of Staff Instruction: Position (Point and Area) Reference Procedures CJCSI 3900.01C, by Lieutenant General, USA Director, Joint Staff Walter L. Sharp (Washington, DC, 2007).

[9] National Geospatial Intelligence Agency, Office of Geomatics, NGA Advisory Notice on "Web Mercator": Application Risks to Operations and Adherence to DoD World Geodetic system 1984 (WGS 84), by Office of Geomatics (Springfield, Virginia, 2014).

course of a year.[10] The access to maps has never been easier. As Peterson had warned, the easy access to maps via the internet creates map illiteracy and changes how people process and interact with their surrounding environment.[11]

The goal of this dissertation was to explain why and how the Mercator Projection became a prevalent choice for a world map projection. Studying the Mercator Projection allows us to examine the complexities of mapping and the choice of map projection. The Mercator Projection's widespread use has shaped not only navigation, but also people's perceptions of the world. As J. B. Harley noted, "[a]s mediators between an inner mental world and an outer physical world, maps are fundamental tools helping the human mind make sense of its universe."[12] That is, maps not only represent the world, they construct it, interweaving geodetic fact with imposed perspectives. Buisseret's expression, "the emergence of map consciousness," asserts that maps have helped to claim countries or parcels of land as extensions of imperial trading enterprises.[13] Maps filtered into every day actions and decisions of empires by being used as evidence in disputes over colonial territorial borders between opposing empires, or as household decorative pieces reflecting

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[10] Michael P. Peterson, *Mapping in the Cloud*, 6-11.

[11] Michael P. Peterson, *Mapping in the Cloud*,11.

[12] J.B. Harley, 'The Map and the Development of the History of Cartography,' in *The History of Cartography, Volume 1, Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean*, eds. J.B. Harley and David Woodward (Chicago, Illinois: University of Chicago Press, 1987), 1.

[13] David Buisseret, *Monarchs, Ministers and Maps: The Emergence of cartography as a Tool of Government in Early Modern Europe* (Chicago, Illinois; London, UK: University of Chicago Press, 1992), 2.

a national pride in economic expansion.[14] Emanuela Casti claims that maps represented the intellectual appropriation of territory through naming. Place names on a map served to order and regulate the message of ownership. Therefore, maps have both an independent and dependent value in orienting a person, providing self-identification to their readers, and the reinforcing cultural perceptions of ownership.[15]

This study has engaged the conceptual, technical and contextual literatures related to the Mercator Projection, including literatures of cartography, histories of cartography and geography. It addresses a gap in the literature by examining the publication of the Mercator Projection on world maps since its creation, beginning with the attempts of explorers and scientists to improve navigation. This dissertation documents the use of the Mercator Projection for world maps in reference and thematic mapping, using world maps and atlases as sources to trace the Mercator Projection, contextualizing its reception in navigation, cartographic, and professional communities, and their continual use of it.

This dissertation is not exhaustive. Hopefully it will encourage future work on the use and role of map projections. It has implications for how future studies could engage with the history of cartography and geography through the emerging geographies of the book. Other research opportunities include:

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[14] David Buisseret, *Monarchs, Ministers, and Maps: The Emergence of Cartography as a Tool of Government in Early Modern Europe*, 1, 4. Christian J. Koot, 'The Merchant, the Map, and Empire: Augustine Herrman's Chesapeake and Interimperial Trade, 1644–73,' in *William and Mary Quarterly* 67, no. 4 (October 2010): 604, 643-644.

[15] Emanuela Casti, *Reality as Representation: The semiotics of cartography and the generation of meaning* (Bergamo, Italy: Bergamo University Press, 2000), 9-12.

i. studying the reasons for the use of other projections, such as the Globular, in a similar manner to this dissertation;

ii. examining how the role of Edward Wright's latitudinal tables later influenced Newton in his development of calculus;

iii. identifying if the combination of the Mercator Projection, chronometer and compass gave the British Empire a significant advantage in its imperial expansion;

iv. exploring why some geographic ideas, concepts and peoples have been better received by history than others;

v. investigating how, and to what extent, open source geospatial technology effects map literacy.

This dissertation has illustrated that a map projection can be studied as an artifact through a historical lens and using a geographic approach. The dissertation addresses the complex processes of map making and the significant role the map projection plays in displaying a map's message. This dissertation shows that it is possible to conceptualize and contextualize the Mercator Projection as well as reconstruct its production, reception and circulation as a tool and scientific idea connected to navigation. It also shows that the projection was an influential component of a larger conversation about navigational knowledge, geography and science. The Mercator Projection changed the way humans interacted with their world; whether by easing the ability of moving from one place to another or by the perception of the spatial arrangement of the globe.

By uncovering how the Mercator Projection moved from a navigational tool to a way of displaying the world, this dissertation offers a glimpse into how it was championed, challenged, accepted and changed throughout time. The legacy of the Scientific Revolution allowed the geographic discipline to develop into a more theoretical and data-driven science. The Mercator Projection was indirectly validated by science, as navigators and scientists worked together to make navigation more efficient. The rise of thematic cartography, and the increase of literacy and availability of knowledge to the public further propelled the distribution and diffusion of the Mercator Projection. It became a widely used projection for world maps and atlases, for which it was ill-suited, but also because it had a reputation of being used by professional and intellectual communities. As a result, the Mercator Projection was published in maps, atlases and school atlases for the general public, which influenced how the majority of people using these resources would come to conceptualize the world. By conceptualizing how the Mercator Projection moved as a physical and ideological tool through space and time within world maps and atlases, this dissertation has offered a glimpse into how the Mercator Projection became a popular envisioning of the world.

BIBLIOGRAPHY

Primary Sources

Arrowsmith, John. *London Atlas of Universal Geography*. London: John Arrowsmith, 1838. David Rumsey Map Collection. https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~33900~1170052:Title-Page--London-atlas-of-univers?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:The%20London%20Atlas%20of%20Universal%20Geography;sort:Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=9&trs=435.

———. "Preface to the London Atlas." In *The London Atlas of Universal Geography, Exhibiting the Physical & Political Divisions of the Various Countries of the World, Constructed from Original Materials. Is Most Respectfully Dedicated to His Venerable Friend John Middleton Esqr. As a Testimony of Gratitude and Esteem, by His Much Obliged & Humble Servant, John Arrowsmith, F.R.G.S. & R.A.S. 35, Essex Street, Strand, London*. London, Pubd. by J. Arrowsmith ... 1838. London: John Arrowsmith, 1838. David Rumsey Map Collection. https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~33901~1170053?qvq=q%3AThe%20London%20Atlas%20of%20Universal%20Geography%3Bsort%3APub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No%3Blc%3ARUMSEY~8~1&mi=5&trs=298%20,%20(retrieved%20on%20October%2019,%202018).

———. "Review: The London Atlas of Universal Geography by John Arrowsmith." *The Journal of the Royal Geographical Society of London* 4 (1834): 320.

Aschenbach, Joy. "Making World Maps Match Real World." The New Service of the National Geographic Society, October 12, 1988. John Parr Snyder Paper's Series 1 Boxes 2&8. Library of Congress.

Atkinson, James, William Mountaine, Jared Tracy, and John Hyde. *Epitome of the Art of Navigation; or, A Short, Easy, and Methodical Way to Become a Compleat Navigator: Containing, Practical Geometry, Plain and Spheric, Superficial and Solid; with Its Uses in All Kinds of Mensuration. Trigonometry, Plain and Spheric, Both Geometric, Instrumental, and Logarithmic; with Its Uses Innavigation, Viz. In Plain, Mercator's, and Great Circle-Sailing, Geography,* *Astronomy, the Projection of the Sphere, &c. The Gregorian or New Calendar, Description Anduse of the Plain-Chart, Mercator's Chart, Both Globes, Hemispheres, and Divers Other Instruments. A New Form of Keeping a Sea-Reckoning, or Account of a Ship's Way. A Traverse-Table; a Table of Meridional Parts; a Table of 10,000 Logarithms, and Logarithmic Sines, Tangents and Secants, Carefully Corrected*. London: Printed for W. and J. Mount, T. Page and sons, on Tower-Hill, 1759. John Carter Brown Library.

Austin, Robert. "Report by Assist. - Surveyor Robert Austin of an Expedition to Explore the Interior of Western Australia." *The Journal of the Royal Geographical Society of London* 26 (1856): 235–74.

Bartz Petchenik, Barbara. Letter. "Barbara Bartz-Petchenik to the Editor of ARC News, December 14, 1989." Letter, December 14, 1989. John Parr Snyder Paper's Series 1 Boxes 2&8. Library of Congress.

Blaeu, Willem Janszoon. "Atlas Maior." Amsterdam: Blaeu, 1662. National Library of Scotland. https://maps.nls.uk/atlas/blaeu-maior/index.html.

Blaeu, Willem Janszoon, Josua Van den Ende, and Willem Janszoon Blaeu. "Nova totius terrarum orbis geographica ac hydrographica tabula." [Amsterdami: Apud Guiljelmum Blaeuw], 1631. State Library of New South Wales. https://www.sl.nsw.gov.au/collection-items/nova-totius-terrarum-orbis-geographica-ac-hydrographica-tabula-auct-guiljelmo.

Blathwayt, William. "Blathwayt Atlas." London: Office of Trade and Plantations, 1685 1680. John Carter Brown Library. https://jcb.lunaimaging.com/luna/servlet/view/search?q=%22Blathwayt%20Atlas%22&sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&os=0.

Collins, Greenville. *Great Britain's Coasting Pilot, the First Part, Being a New and Exact Survey of the Sea-Coast of England from the River of Thames to the Westward with the Islands of Scilly and from Thence to Carlile*. London: Freeman Collins, 1693. Folger Shakespeare Library.

Cook, James, and Barak Longmate. "[Cook, James] 1728-1779: Map of the Coast of the New Zealand Discovered in the Years 1769 and 1770, By I. Cook, Commander of His Majesty's Bark Endeavour. B. Longmate Sculpsit. [London, 1773]." 1773. Alexander Turnbull Library, Wellington, New Zealand. http://natlib.govt.nz/records/22751427.

Cook, Captain James. “A General Chart of the Island of Newfoundland.” Atlas Map, 1: 1,280,000. London: Sayer and Bennett, 1776. David Rumsey Map Collection. https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~1907~120014: A-General-Chart-Of-The-Island-Of-Ne#.

Cook, Captain James. “Astronomical Observations Made during Captain Cook’s Last Voyage,” 1780 1778. Papers of the Board of Longitude (RGO 14/61). University of Cambridge Digital Library. https://cudl.lib.cam.ac.uk/view/MS-RGO-00014-00061/1.

Cook, James, Michael Lane, and Thomas Jefferys. “A General Chart Of The Island Of Newfoundland.” Atlas Map, 1:280,000. The American Atlas: Or, A Geographical Description Of The Whole Continent Of America ... Engraved On Forty-Eight Copper Plates, By The Late Mr. Thomas Jefferys, Geographer to the King, and Others. London, Printed and Sold by R. Sayer and J. Bennett, Map and Print Sellers, No. 53, Fleet-Street. MDCCLXXVI. London: Sayer and Bennett, 1776. David Rumsey Map Collection. https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~1907~120014: A-General-Chart-Of-The-Island-Of-Ne.

———. “Carte reduite de l’île de Terre-Neuve | Library of Congress.” Atlas Mapp, 1: 1,160,000. Paris, France: Dépôt des cartes et plans de la marine, 1784. Library of Congress. https://www.loc.gov/item/73694675/.

Cook, James, J. C Beaglehole, and R. A Skelton. *The Journals of Captain James Cook on His Voyages of Discovery*. Rochester, NY: Boydell Press, 1999.

———. *The Journals of Captain James Cook on His Voyages of Discovery: Charts & Views*. Cambridge [Cambridgeshire: Published for the Hakluyt Society at the University Press, 1969.

Dampier, William. *A New Voyage Round the World Describing Particularly the Isthmus of America, Several Coasts and Islands in the West Indies, the Isles of Cape Verd, the Passage by Terra Del Fuego, the South Sea Coasts of Chili, Peru and Mexico, the Isle of Guam One of the Ladrones, Mindanao, and Other Philippine and East-India Islands near Cambodia, China, Formosa, Luconia, Celebes, &c., New Holland, Sumatra, Nicobar Isles, the Cape of Good Hope, and Santa Hellena : Their Soil, Rivers, Harbours, Plants, Fruits, Animals, and Inhabitants : Their Customs, Religion, Government, Trade, &c. / by William Dampier* ; Illustrated with Particular Maps and Draughts. Early English Books, 1641-1700 / 350:01. London: Printed for James Knapton ..., 1697-1703., 1697.

Dee, John. *General and Rare Memorials Pertayning to the Perfect Arte of Nauigation*. Discovering Literature: Shakespeare and Renaissance Writers, 1577. British Library, https://www.bl.uk/collection-items/john-dees-general-and-rare-memorials-bound-with-a-signed-manuscript.

Des Barres, Joseph F.W. "Boston Harbor." London, 1800. Library of Congress. https://www.loc.gov/resource/g3301pm.gan00003/?sp=98.

———. "Coast of Nova Scotia, New England and New York | Library of Congress." London, 1800. Library of Congress. https://www.loc.gov/resource/g3301pm.gan00003/?sp=9.

Dudley, Sir Robert. *Dell'arcano Del Mare*. Florence, Italy: Giuseppe Cocchini, 1661. John Carter Brown Library. https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1678~102560001:Carta-seconda-Generale-del--America?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=q:source_title%3D%22Dell%27arcano%20del%20mare%20...%22;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=2&trs=5.

Faden, William. "A New General Chart of the World [Cartographic Material] : Exhibiting the Whole of the Discoveries Make by the Late Captain James Cook, F.R.S. with the Tracks of the Ships under His Command ; Also Those of Cap'n Phipps (Now Lord Mulgrave) in His Expedition to the North Pole." London: Published by Wm. Faden, Geographer to the King, Charing Cross, January 1, 1787. National Library of Australia. http://nla.gov.au/nla.obj-230590364, http://image.sl.nsw.gov.au/cgi-bin/ebindshow.pl?doc=maps/a562;seq=5.

Fitzroy, Robert, and J. Gardner. "General Chart Showing the Principal Tracks of H.M.S Beagle 1831-1836." London: Henry Colburn, Great Marloborough Street, 1839. Rylands Collection, The University of Manchester Library. https://johannes.library.manchester.ac.uk/luna/servlet/detail/Manchester~91~1~132502~200333:General-chart-showing-the-principal.

Goode, J Paul. "VII. Interrupted Homolographic Projection by J. Paul Goode 1916." Atlas Map. Chicago, Illinois; New York, New York; San Francisco, California: Rand McNally & Company, 1948.

———. "VIII. Interrupted Homolographic Projection by J. Paul Good 1923." Atlas Map. Chicago, Illinois; New York, New York; San Francisco, California: Rand McNally & Company, 1948.

Goos, Pieter. *De Zee-Atlas Ofte Water-Wereld, Waer in Vertoont Werden Alle de Zee-Kusten van Het Bekende Des Aerd-Bodems : Seer Dienstigh Voo Alle Heeren En Kooplieden, Als Oock Voor Alle Schippers En Stuurlieden, 1676*. Universiteitsbibliotheek Utrecht. http://bc.library.uu.nl/maritime-atlas-well-do.

Halley, Edmund. “A Theory of the Variation of the Magnetical COMPASS, by Mr. Ed. Halley Fellow of the R. S.” *Philosophical Transactions* (1683-1775) 13 (1683): 208–21.

Halley, E. “An Historical Account of the Trade Winds, and Monsoons, Observable in the Seas between and Near the Tropicks, with an Attempt to Assign the Phisical Cause of the Said Winds, By E. Halley.” *Philosophical Transactions of the Royal Society* 16 (1686): 153–68.

Halley, Edmund. “A New and Correct Chart Shewing the Variations of the Compass in the Western & Southern Oceans as Observed in Ye Year 1700 by His Ma:Ties Command by Edm. Halley - JCB Map Collection.” London: W. and J. Mount, and T. Page, 1701. John Carter Brown Library. https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~3540~101701:A-new-and-correct-chart-shewing-the?qvq=q:Edmond%2BHalley&mi=1&trs=4#. John Carter Brown Library. https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~3540~101701:A-new-and-correct-chart-shewing-the?qvq=q:Edmond%2BHalley&mi=1&trs=4#.

———. “Nova & Accuratissima Totius Terrarum Orbis Tabula Nautica Variationum Magneticarum Index Juxta Observationes Anno. 1700 Habitas Constructa per Edm. Halley = A New and Correct Chart of the Whole World Shewing the Variations of the Compass as They Were Found in the Year M.D.CC.” Engraved. London: R. Mount and T. Page, 1701. John Carter Brown Library. https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~3542~101716:Nova-&-Accuratissima-Totius-Terraru.

Happel, Eberhard Werner. “Die Ebbe Und Fluth Auff Einer Flachen Landt-Karten Fürgestelt.” 1675. Copperplate engraving. Princeton University Library. http://libweb5.princeton.edu/visual_materials/maps/websites/thematic-maps/quantitative/hydrography/hydrography.html.

Hawkesworth, John. *An Account of the Voyages Undertaken by the Order of His Present Majesty for Making Discoveries in the Southern Hemisphere.And Successively Performed by Commodore Byron, Captain Wallis, Captain Carteret, and Captain Cook, in the Dolphin, the Swallow, and the Endeavour: Drawn up from the Journals Which Were Kept by the Several Commanders, and from the Papers of*

Sir Joseph Banks, Bart. The 3d ed. London, 1785. Hathi Trust, https://babel.hathitrust.org/cgi/pt?id=nyp.33433066583521;view=1up;seq=17.

Heilsnis, Harold. Letter. “Harold Heilsnis to Arthur Robinson.” Letter, August 9, 1989. John Parr Snyder Paper’s Series 1 Boxes 2&8. Library of Congress.

Hondius, Jodocus. “Christian Knight World Map.” 1596. The British Library. http://www.bl.uk/learning/timeline/item102769.html.

Humboldt, Alexander. “Alexander von Humboldt’s System Der Isotherm-Kurven. - David Rumsey Historical Map Collection.” Atlas Map, 1:10,000,000. Gotha: Justus Perthes, 1849. David Rumsey Map Collection. https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~1477~160017:Alexander-von-Humboldt-s-System-Der.

Humboldt, Alexander von. “Europa in Geologischer Beziehung.” Atlas. *Atlas Zu Alex. v. Humboldt’s Kosmos in Zweiundvierzig Tafeln Mit Erla¨uterndem Texte*. Stuttgart: Krais & Hoffmann, 1851. Biodiversity Heritage Library. https://www.biodiversitylibrary.org/item/89025#page/148/mode/1up.

———. “Geologische Erdkarte.” *Atlas. Atlas Zu Alex. v. Humboldt’s Kosmos in Zweiundvierzig Tafeln Mit Erla¨uterndem Texte.* Stuttgart: Krais & Hoffmann, 1851. Biodiversity Heritage Library. https://www.biodiversitylibrary.org/item/89025#page/148/mode/1up.

Humboldt, Alexander von, and Traugott Bromme. *Atlas Zu Alex. v. Humboldt’s Kosmos in Zweiundvierzig Tafeln Mit Erläuterndem Texte /.* Stuttgart : Krais & Hoffmann, 1851. Biodiversity Heritage Library. https://www.biodiversitylibrary.org/bibliography/39968.

Jaillot, Alexis-Hubert. *Le Neptune François Ou Recueil Des Cartes Marines Levées et Gravées Par Ordre Du Roy. Premier Volume, Contenant Les Costes de l’Europe Sur l’océan, Depuis Dronthem En Norvège Jusques Au Détroit de Gibraltar, Avec La Mer Baltique, 1693*. Bibliothèque nationale de France. https://gallica.bnf.fr/ark:/12148/btv1b59634708.

Jefferson, Thomas. “79. A Bill for the More General Diffusion of Knowledge,” June 18, 1779. Founders Online: National Archives. https://founders.archives.gov/documents/Jefferson/01-02-02-0132-0004-0079#document_page.

King, P. P., P. Stokes, and R. Fitz-Roy. “Sketch of the Surveying Voyages of His Majesty’s Ships Adventure and Beagle, 1825-1836.” *The Journal of the Royal Geographical Society of London* 6 (1836): 311–43.

Kircher, Athanasius. “Tabula Geographico Hydrographica Motus Oceani Currentes.” Copperplate engraving. D’onder-Aardse Weereld in Haar Goddelijk Maaksel En Wonderbare Uitwerkselen Aller Dingen. Amsterdam, 1675. Princeton University Library. http://libweb5.princeton.edu/visual_materials/maps/websites/thematic-maps/quantitative/hydrography/hydrography.html.

Maggiolo, Vesconte. “Portolan Chart of the Western Mediterranean.” Portolan Chart. Naples, Italy, 1511. 08658. John Carter Brown Map Collection Library. https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~6441~115902763:-Portolan-chart-of-the-western-Medi?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/where%2F%25255BPortolan%2Bchart%2Bof%2Bthe%2Bwestern%2BMediterranean%25255D;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=0&trs=1#.

Mercator, Gerard. “Nova et Aucta Orbis Terrae Descriptio Ad Usum Navigantium Emendate Accommodata. [New and More Complete Representation of the Terrestrial Globe Properly Adapted for Use in Navigation].” 1569. Bibliothèque nationale de France. http://gallica.bnf.fr/ark:/12148/btv1b7200344k.

Mercator, Gerhard, Henry Hexham, and Jodocus Hondius. *Gerardi Merc[Atoris et] l. Hondii Atlas, or, A Geographicke Description of the Regions, Countries and Kingdomes of the World, through Europe, Asia, Africa, and America: Represented by New & Exact Maps. Editio vltima. A Amsterdam: Chez Henry Hondius, demeurant sur le dam, à l’enseigne du Chien vigilant, 1638*. http://gateway.proquest.com/openurl?ctx_ver=Z39.88-2003&res_id=xri:eebo&rft_val_fmt=&rft_id=xri:eebo:image:184156.

Mercator, Gerardus. “Atlas Sive Cosmographicae Meditationes de Fabrica Mundi et Fabricati Figura: Duisburg, 1595.” CD-ROM (2 discs). Translated by David Sullivan. Oakland, California: Ocatvo, 2000. https://web.archive.org/web/20160310032427if_/http://mail.nysoclib.org/mercator_atlas/mcrats.pdf. Library of Congress.

Mercator, Gerhard, Jodocus Hondius, Wye Saltonstall, and George Glover. *Historia Mundi: Or Mercator’s Atlas: Containing His Cosmographicall Description of the Fabricke and Figure of the World. Lately Rectified in Divers Places, as Also Beautified and Enlarged with New Mappes and Tables; by the Studious Industry of Iudocus Hondy. Englished by W. S. Generosus, & Coll. Regin. Oxoniae.*

London: Printed by T. Cotes, for Michael Sparke and Samuel Cartwright, 1635. Early English Books Online, http://gateway.proquest.com/openurl?ctx_ver=Z39.88-2003&res_id=xri:eebo&rft_val_fmt=&rft_id=xri:eebo:image:14932.

Minahan, Elizabeth. Letter. "Elizabeth Minahan Judge to Arthur Robinson." Letter, November 2, 1987. John Parr Snyder Paper's Series 1 Boxes 2&8. Library of Congress.

Morse, Jedidiah. "Chart of the World on Mercator's Projection." Atlas Map. *Elements of Geography*. Boston: I. Thomas and E.T. Andrews, 1795. John Carter Brown Library.

Moullart-Sanson, Pierre. "Mappe Monde Ou Carte Marine Universelle Réduite, Ou Sont l'Asie, l'Afrique, l'Europe, l'Amérique Septentrionale, l'Amérique Méridionale." A Paris: Aux Galléries du Louvre vis à vis St. Nicolas, 1695. National Library of Australia. http://nla.gov.au/nla.obj-232171805/view.

Norwood, Matthew. *Norwood's System of Navigation: Teaching the Whole Art, in a Way More Familiar, Easie, and Practical, than Hath Been Hitherto Done. Shewing, the Projection of the Plain Scale: The Sphere in Plaino: Astronomical Problems Useful in Navigation: Traverse Tables: Right Lin'd Triangles, Geometrically, by Tables of Sines, Tangents, Logarithms, and by Gunter's Ruler; Applied to Plain and Mercator's Sailing. Illustrated by Schemes on Copper-Plates. How to Make Observations at Sea or Shore. Sure, and Easie Ways of Reckoning by Latitude, Longitude, and Meridional Distance; with Tables ... Spherical Triangles; and Their Use in Great Circle Sailing. The Use of the Globes, Azimuth Compass for Variation. And Also of Sea-Gunnery. The Description and Use of a New Instrument, Called Encyclologium, or the Sliding Circles; Which, with Ease, Resolves All Questions of Proportion, Trigonometry, Arithmetick, Square and Cube Root, Gunnery, Mensuration, and Dyalling. By Matthew Norwood, Teacher of Mathematical Arts*. London: Printed for H. Sawbridge, T. Wall, T. Guy, T. Parkhurst, J. Robinson, H. White, T. Malthus, and C. Conyers, 1685. John Carter Brown Library.

Ortelius, Abraham. *Theatrum Orbis Terrarum / Opus Nunc Denuo Ab Ipso Auctore Recognitum, Multisquè Locis Castigatum, & Quamplurimis Nouis Tabulis Atquè Commentarijs Auctum. Antwerp: Christopher Plantin, 1570*. Folger Shakespeare Library.

Parkes, Harry. "Geographical Notes on Siam, with a New Map of the Lower Part of the Menam River." *The Journal of the Royal Geographical Society of London* 26 (1856): 71–78.

Ptolemy, Claudius, and Lienhart Holle. “Beatissimo Patri Paulo Secundo Pontifici Maximo, Donis Nicolaus Germanus.” 1482. British Library. https://www.bl.uk/collection-items/ptolemy-world-map#.

Raisz, Erwin J. “World in Armadillo.” Cambridge, Massachusetts: Institute of Geographical Exploration, Harvard University, 1960. David Rumsey Map Collection. https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~267279~90041761:World-in-Armadillo-.

Raper, Henry, and R. Fitz-Roy. “Hints to Travellers.” *The Journal of the Royal Geographical Society of London* 24 (1854): 328–58.

Rink, H. “On the Large Continental Ice of Greenland, and the Origin of Icebergs in the Arctic Seas.” *The Journal of the Royal Geographical Society of London* 6 (1836): 145–54.

Robinson, Arthur. Letter. “Arthur Robinson to The Editor of The Wall Street Journal.” Letter, April 11, 1989. John Parr Snyder Paper’s Series 1 Boxes 2&8. Library of Congress.

Sanderson, John. “Notes to Accompany Sketch-Maps of the Zulu and Amatonga Countries, and of the Country between Aliwal, North, and Natal.” *The Journal of the Royal Geographical Society of London* 32 (1862): 335–39.

Society for the Diffusion of Useful Knowledge. “Pacific Ocean.” Atlas Map, 1: 50,000,000. London: Chapman and Hall, 1840. David Rumsey Map Collection. https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~20991~530083:Pacific-Ocean-?qvq=q:author%3D%22Society%20for%20the%20Diffusion%20of%20Useful%20Knowledge%20(Great%20Britain)%22;lc:RUMSEY~8~1&mi=163&trs=378.

———. “World, Mercator’s Projection.” Atlas Map, 1: 68,000,000. London: Chapman and Hall, 1841. David Rumsey Map Collection. https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~20841~520034:World,-Mercator-s-projection-?qvq=q:author%3D%22Society%20for%20the%20Diffusion%20of%20Useful%20Knowledge%20(Great%20Britain)%22;lc:RUMSEY~8~1&mi=8&trs=378.

Thornton, John, ed. *The English Pilot: The Third Book Describing the Sea-Coasts, Capes, Head-Lands, Streights, Soundings, ... The Islands, Bays, Roads, Harbours, and Ports in the Oriental Navigation. Shewing the Property and Nature of the Winds and Moussons [Sic] in Those Seas; ... With Many Other Things Necessary to Be*

Known. ... Divided into Three Parts. London: Printed for Thomas Page, and William and Fisher Mount, 1723. Folger Shakespeare Library.

Waghenaer, Lucas Janszoon. *Teerste Deel Vande Spieghel Der Zeevaerdt, Vande Navigatie Der Westersche Zee, Innehoudende Alle de Custen van Vranckrijck, Spaignen Ende 't Principaelste Deel van Engelandt, in Diversche Zee Caerten Begrepen. Leiden: Ghedruct tot Leyden: by Christoffel Plantijn, 1584.* Universiteitsbibliotheek Utrecht. http://objects.library.uu.nl/reader/index.php?obj=1874-210220&lan=en#page//97/59/68/97596862771362307101301317971743 4337.jpg/mode/1up.

Woodbridge, William C. *A System of Universal Geography: On the Principles of Comparison and Classification.* 2nd ed. Hartford, Connecticut: Oliver D. Cook & Co, 1827. Hathi Trust Digital Library. https://babel.hathitrust.org/cgi/pt?id=hvd.32044097022131;view=1up;seq=9.

———. "Inhabited World. - David Rumsey Historical Map Collection." Atlas Map, 1: 93,000,000. Hartford, Connecticut: Oliver D. Cook & Sons, 1824. David Rumsey Map Collection. https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~29536~1130580:Inhabited-World-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%275031.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=3&trs=11.

———. "Isothermal Chart. - David Rumsey Historical Map Collection." Atlas Map, 1: 95,000,000. Hartford, Connecticut: Oliver D. Cook & Sons, 1824. David Rumsey Map Collection. Https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~29543~1130587:Isothermal-chart-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%275031.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=10&trs=11. David Rumsey Map Collection. https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~29543~1130587:Isothermal-chart-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%275031.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=10&trs=11.

———. "School Atlas, Woodbridge's Rudiments of Geography. - David Rumsey Historical Map Collection." School Atlas. Hartford, Connecticut, 1824. Https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~29534~11305

89:Cover--School-atlas,-Woodbridge-s-r. David Rumsey Map Collection. https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~29534~1130589:Cover--School-atlas,-Woodbridge-s-r.

Wright, Edward. “A Plat of the World.” Engraving. London: Joseph Moxon, 1657. John Carter Brown Library.

———. “A True Hydrographical Description of so Much of the World as Hath Beene Hitherto Discouered, and Is Come to Our Knowledge.” Engraving. *The Principal Nauigations, Voiages, Traffiques and Discoueries of the English Nation, Made by Sea or Ouer-Land, to the Remote and Farthest Distant Quarters of the Earth, at Any Time within the Compasse of These 1500. Yeeres Deuided into Ree Seuerall Volumes, According to the Positions of the Regions, Whereunto They Were Directed…And Latly, the Memorable Defeate of the Spanish Huge Armada, Anno 1588. And the Famous Victories Atchieued at the Citie of Cadiz, 1596 Are Described by Richard Haklyut.* London: George Bishop, Ralph Newberie and Robert Barker, 1599. John Carter Brown Library., https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4344~102394:By-the-discouerie-of-Sr-Francis-Dra?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=q:publication_date%3D%221598%22;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=6&trs=9.

———. *Certaine Errors in Nauigation, Arising Either of the Ordinarie Erroneous Making or Vsing of the Sea Chart, Compasse, Crosse Staffe, and Tables of Declination of the Sunne, and Fixed Starres Detected and Corrected. London: Valentine Sims and W. White, 1599.* Early English Books Online. http://eebo.chadwyck.com/search/full_rec?SOURCE=pgthumbs.cfg&ACTION=ByID&ID=99837677&FILE=../session/1508339433_10560&SEARCHSCREEN=CITATIONS&SEARCHCONFIG=var_spell.cfg&DISPLAY=AUTHOR.

Secondary Sources

Akerman, James R. (ed.). *The Imperial Map: Cartography and the Mastery of Empire.* The Kenneth Nebenzahl, Jr., Lectures in the History of Cartography. Chicago, Illinois: University of Chicago Press, 2009.

Anderson, Benedict R. O’G. *Imagined Communities: Reflections on the Origin and Spread of Nationalism.* Revised edition. London; Verso, 2006.

Arrowsmith, John. “Review: The London Atlas of Universal Geography by John Arrowsmith.” *The Journal of the Royal Geographical Society of London* 4 (1834): 320.

Arrowsmith, John. “Preface to the London Atlas.” In *The London Atlas of Universal Geography, Exhibiting the Physical & Political Divisions of the Various Countries of the World, Constructed from Original Materials. Is Most Respectfully Dedicated to His Venerable Friend John Middleton Esqr. As a Testimony of Gratitude and Esteem, by His Much Obliged & Humble Servant, John Arrowsmith, F.R.G.S. & R.A.S. 35, Essex Street, Strand, London. London, Pubd. by J. Arrowsmith ... 1838.* London: John Arrowsmith, 1838. https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~33901~1170053?qvq=q%3AThe%20London%20Atlas%20of%20Universal%20Geography%3Bsort%3APub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No%3Blc%3ARUMSEY~8~1&mi=5&trs=298%20,%20(retrieved%20on%20October%2019,%202018).

Ash, Eric H. “Navigation Techniques and Practice in the Renaissance.” In *The History of Cartography, Vol. 3, Cartography in the European Renaissance.* Chicago, Illinois; London, UK: University of Chicago Press, 2007.

Ashmore, Bernie. “Arno Peters Changed the World! Development Education and the Peters’ Projection.” *The Cartographic Journal* 40, no. 1 (June 1, 2003): 57–59.

Austin, Robert. “Report by Assist. -Surveyor Robert Austin of an Expedition to Explore the Interior of Western Australia.” *The Journal of the Royal Geographical Society of London* 26 (1856): 235–74.

Bagrow, Leo. *History of Cartography*. 2nd ed. Chicago, Illinois: Precedent Publishing, Inc., 1985.

Battersby, Sarah E. “The Effect of Global-Scale Map-Projection Knowledge on Perceived Land Area.” Cartographica: *The International Journal for Geographic Information and Geovisualization* 44, no. 1 (2009): 33–44.

Battersby, Sarah E., Michael P. Finn, E. Lynn Usery, and Kristina H. Yamamoto. “Implications of Web Mercator and Its Use in Online Mapping.” *Cartographica: The International Journal for Geographic Information and Geovisualization* 49, no. 2 (2014): 85–101.

Battersby, Sarah E, and Daniel R Montello. “Area Estimation of World Regions and the Projection of the Global-Scale Cognitive Map.” *Annals of the Association of American Geographers* 99, no. 2 (2009): 273.

Beaglehole, J. C. *The Life of Captain James Cook*. Stanford, Calif.: Stanford University Press, 1974.

Belich, James. *Replenishing the Earth: The Settler Revolution and the Rise of the Anglo-World*, 1783-1939. Oxford, UK: Oxford University Press, 2009.

Benton, Lauren. *A Search for Sovereignty Law and Geography in European Empires, 1400-1900*. New York, New York: Cambridge University Press, 2010.

Black, Jeannette. "The Blathwayt Atlas: Maps Used by British Colonial Administrators in the Time of Charles II." *Imago Mundi* 22 (1968): 20–29.

Blake, John Lieutenant Commander. *The Sea Chart : The Illustrated History of Nautical Maps and Navigational Charts*. 2nd ed. London: Conway, 2016.

Black, Jeremy. "Government, State, and Cartography: Mapping, Power, and Politics in Europe, 1650–1800." *Cartographica: The International Journal for Geographic Information and Geovisualization* 43, no. 2 (2008): 95–105.

Boxer, C. R. *The Dutch Seaborne Empire, 1600-1800*. London: Hutchinson, 1965.

Brannon, Gary, and Less Harding. *Carto-Quotes: An Inspirational Companion for the Map-Maker and the Map-User*. Kitchener, Ontario: Upney Editions, 1996.

Broecke, Steven Vanden. "Dee, Mercator, and Louvain Instrument Making: An Undescribed Astrological Disc by Gerard Mercator (1551)." *Annals of Science* 58, no. 3 (2001): 219–40.

Brotton, Jerry. *A History of the World in 12 Maps*. New York, New York: Penguin Books, 2012.

Buisseret, David. *Monarchs, Ministers, and Maps: The Emergence of Cartography as a Tool of Government in Early Modern Europe*. Chicago, Illinois: University of Chicago Press, 1992.

———. *The Mapmakers Quest: Depicting New Worlds in Renaissance Europe*. Oxford, UK; New York, NY: Oxford University Press, 2003.

Cain, Mead T. "The Maps of the Society for the Diffusion of Useful Knowledge: A Publishing History." *Imago Mundi* 46 (1994): 151–67.

Calhoun, Daniel H. "Eyes for the Jacksonian World: William C. Woodbridge and Emma Willard." *Journal of the Early Republic* 4, no. 1 (1984): 1–26.

Campbell, John. *Map Use and Analysis*. Dubuque, IA: Wm. C. Brown, 1993.

Canada, Library and Archives. “The Mapmakers: An Essay in Four Parts,” June 10, 2015. http://www.bac-lac.gc.ca/eng/discover/exploration-settlement/pathfinders-passageways/Pages/mapmakers-essay.aspx.

Casale, Giancarlo. *The Ottoman Age of Exploration*. Oxford, UK; New York, NY: Oxford University Press, 2010.

Casti, Emanuela. *Reality as Representation: The Semiotics of Cartography and the Generation of Meaning*. Bergamo: Bergamo University Press: Edizioni Sestante, 2000.

Clulee, Nicholas H. *John Dee’s Natural Philosophy: Between Science and Religion*. London; New York: Routledge, 1988.

Cook, James, J. C Beaglehole, and R. A Skelton. *The Journals of Captain James Cook on His Voyages of Discovery*. Rochester, NY: Boydell Press, 1999.

Cosgrove, Denis. *Social Formation and Symbolic Landscape*. Totowa, New Jersey: Barnes & Noble Books, 1985.

Crampton, Jeremy W. “Reflections on Arno Peters (1916–2002).” *The Cartographic Journal* 40, no. 1 (June 1, 2003): 55–56.

———. *Mapping: A Critical Introduction to Cartography and GIS, Critical Introductions to Geography Series V. 11*. Chicester: John Wiley & Sons, Incorporated, 2010.

Crane, Nicholas. *Mercator: The Man Who Mapped the Planet*. New York, New York: Henry Holt and Company, 2003.

Cresswell, Tim. *Geographic Thought: A Critical Introduction. 1 online resource. vols. Critical Introductions to Geography*. Chichester, West Sussex, UK: Wiley-Blackwell, 2013.

Crosbie, Barry. “Ireland, Colonial Science, and the Geographical Construction of British Rule In India, c. 1820-1870.” *The Historical Journal* 52, no. 4 (2009): 963–87.

Delaney, John. “XYZ Contents.” First X, Then Y, Now Z : Landmark Thematic Maps, 2012. http://libweb5.princeton.edu/visual_materials/maps/websites/thematic-maps/contents.html.

Dwyer, Colin. “Boston Students Get A Glimpse of a Whole New World, With Different Maps.” NPR.org, October 25, 2018. https://www.npr.org/sections/thetwo-way/2017/03/21/520938221/boston-students-get-a-glimpse-of-a-whole-new-world-with-different-maps.

Eckert, Max, and W. Joerg. “On the Nature of Maps and Map Logic.” *Bulletin of the American Geographical Society* 40, no. 6 (1908): 344–51.

Edney, Matthew H. *Mapping an Empire: The Geographical Construction of British India, 1765-1843*. Chicago, Illinois: University of Chicago Press, 1997.

———. “Cartography, history of” In Gregory, D., Johnston, R., Pratt, G., Watts, M.J., and Whatmore, S. [Eds.] *The Dictionary of Human Geography*, 5th Edition (Hoboken: John Wiley & Sons, Incorporated, 2009): 69-72.

———. “Academic Cartography, Internal Map History, and the Critical Study of Mapping Processes.” *Imago Mundi* 66, no. sup1 (2014): 83–106.

———. “Putting ‘Cartography’ into the History of Cartography: Arthur H. Robinson, David Woodward, and the Creation of a Discipline.” *Cartographic Perspectives* 51 (2005): 14–29.

Goode, J Paul. “A New Method of Representing the Earth’s Surface.” *Journal of Geography* 4, no. 9 (1905): 369–73.

———. “The Map as a Record of Progress in Geography.” *Annals of the Association of American Geographers* 17, no. 1 (1927): 1–14.

ESRI. ArcGIS Desktop: Release 10. Redlands, California: Environmental Systems Research Institute, 2010.

ESRI. *Map Projections: Georeferencing Spatial Data*. Redlands, California: Environmental Systems Research Institute, Inc., 1994.

———. *Understanding Map Projections*. Redlands, California: Environmental Systems Research Institute, Inc., 2000.

Febvre, Lucien, and Henri-Jean Martin. *The Coming of the Book: The Impact of Printing, 1450-1800*. Third Edition. London: Verso, 2010.

Friendly, Michael, and Daniel J. Denis. “Milestones in the History of Thematic Cartography, Statistical Graphics, and Data Visualization,” 2001. http://datavis.ca/milestones/.

Goode, J Paul. *Goode's School Atlas Physical, Political and Economic for American Schools and Colleges*. Chicago, Illinois; New York, New York: Rand McNally & Company, 1925.

Greenhood, David. *Mapping*. Chicago, Illinois: University of Chicago Press, 1964.

Harley, J.B. "Preface." In *The History of Cartography, 1, Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean*. Chicago, Illinois; London, UK: University of Chicago Press, 1987: xv-xxi.

———. "The Map and the Development of the History of Cartography." In *The History of Cartography, 1, Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean.* Chicago, Illinois; London, UK: University of Chicago Press, 1987: 1-42.

———. *The New Nature of Maps*. Edited by Paul Laxton. Baltimore, Maryland: Johns Hopkins University Press, 2001.

Harley, J.B., and David Woodward, eds. *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean. Vol. The History of Cartography V.1.* Chicago, Illinois: University of Chicago Press, 1987.

Haas, William, and Harold Ward. "J. Paul Goode." *Annals of the Association of American Geographers* 23, no. 4 (December 1933): 241–46.

Herbert, Francis. "The Royal Geographical Society's Membership, the Map Trade, and Geographical Publishing in Britain 1830 to Ca 1930: An Introductory Essay with Listing of Some 250 Fellows in Related Professions." *Imago Mundi* 35 (1983): 67–95.

Herzog, Tamar. *Frontiers of Possession: Spain and Portugal in Europe and the Americas*. Cambridge, Massachusetts: Harvard University Press, 2015.

Hobbs, Richard R. *Marine Navigation: Piloting and Celestial and Electronic Navigation*. 4th edition. Annapolis, Md: Naval Institute Press, 1997.

Holdsworth, Deryck W. "The Counting-House Library: Creating Mercantile Knowledge in the Age of Sail." In *Geographies of the Book*. London, UK: Routledge, 2016.

Hopkins, Daniel. "Books, Geography and Denmark's Colonial Undertaking in West Africa, 1790-1850." In *Geographies of the Book*, 221–46. London, UK; New York, New York: Routledge, 2010.

Hornsby, Stephen, and Hope Stege. *Surveyors of Empire: Samuel Holland, J.W.F. Des Barres, and the Making of the Atlantic Neptune*. Carleton Library Series 221. Montréal: McGill-Queens University Press, 2011.

Jenny, Bernhard, and Tom Patterson. "Flex Projector." *Flex Projector,* 2018. http://www.flexprojector.com/.

Kaiser, Ward L., and Denis Wood. "Arno Peters—The Man, The Map, The Message." *The Cartographic Journal* 40, no. 1 (June 1, 2003): 53–54.

Karrow, Robert. "Centers of Map Publishing in Europe, 1472-1600." In *The History of Cartography, edited by David Woodward, Vol. 3, Cartography in the European Renaissance.* Chicago, Illinois; London, UK: University of Chicago Press, 2007.

Keighren, Innes M. *Bringing Geography to Book: Ellen Semple and the Reception of Geographical Knowledge*. London: I.B. Tauris, 2010.

Keighren, Innes M. "Geographies of the Book: Review and Prospect." *Geography Compass* 7, no. 11 (November 2013): 745–58.

Kimerling, A. Jon, Aileen R. Buckley, Phillip C. Muehrcke, and Juliana O. Muehrcke. *Map Use Reading and Analysis*. 6th ed. Redlands, California: Esri Pr, 2010.

King, P. P., P. Stokes, and R. Fitz-Roy. "Sketch of the Surveying Voyages of His Majesty's Ships Adventure and Beagle, 1825-1836." *The Journal of the Royal Geographical Society of London* 6 (1836): 311–43.

Knowles, Anne Kelly. "Historians and Cartography." In *History of Cartography, 6, Cartography in the Twentieth Century*. Chicago, Illinois; London, UK: University of Chicago Press, 2015: 597–601.

Koeman, Cornelis. "Atlas Cartography in the Low Countries in the Sixteenth, Seventeenth and Eighteenth Centuries." In *Images of the World: The Atlas Through History,* edited by John A. Wolter and Ronald E. Grim, 73–108. Washington, D.C.: Library of Congress, 1997.

Koot, Christian J. "The Merchant, the Map, and Empire: Augustine Herrman's Chesapeake and Interimperial Trade, 1644-73." *The William and Mary Quarterly* 67, no. 4 (2010): 603–44.

Leitão, Henrique, and Joaquim Alves Gaspar. "Globes, Rhumb Tables, and the Pre-History of the Mercator Projection." *Imago Mundi* 66, no. 2 (2014): 180–95.

Library of Congress., John Amadeus, and Wolter. *Images of the World: The Atlas through History*. New York: McGraw-Hill, 1997.

Livingstone, David N. *The Geographical Tradition: Episodes in the History of a Contested Enterprise*. Oxford, UK; Cambridge, USA: Blackwell, 1993.

Livingstone, David N, and Charles W. J Withers. *Geography and Revolution*. Chicago, Illinois: University of Chicago Press, 2005.

"Lonely Planet." West of Lenin. Accessed May 9, 2019. http://westoflenin.com/index.php?option=com_content&view=article&id=211:lonely-planet&utm_source=Lonely+planet+performance&utm_campaign=Lonely+Planet+Seattle&utm_medium=email.

MacEachern, Alan M. *How Maps Work: Representation, Visualization, and Design*. New York, New York: The Guilford Press, 1995.

———. *Some Truth With Maps: A Primer on Symbolization and Design*. 1st edition. Washington, D.C: Association of American Geographers, 1994.

Michaels, Lorne. "Weekend Update." Television. New York, New York: NBC, 2017.

Miller, O.M. "Notes on Cylindrical World Map Projections." *Geographical Review* 32, no. 3 (1942): 424–30.

Monmonier, Mark. *Rhumb Lines and Map Wars: A Social History of the Mercator Projection*. Chicago, Illinois: University of Chicago Press, 2004.

Monmonier, Mark. "Cartography: The Multidisciplinary Pluralism of Cartographic Art, Geospatial Technology, and Empirical Scholarship." *Progress in Human Geography* 31, no. 3 (June 2007): 371–79.

Mukerji, Chandra. *From Graven Images: Patterns of Modern Materialism*. New York, New York: Columbia University Press, 1983.

National Maritime Museum. "Charts and Maps Collections - National Maritime Museum." Accessed May 2, 2019. https://collections.rmg.co.uk/collections.html#!csearch;collectionReference=subject-90232;authority=subject-90232.

Office of Geomatics. “NGA Advisory Notice on ‘Web Mercator.’” National Geospatial-Intelligence Agency, October 1, 2014. http://earth-info.nga.mil/GandG/wgs84/web_mercator/index.html.

Ogborn, Miles, and Charles W. J Withers. “Introduction: Book Geography, Book History.” In *Geographies of the Book*, edited by Miles Ogborn and Charles W. J Withers. London, UK; New York, New York: Routledge, 2010.

Onge, Tim St. “Maps for the Masses: Geography in the Society for the Diffusion of Useful Knowledge | Worlds Revealed: Geography & Maps at The Library Of Congress.” Library of Congress, 2016. https://blogs.loc.gov/maps/2016/07/maps-for-the-masses-geography-in-the-society-for-the-diffusion-of-useful-knowledge/.

Parkes, Harry. “Geographical Notes on Siam, with a New Map of the Lower Part of the Menam River.” *The Journal of the Royal Geographical Society of London* 26 (1856): 71–78.

Parry, Glyn. “John Dee and the Elizabethan British Empire in Its European Context.” *The Historical Journal* 49, no. 3 (2006): 643–75.

Parry, J.H. *The Age of Reconnaissance*. London, UK: Weidenfeld and Nicholson, 1963.

———. *The Discovery of the Sea*. New York, New York: Dial Press, 1974.

Patterson, Tom, Bernhard Jenny, and Bojan Savric. “A Compromise Aspect-Adaptive Cylindrical Projection for World Maps.” *International Journal of Geographical Information Science* 29, no. 6 (2015): 935.

Patterson, Tom, Bojan Savric, and Bernhard Jenny. “Introducing the Patterson Cylindrical Projection.” *Cartographic Perspectives* 78 (2014): 77–81.

Patterson, Tom. “Patterson Cylindrical Projection.” *Shaded Relief*. Accessed October 25, 2018. http://shadedrelief.com/patterson/.

Patterson, Tom. “Equal Earth Projection.” Shaded Relief, January 24, 2019. http://shadedrelief.com/ee_proj/.

Patton, Jeffrey C. “The American School Atlas: 1784-1900.” *Cartographic Perspectives* 33 (1999): 4–32.

Peterson, Michael P. *Mapping in the Cloud*. New York, New York: The Guilford Press, 2014.

Preston, Diana, and Michael Preston. *A Pirate of Exquisite Mind: The Life of William Dampier: Explorer, Naturalist, and Buccaneer*. New York, New York: The Berkley Publishing Group, 2004.

Principe, Lawrence M. *The Scientific Revolution: A Very Short Introduction*. 1st edition. OUP Oxford, 2011.

Phillips, Eóin. "Astronomical Observations Made during Captain Cook's Last Voyage (RGO 14/61)," n.d. https://cudl.lib.cam.ac.uk/view/MS-RGO-00014-00061/5.

Prior, Amy Dawn. "British Mapping of Africa: Publishing Histories of Imperial Cartography, c.1880-C1915." Ph.D., The University of Edinburgh (United Kingdom), 2013.

Raisz, Erwin J. *Principles of Cartography*. First edition. McGraw-Hill, 1962.

Ramirez, Francisco O., and John Boli. "The Political Construction of Mass Schooling: European Origins and Worldwide Institutionalization." *Sociology of Education* 60, no. 1 (1987): 2–17.

Raper, Henry, and R. Fitz-Roy. "Hints to Travellers." *The Journal of the Royal Geographical Society of London* 24 (1854): 328–58.

Rink, H. "On the Large Continental Ice of Greenland, and the Origin of Icebergs in the Arctic Seas." *The Journal of the Royal Geographical Society of London* 6 (1836): 145–54.

Robinson, A. H., and Helen M. Wallis. "Humboldt's Map of Isothermal Lines: A Milestone in Thematic Cartography." *The Cartographic Journal* 4, no. 2 (1967): 119–23.

Robinson, Arthur Howard. *Early Thematic Mapping in the History of Cartography*. Chicago: University of Chicago Press, 1982.

Robinson, Arthur. "Arno Peters and His New Cartography." *The American Cartographer* 12, no. 2 (1985): 103–11.

———. "Rectangular World Maps - NO!" *The Professional Geographer* 42, no. 1 (1990): 101–4.

———. *Elements of Cartography*. 4th ed. New York: Wiley, 1995.

Robinson, Arthur, and Barbara Bartz Petchenik. *The Nature of Maps: Essays toward Understanding Maps and Mapping*. Chicago, Illinois: University of California Press, 1976.

Robinson, Arthur Howard, Helen Wallis, and International Cartographic Association. *Cartographical Innovations: An International Handbook of Mapping Terms to 1900.* Tring, Herts: Published by Map Collector Publications in association with the International Cartographic Association, 1987.

Sanderson, John. "Notes to Accompany Sketch-Maps of the Zulu and Amatonga Countries, and of the Country between Aliwal, North, and Natal." *The Journal of the Royal Geographical Society of London* 32 (1862): 335–39.

Šavrič, Bojan, Tom Patterson, and Bernhard Jenny. "The Equal Earth Map Projection." *International Journal of Geographical Information Science* 33, no. 3 (March 4, 2019): 454–65.

Schama, Simon. *The Embarrassment of Riches: An Interpretation of Dutch Culture in the Golden Age*. New York: Vintage Books, 1997.

Scharfe, Wolfgang. "Max Eckert's 'Kartenwissenschaft'. The Turning Point in German Cartography." *Imago Mundi* 38 (1986): 61–66.

Schilder, Gunter. "Lucas Janszoon Waghenaer's Nautical Atlases and Pilot Books." In *Images of the World: The Atlas Through History*. Washington, D.C.: Library of Congress, 1997.

Schilder, Gunter, and van Egmond Marco. "Maritime Cartography in the Low Countries during the Renaissance." In *The History of Cartography, Volume 3, Cartography in the European Renaissance, Part 2*, edited by David Woodward, 1409. Chicago, Illinois: University of Chicago Press, 2007.

Schulten, Susan. *The Geographical Imagination in America, 1880-1950*. Chicago: University of Chicago Press, 2001.

Schulten, Susan. "Thematic Cartography and Federal Science in Antebellum America." In *History of Cartography*, 37–56. Springer Berlin Heidelberg : Berlin, Heidelberg, 2012.

Schulten, Susan. *Mapping the Nation: History and Cartography in Nineteenth-Century America*. Chicago ; London: University of Chicago Press, 2012.

Schulten, Susan. “Alexander von Humboldt: Master of Infographics.” *Mapping the Nation: A Companion Site to Mapping the Nation by Susan Schulten*. Accessed November 26, 2018. http://www.mappingthenation.com/blog/alexander-von-humboldt-master-of-infographics/.

Seed, Patricia. *The Oxford Map Companion: One Hundred Sources in World History*. New York, New York; Oxford, UK: Oxford University Press, 2014.

Sharp, Walter L. “CJCSI 3900.01C Position (Point and Area) Reference Procedures.” Chairman of the Joint Chiefs of Staff, June 30, 2007.

———. “Position (Point and Area) Reference Procedures.” Chairman of the Joint Chiefs of Staff, 2007.

Sherman, William H. “Dee, John – Oxford Reference.” In *The Oxford Encyclopedia of Maritime History*, edited by John J. Hattendorf, 2007.

http://www.oxfordreference.com/view/10.1093/acref/9780195130751.001.0001/acref-9780195130751-e-0228?rskey=mzUQ3X&result=2.

Slocum, Terry A, Robert B. McMaster, Fritz C. Kessler, and Hugh H. Howard. *Thematic Cartography and Geographic Visualization*. Upper Saddle River, NJ: Pearson/Prentice Hall, 2005.

Smith, Catherine Delano. “Selected Papers from the 16th International Conference on the History of Cartography: Theoretical Aspects of the History of Cartography: Why Theory in the History of Cartography?” *Imago Mundi* 48, no. 1 (January 1996): 198–203.

Snyder, John P. *Flattening the Earth: Two Thousand Years of Map Projections*. Chicago, Illinois: University of Chicago Press, 1993.

Snyder, John Parr. *Map Projections--a Working Manual*. US Geological Survey Professional Paper 1395. Washington, D.C.: U.S Government Printing Office, 1987.

Sobel, Dava. *Longitude: The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time*. New York, New York: Walker & Co., 2005.

Stoddart, D. R. *On Geography and Its History*. New York: B. Blackwell, 1986.

Taylor, Andrew. *The World of Gerard Mercator: The Mapmaker Who Revolutionized Geography*. New York, New York: Walker & Co., 2004.

Taylor, E.G.R. *Late Tudor and Early Stuart Geography, 1583-1650*. New York, New York: Octagon Books, 1968.

———. *Tudor Geography, 1485-1583*. London, UK: Methuen & Co. LTD., 1930.

Thomas, Nicholas. *Cook: The Extraordinary Voyages of Captain James Cook*. New York: Walker & Co., 2003.

Thrower, Norman J. W. “EDMOND HALLEY AS A THEMATIC GEO-CARTOGRAPHER.” *Annals of the Association of American Geographers* 59, no. 4 (1969).

Thrower, Norman J. W. *Maps & civilization: cartography in culture and society*. Chicago, Illinois; London, UK: University of Chicago Press, 2008.

Thrower, Norman J.W. “Scientific Discovery and Cartography.” In *The History of Cartography, Cartography in the Twentieth Century*, edited by Mark Monmonier, 6:1389–94. Chicago, Illinois; London, UK: University of California Press, 2015.

Tobler, Waldo. “A CLASSIFICATION OF MAP PROJECTIONS.” *Annals of the Association of American Geographers* 52, no. 2 (1962): 167–75.

Unger, Richard W. “Dutch Nautical Sciences in the Golden Age: The Portuguese Influence.” *E-Journal of Portuguese History* 9, no. 2 (2011): 68–83.

Vujakovic, Peter. “Damn or Be Damned: Arno Peters and the Struggle for the ‘New Cartography.’” *The Cartographic Journal* 40, no. 1 (June 1, 2003): 61–67.

Wallis, Helen M. “Sixteenth-Century Maritime Manuscript Atlases for Special Presentation.” In *Images of the World: The Atlas Through History*, edited by John A. Wolter and Ronald E. Grim. Washington, D.C.: Library of Congress, 1997.

Waters, D.W. “Captain Edmond Halley, F.R.S., Royal Navy and the Practice of Navigation.” In *Standing on the Shoulders of Giants*, edited by Norman J. W Thrower, 171–202. Berkeley and Los Angeles, California; Oxford, England: University of California Press, 1990.

Withers, Charles W. J. “Geography, Science, and the Scientific Revolution.” In *Geography and Revolution*, edited by David N Livingstone and Charles W. J. Withers, 75–105. Chicago: University of Chicago Press, 2005.

Withers, Charles W. J. *Zero Degrees: Geographies of the Prime Meridian*. Cambridge, Massachusetts; London, England: Harvard University Press, 2017.

Wood, Denis. *The Power of Maps*. New York, New York: The Guilford Press, 1992.

Wright, David. “The Astronomy of Pepys’ Diary.” *Astronomy & Geophysics* 41, no. 4 (2000): 4.23-4.27.

Wright, John K. “Map Makers Are Human: Comments on the Subjective in Maps.” *Geographical Review* 32, no. 4 (1942): 527–44.

Yu, Jessica. “Somebody’s Going to Emergency, Somebody’s Going to Jail.” Television Show. NBC, 2001.

Zandvliet, Kees. *Mapping for Money: Maps, Plans, and Topographic Paintings and Their Role in Dutch Overseas Expansion during the 16th and 17th Centuries.* Amsterdam: Batavian Lion International, 1998.

APPENDIX A

DATA FOR THE STUDY

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Cosmographia Universalis et Exactissima Ivxta Postremem Neotericorvm Traditionem I. Francs. Camotius, S.D.P.	1569	Italy	Single Sheet	Map	Ptolemaic	Reference		John Carter Brown	
Chart of the Atlantic Ocean	1569	France	n/a	Chart	Mercator	Navigation		John Carter Brown	
Cosmographia Vniversalis Et Exactissima Ivxta Postremem Neotericorvm Traditionem Io. Francs. Camotius, S.D.P	1569	Italy	Single Sheet	Map	Oval	Reference		JCB	Accession Number: 06063; File Name: 06063-002; Call Number: B569 M491a; http://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4168~102233:-Chart-of-the-Atlantic-Ocean-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1569;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=1&trs=5
Typo de la carta cosmographica de Gaspar Vopellio Medeburgense	1570	Italy	Atlas	Map	Ptolemaic	Reference		JCB	Accession Number: 32642; File Name: 32642-000; Call Number: A5691.1; http://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~648~10019:Cosmographia-Vniversalis-Et-Exactis?sort=normalized_date%2Cfile_name%2Csour

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									ce_author%2Csource_title&qvq=w4s:/when%2F1569;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=4&trs=5
Typus orbis terrarum	1570	Low Countries	Atlas	Map	Ptolemaic	Reference		John Carter Brown	
Orbis tabula. Ben. Aria Montano. Auctore	1571	Low Countries	n/a	Map	Globular	Reference		John Carter Brown	
Carta marina et descriptio septentrionalium Terrarum	1572	Italy	Single Sheet	Map	Rectangular	Navigation		JCB	Accession Number: 01600; File Name: 01600-1; Call Number: Z 077 1570/2 Size; http://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~5495~115901105:Typus-orbis-terrarum?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1570;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=0&trs=10
Americae sive Novi Orbis, nova descriptio.	1574	France	Single Sheet	n/a	Globular	Reference		JCB	Accession Number: 07817; File Name 07817-1; Call Number: B570 G523c; http://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1934~106460003:Typo-de-la-carta-cosmographica-de-G?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1570;sort:normalized_date%2Cfile_name%2Csource_author%2Cso

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									urce_title;lc:JCBMAPS~1~1&mi=2&trs=10
Tiipus orbis Terrarum	1574	Low Countries	Atlas	n/a	Octant	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?q=pub_list_no%3D%2210000.000%22&sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&pgs=250&res=1
un disegno, ouero una particolar descrittione di tutte le nauigationi del Mondo nuouo	1574	Italy	Single Sheet	n/a	Mercator	Navigation		JCB	Accession Number: 08989; File Name: 08989-1; Call Number: FA572 B582B vol. 8http://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1155~115900891:-Orbis-tabula--Ben--Aria-Montano--A?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1571;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=0&trs=1
Carta cosmographica, con los nombres, propriedad, y virtud delos vientos	1575	Low Countries	Map	Cordi form	Reference		JCB	Accession Number: C-6102; File Name C-6102; Call number: Cabinet Le 572/1; http://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1178~104010002:-Carta-marina-et-descriptio-septent?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1572;sort:normalized_date%2Cfile_name%2Csource_author	

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
								%2Csource_title;lc:JCBMAPS~1~1&mi=0&trs=1	
Demarcacion y nauegaciones de Yndias	1575	Spain	n/a	Map	Mercator	Reference		JCB	Accession Number: 08720; File Name: 08720-024; Call Number Z Z1/6; http://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~6091~115902263:Americae-sive-Novi-Orbis,-nova-desc?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1574;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=0&trs=3
Descripcion de la Audiencia del Quito.	1575	Spain	Map	Map	n/a	Reference		JCB	Accession Number: 12370; File Name: 12370-2; Call Number Z H 619 1579http://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1553~101860003:Tiipus-orbis-Terrarum-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1574;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=1&trs=3
Descripcion de la Audiencia de Lima	1575	Spain	Map	Map	n/a	Reference		JCB	Accession Number: 32380; File Name: 32380; Call Number: Cabinet B574 FoP; http://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1117~102380001:----un-disegno,-ouero-una-particola?sort=normalized_

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1574;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=2&trs=3
Descripcion de la Audiencia de los Chárcas	1575	Spain	Map	Map	n/a	Reference		JCB	Accession Number: 4288, File Name: 4288-2; Call Number: J575 A64cB1; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~2007~107410005:Carta-cosmographica,-con-los-nombre?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=31&trs=32
Descripcion de Prouincia de Chile	1575	Spain	Map	Map	n/a	Reference		JCB	Accession Number: 17000; File Name: 1700-1; Call Number: Codex Sp 7/1 SIZE; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1100~102700001:-Demarcacion-y-nauegaciones-de-Yndi?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=18&trs=32

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Descripcion delas Yndias del Norte.	1575	Spain	Map	Map	n/a	Reference		JCB	Accession Number: 17000; File Name: 17000-10; Call Number: Codex Sp 7/1-SIZE; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1697~102710001:-Descripcion-de-la-Audiencia-del-Qu?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=19&trs=32
Descripcion dela Audiencia de la Española.	1575	Spain	Map	Map	n/a	Reference		JCB	Accession Number: 17000; File Name: 17000-11; Call Number: Codex Sp 7 /1-Size; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1698~102790003:-Descripcion-de-la-Audiencia-de-Lim?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=20&trs=32
Descripcion de la Audiencia de la Nueva España	1575	Spain	Map	Map	n/a	Reference		JCB	Accession Number: 17000; File Name: 17000-12; Call Number: Codex Sp 7/1 SIZE; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1699~102710002:-Descripcion-de-la-

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									Audiencia-de-los?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=21&trs=32
Descripcion de la Audiencia de la Nueva Galizia	1575	Spain	Map	Map	n/a	Reference		JCB	Accession Number: 17000; File Name: 17000-13; Call Number: Codex Sp 7/1-Size; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1700~102790004:-Descripcion-de-Prouincia-de-Chile-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=22&trs=32
Descripcion de la Audiencia de Guatimala	1575	Spain	Map	Map	n/a	Reference		JCB	Accession Number: 17000; File Name: 17000-2; Call Number: Codex Sp 7/1 Size; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1689~102700002:-Descripcion-delas-Yndias-del-Norte?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									Csource_title;lc:JCBMAPS~1~1&mi=23&trs=32
Descripcion de las Yndias del medio dia	1575	Spain	Map	Map	n/a	Reference		JCB	Accession Number: 17000; File Name: 17000-3; Call Number: Codex Sp 7/1 SIZE; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1690~102700003:-Descripcion-dela-Audiencia-de-la-E?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=24&trs=32
Descripcion de la Audiencia de Panamâ	1575	Spain	Map	Map	n/a	Reference		JCB	Accession Number: 17000; File Name: 17000-4; Call Number Codex Sp 7 / 1 SIZE ; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1691~102700004:-Descripcion-de-la-Audiencia-de-la-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=25&trs=32
Descripcion del Nuevo Reyno	1575	Spain	Map	Map	n/a	Reference		JCB	Accession Number: 17000; File Name: 17000-5; Call Number: Codex Sp 7/1 SIZE; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMA

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									PS~1~1~1692~102700005:-Descripcion-de-la-Audiencia-de-la-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=26&trs=32
La cosmographie vniuerselle d'André Theuet cosmographe du roy. Illustree de diverses figures des choses plus remarquables vevës par l'auteur, & incongneuës de nos anciens & modernes. Tome premier	1575	France	Atlas	Map	Ptolemaic	Reference		JCB	Accession Number: 17000; File Name: 17000-6; Call Number: Sp 7 /1 SIZE; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1693~102710003:-Descripcion-de-la-Audiencia-de-Gua?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=27&trs=32
A general map, made onelye for the particuler declaration of this discovery	1576	Britain	n/a	Map	Cordiform	Reference		JCB	Accession Number: 17000; File Name: 17000-7; Call Number: Codex Sp 7/1 Size; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1694~102710004:-Descripcion-de-las-Yndias-del-medi?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									Csource_title;lc:JCBMAPS~1~1&mi=28&trs=32
L'isole piu famose del mondo descritte da Thomaso Porcacchi da Castiglione arretino e intagliate da Girolamo Porro padouano con l'aggiunta di molte isole	1576	Italy	Atlas	n/a	n/a	Reference		JCB	Accession Number: 17000; File Name: 17000-8; Call Number: Codex Sp 7/1Size; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1695~102710005:-Descripcion-de-la-Audiencia-de-Pan?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=29&trs=32
[De chorographia] Pomponii Melæ De orbis situ, libri III. Et C. Iulii Solini, Polyhistor. : quorum ille descriptionem singularum orbis terreni partium atque regionum: Hic uero præter eadem, quæ ubiq[ue] memorabilia sint loca, animantia, ... compendiose enarrat. Authores ut politissimi, ita geographiæ studiosis utilissimi, in quorum gratiam	1576	Switzerland	Atlas	n/a	Ptolemaic	Reference		JCB	Accession Number: 17000; File Name: 17000-9; Call Number: Codex Sp 7/1SIZE; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1696~102790005:-Descripcion-del-Nuevo-Reyno--?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=30&trs=32

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Mela scholiis, uterq[ue] uerò tabulis elegantibus illustratus est, præfixo indice sufficienti									
Fr. Iunctini Florentini, sacrae theologiae doctoris, commentaria in tertium & quartum capitulum Sphaerae Io. de Sacro Bosco	1577	France	Atlas	n/a	Globular	Reference			
A true discourse of the late voyages of discouerie, for the finding of a passage to Cathaya, by the Northweast, vnder the conduct of Martin Frobisher generall: deuided into three bookes. : In the first wherof is shewed, his first voyage. Wherein also by the vvay is sette out a geographicall description of the worlde, and what partes thereof haue bin discouered by the	1578	Britain	n/a	n/a	Ptolemaic	Navigation		JCB	Accession Number: 07598; Call Number: E575 T418c; Call Number: E575 t418c; http://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4427~102525?qvq=w4s%3A%2Fwhen%2F1575%3Bsort%3Anormalized_date%2Cfile_name%2Csource_author%2Csource_title%3Blc%3AJCBMAPS~1~1&mi=1&trs=34

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
nauigations of the Englishmen									
Americae sive Novi Orbis, nova descriptio.	1579	France	Single Sheet	n/a	Globular	Reference		JCB	Accession Number: 07598; File Name: 07598-004; Call Number: E 575 T418c; http://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4430~102527:-Map-of-Asia-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=3&trs=34
Hispaniae Novae sivae Magnae recens et vera descriptio	1579	Low Countries	Atlas	n/a	n/a	Reference		JCB	Accession Number: 6009; File Name: 6009-3; Call NumberL Z 077 1598 1/3 SIZE (copy 2); https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1556~101900003:Hispaniae-novae-sivae-magnae,-recen?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1579;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=4&trs=5
Peruviae auriferae regionis typus. Didaco Mendezio Auctore	1579	Low Countries	Atlas	n/a	n/a	Reference		JCB	Accession Number: 08720; File Name: 08720-002; Call Number: Z Z1/6 3 SIZE; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~6043~115902085:Typus-Orbis-Terrarum?sort=normalized_

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1579;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=2&trs=5
Illustri viro, domino Philippo Sidnaeo Michael Lok civis Londinensis hanc chartam dedicabat	1582	Britain	n/a	n/a	Conical	Reference		JCB	Accession Number: 01804; File Name: 01804-002; Call Number: D582 H155d copy 1; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4222~102308:Illustri-viro,-domino-Philippo-Sidn?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1582;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=1&trs=9
Orbis Vniuersalis Descriptio	1582	Britain	n/a	n/a	Mercator	Navigation		JCB	Accession Number: 15228; File Name: 15228-1; Call Number: Cabinet A582 ThR; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1131~101820011:Orbis-Vniuersalis-Descriptio-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1582;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=8&trs=9
Diuers voyages touching the	1582	Britain	n/a	n/a	n/a	Navigation		JCB	Accession Number: 01804; File Name: 01804-001; Call

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
discouerie of America, and the ilands adiacent vnto the same, made first of all by our Englishmen, and afterward by the French-men and Britons and certaine notes of aduertisements for obseruations, necessarie for such as shall heereafter make the like attempt, with two mappes annexed heereunto for the plainer understanding of the whole matter.									Number: D582 H155d copy 1; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4221~102307:-Title-page-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1582;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=0&trs=9
Les Trois Mondes. Parle seigneur de la Popelliniere.	1582	France	n/a	n/a	n/a	Navigation		JCB	Accession Number: 0666; File Name: 0666-001; Call Number: E582 L315tol; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4256~102371:-Title-page-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1582;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=2&trs=9
[De Chorographia] Pomponii Melae De situ orbis libri	1582	France	n/a	n/a	Globular	Reference		JCB	Accession Number: 0666; File Name: 0666-002; Call Number E582 L315tol; https://jcb.lunaimaging.com

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
tres, ad multa noua, veteráque exemplaria emendati, per Eliam Vinetum Santonem. Secunda editio emendatior									/luna/servlet/detail/JCBMAPS~1~1~4257~102372:Les-Trois-Mondes?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1582;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=3&trs=9
Map illustrating the voyage of Christopher Columbus	1583	Italy	n/a	n/a	n/a	Reference		JCB	Accession Number: 06682; File Name: 066682-002; Call Number: A582 M517d2; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4074~102130:Vetus-orbisterrae-pictura--Nova-orb?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1582;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=5&trs=9
La navigation du roy d'Escosse Iaques cinquiesme du nom, autour de son royaume, & Isles Hebrides & Orchades, soubz la conduicte d'Alexandre Lyndsay excellent pilote escossois. Recueillie &	1583	France	Atlas	n/a	n/a	Navigation		JCB	Accession Number: 07598-003; http://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4428~102526:-Map-of-Madagascar-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=2&trs=34

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
redigee en forme de description hydrographique, & representée en carte marine, & routier ou pilotage ... par Nicolay d'Arfeville, seigneur dudict lieu et de Bel-air, daulphinois, premier cosmographe du roy									
Chronographia o reportorio de tiempos, el mas copioso y precisso, : que hasta ahora ha solido a luz. Compuesto por Hieronimo de Chaues	1584	Spain	n/a	n/a	Globular	Reference		JCB	Accession Number: 07598; File Name: 07598-013; Call Number: E575 T418c; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4439~102536:Ville-&-assiette-de-Napoli-de-Roman?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1575;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=12&trs=32
Westfalia Cum Dioecesi Bremensi Per Gerardum Mercatorem, Cum privilegio	1585	Germany	Atlas	n/a	n/a	Reference		JCB	Accession Number: C-7518; File Name: C-7518-000; Call Number: Cabinet Ld585 MeG 61;https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~3719~101856:Westfalia-Cum-Dioecesi-Bremensi-Per?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qv

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									q=w4s:/when%2F1585;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=0&trs=1
A true hydrographical description of so much of the world as hath beene hetherto discouered, and is come to our knowledge	1598	Britain	Single Sheet	n/a	Wright's Mercator	Navigation	discovered	JCB	Accession Number: 15229 File Name: 15229-002 Call Number: D598 P975n
By the discouerie of Sr Francis Drake made in the yeare 1577	1598	Britain	Single Sheet	n/a	Wright's Mercator	Navigation	discovery	JCB	Accession Number: 15229; File Name: 15229-003; Call Number D598 P975n
Geographisch Handtbuch ... Matthis Quaden ... Coln am Rein	1600	Germany	n/a	Map	Mercator	Navigation		JCB	Accession Number: 02128; File Name: 02128-1; Call Number: D576 G464d; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1244~103460002:A-general-map,-made-onelye-for-the-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1576;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=0&trs=81
Atlas minor Gerardi Mercatoris, a I. Hondio plurimis aeneis tabulis auctus et illustratus. Amsterodami	1607	Low Countries	n/a	Map	Globular	Reference		JCB	Accession Number: 1794; File Name: 1794-001; Call Number: H576 P933i; https://jcb.lunaimaging.com/luna/servlet/view/all/when/1576?sort=normalized_date%2Cfile_name%2Csource_

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Excusum in aedibus Iudoci Hondij, venunt etiam apud Corneliu Nicolai, item apud Ioannem Ianssoniu Arnhemi									author%2Csource_title&os=50
Theatro Del Mondo.	1608	Low Countries	n/a	Map	Oval	Reference		JCB	Accession Number: 13178; File Name: 13178-001; Call Number: A576 M517d; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4036~102087:-title-page-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1576;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=1&trs=81
Nova Totius Terrarum Orbis Geographica Ac Hydrographica Tabula a Pet. Kaerio	1631	Low Countries	Single Sheet	Map	Mercator	Reference		JCB	Accession Number: 94-01; File Name: 94-01-001; Call Number: A577 G537c; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4083~102161:-Title-page-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1577;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=0&trs=3
Nova totius terrarum orbis geographica ac	1638	n/a	Single Sheet	Map	Mercator	Reference		JCB	Accession Number: 02169; File Name: 02169-001; Call Number: D578 B561t;

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
hydrographic tabula									https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4247~102311?qvq=w4s%3A%2Fwhen%2F1578%3Bsort%3Anormalized_date%2Cfile_name%2Csource_author%2Csource_title%3Blc%3AJCBMAPS~1~1&mi=0&trs=3
Dell'arcano del mare	1646	Italy	Atlas	Chart	Mercator	Navigation		JCB	Accession Number: 08720; File Name: 08720-023; Call Number: Z Z1/6 3 SIZE; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~6090~115902264:Americae-sive-Novi-Orbis,-nova-desc?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1579;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=3&trs=5
A Plat of all the World. Projected according to the truest Rules Being far more exact then either the Plain-Card or the Maps of the World discribed in two Rounds…	1655	Britain	Single Sheet	n/a	Wright's Mercator	Navigation		JCB	Accession Number: 08569; File Name: 08569-032; Call Number: Z Z1 7/3-SIZE; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~6250~115902421:Hispaniae-Novae-sivae-Magnae-recens?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1579;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=0&trs=5

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
A plat of all the world	1657	n/a	Single Sheet	n/a	Mercator	Reference		JCB	Accession Number: 08569; File Name: 08569-033; Call Number Z Z1 7/ 3 SIZE; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~6251~115902420:Peruviae-auriferae-regionis-typus--?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1579;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=1&trs=5
De zee-atlas ofte water-waereld [cartographic material] : vertoonende alle de zee-kusten van het bekende deel des aerd-bodems seer dienstigh voor alle schippers en stuurlieden, mitsgaders koop-lieden om op 't kantoor gebruyckt te werden. Nieuwelijcks aldus uytgegeven	1659	Low Countries	Atlas	n/a	Mercator	Navigation		JCB	Accession Number: 6009; File Name: 6009-3; Call NumberL Z 077 1598 1/3 SIZE (copy 2); https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1556~101900003:Hispaniae-novae-sivae-magnae,-recen?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1579;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=4&trs=5
Atlas Maior Sive Cosmographia Blaviana, Qua Solvm, Salvm, Coelvm, Accvratissime Describvntvr.	1665	Low Countries	Atlas		Globular	Reference		JCB	Accession Number: 08720; File Name: 08720-002; Call Number: Z Z1/6 3 SIZE; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~6043~115902085:Typus-Orbis-

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									Terrarum?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1579;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=2&trs=5
Nova totius terrarum orbis geographica ac hydrographic tabula	1680	n/a	Single Sheet	Map	Mercator	Reference		JCB	Accession Number: 01804; File Name: 01804-002; Call Number: D582 H155d copy 1; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4222~102308:Illustri-viro,-domino-Philippo-Sidn?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1582;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=1&trs=9
To Capt. John Wood this Map of the World Drawn on Mercators Projections is humby Dedicated By Robt. Morden & Willm. Berry	1681	Britain	Single Sheet	Map	Mercator	Navigation		JCB	Accession Number: 15228; File Name: 15228-1; Call Number: Cabinet A582 ThR; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~1131~101820011:Orbis-Vniuersalis-Descriptio-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1582;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=8&trs=9

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
To Capt. John Wood this map of the world [cartographic material] / drawn according to Mercators projection is humbly dedicated by Robt. Morden & Willm. Berry	1688	Britain	Single Sheet	Map	Mercator	Navigation		JCB	Accession Number: 01804; File Name: 01804-001; Call Number: D582 H155d copy 1; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4221~102307:-Title-page-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1582;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=0&trs=9
Nouvelle metode, la geographie	1693	n/a	Atlas	n/a	Globular	Reference - Education	JCB	Accession Number: 0666; File Name: 0666-001; Call Number: E582 L315tol; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4256~102371:-Title-page-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1582;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=2&trs=9	
Mappe monde ou Carte marine universelle reduite, ou sont l'Asie, l'Afrique, l'Europe, l'Amerique septentrionale, l'Amerique meridionale	1695	France	Single Sheet	Map	Mercator	Navigation		JCB	Accession Number: 0666; File Name: 0666-002; Call Number E582 L315tol; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4257~102372:Les-Trois-Mondes?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1582

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=3&trs=9
Cartes et Tables de la Geographie Ancienne et Nouvelle ou Methode pour s'Instruire Avec facilite de la Geographie, et Connoistre des Empires, Monarchies, Royaumes, Estats, Republiques, et Peuples ... Par les Srs. Sanson, Geographes du Roy ... A Paris. Chez l'Autheur ... 1697.	1697	France	Atlas	Map	Globular	Reference		JCB	Accession Number: 06682; File Name: 066682-002; Call Number: A582 M517d2; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4074~102130:Vetus-orbisterrae-pictura--Nova-orb?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1582;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=5&trs=9
A new mapp of the world according to Mr. Edward Wright commonly called Mercator's projection [cartographic material] / by John Thornton at the signe of England, Scotland & Ireland in the Minories London ; Ia. Clark sculy	1700	Britain	Single Sheet	Map	Wright's Mercator	Navigation		JCB	Accession Number: 02279; File Name 02279-1; Call Number: H583 G188d; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~2249~111180002:-Map-illustrating-the-voyage-of-Chr?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1583;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=0&trs=3
A new sett of maps both of	1700	Britain	Atlas	Map	Globular	Reference - Education	new set of maps;	JCB	Accession Number: 31654; File Name: 31654-001; Call

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
antient and present geography : wherein not only the latitude and longitude of many places are corrected, according to the latest observations ; but also the most remarkable differences of antient and present geography may be quickly discern'd by a bare inspection or comparing of correspondent maps ; which seems to be the most natural and easy method to lead young students (for whose use the work is principally intended) unto a competent knowledge of the geographic science. Together with a geographical treatise particularly adapted to the							corrected; according to the latest observations		Number: E583 A685n; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4260~102377:-Title-page-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1583;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=1&trs=3

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
use and design of these maps.									
A chart of South America from the River Real to Cape Horn according to Mr Wright's projection called Mercator's chart	1702	Britain	Single Sheet	Chart	Wright's Mercator	Navigation		JCB	Accession Number: 12637; File Name: 12637-001; Call NumberL B584 C512c; https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~4177~102288:-Title-page-?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1584;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=0&trs=3
Atlas Curieux oder Neuer und Compendieuser Atlas : in welchem ausser den General-Land-Charten von America, Africa, Asia und Europa, und der in letzterem gelegenen Reichen und Landern, sehr viele Speciale von besondern Provincien und Territorien, sonderlich deren, die in letzteren Kriegen renommiert worden, enthalten sind.	1704	Germany	Atlas	Map	Globular; Polar; Mercator	Reference		JCB	Accession Number: C-7518; File Name: C-7518-000; Call Number: Cabinet Ld585 MeG 61;https://jcb.lunaimaging.com/luna/servlet/detail/JCBMAPS~1~1~3719~101856:Westfalia-Cum-Dioecesi-Bremensi-Per?sort=normalized_date%2Cfile_name%2Csource_author%2Csource_title&qvq=w4s:/when%2F1585;sort:normalized_date%2Cfile_name%2Csource_author%2Csource_title;lc:JCBMAPS~1~1&mi=0&trs=1

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
A new map of the world according to Wrights alias Mercators projection &c.	1706	Britain	Single Sheet	Map	Wright's Mercator	Reference		John Carter Brown	Accession Number: 15229 File Name: 15229-002 Call Number: D598 P975n
A New and Correct Mapp of the World according to M.r Edward Wright commonly called Mercator's Projection. With a view of the winds and variation by Sam I Thornton Hydrographer at the signe of England Scotland and Ireland in the Minories London	1708	Britain	Single Sheet	Map	Wright's Mercator	Thematic		John Carter Brown	Accession Number: 15229; File Name: 15229-003; Call Number D598 P975n
Atlas Nouveau Contenant Toutes Les Parties du Monde, ou Sont exactement Remarques Les Empires, Monarchies, Royaumes, Estats, Republiques & Peuples qui fy trouuent a present. Par le Sr. Sanson, Geographe ordinaire du Roy. Presente a Monseigeur le	1708	France	Atlas	Map	Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?search=Search&q=9690.000&QuickSearchA=QuickSearchA&sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&pgs=250&res=1

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Dauphin ... Hubert Jaillot Geographe du Roy. A Paris, Chez Hubert Jaillot									
A new map of the North Parts of America claimed by France under ye names of Louisiana, Mississippi, Canada and New France with ye adjoining territories of England and Spain…The projection of this map is call'd Mercator's And it is laid down according to the newest and most exact observations by H.Moll geographer. 1720	1709	Britain	Atlas	Map	Mercator	Reference	newest and most exact observations	David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?q=pub_list_no%3D%2211201.000%22&sort=pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no&pgs=250&res=1
A new and correct mapp of the world, according to Mr. Edward Wright commonly called Mercator's projection [cartographic material] : with a view of the winds and	1715	Britain	Single Sheet	Map	Wright's Mercator	Thematic	new and correct map	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~275521~90048991:-1--Typus-Orbis-Terrarum-?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:pub_list_no%3D%2210001.000%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
variation / by Saml. Thornton at the signe of England, Scotland & Ireland in the Minories, London									%2CSeries_No;lc:RUMSEY~8~1&mi=55&trs=469
A new General Chart for the West Indies of E. Wrights projection vut Mercators Chart	1716	n/a	Atlas	Chart	Wright's Mercator	Navigation		Osher Map Library	389
A New Map of the World according to Wrights alias Mercators Projection &c drawn from the Newest and the most Exact Observations together with a view of the General and Coasting Trade Winds, Monsoon or the Shifting Trade Winds with other Considerable Improvements &c. By Richd. Mount and Tho. Page on Great Tower Hill London.	1716	Britain	Single Sheet	Map	Mercator	Thematic	considerable improvements	Norman B Leventhal Map Center	Mapping Boston Collection
A new Generall Chart for the West Indies of E.	1716	Britain	Single Sheet	Chart	Mercator	Navigation	new general chart	John Carter Brown	Accession Number: 08109; File Name: 08109-1; Call

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Wright's projection vul. Mercators Chart									Number Z D848 1646/2-SIZE
Introduction a la geographie avec une description historique sur toutes les parties de la Terre	1717	France	Atlas	Map	Globular	Reference - Education	National Library of Australia	Bib ID: 3524344; Call Number: MAP RM 536	
A new & correct map of the whole world shewing ye situation of its principal parts viz the oceans, kingdoms, rivers, capes, ports, mountains, woods, trade-winds, monsoons, variation of ye compass, climats, &c. With the most remarkable tracks of the bold attempts which have been made to find out the North East & North West Passages by Herman Moll, geographers	1719	Britain	Single Sheet	Map	Mercator	Reference	most remarkable tracks of the bold attempts	National Library of Australia	Bib ID: 3523930; Call Number: MAP RM 531
Carte tres curieuse de la Mer du Sud, contenant des remarques nouvelles et tres utiles non seulement sur les	1719	Low Countries	Single Sheet	Map	Mercator	Navigation		National Library of Australia	Bib ID: 3707154; MAP RM 3939

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
ports et iles de cette mer									
A New & Correct Map of the Whole World Shewing ye Situation of its Principal Parts. Viz the Oceans, Kingdoms, Rivers, Capes, Ports, Mountains, Woods. Trade-Winds, Monsoons, Variation of ye Compass, Climats, & c. With the most Remarkable tracks of the bold attempts which have been made to find out the North East & North West passages. The projection of this Map is call'd Mercator's the Design is to make it useful both for Land and Sea. And it is laid down with all possible Care, According to the Newest and Most Exact Observations by Herman Moll	1719	Britain	Atlas	Map	Mercator	Thematic	most remarkable tracks of the bold attempts; all possible care; according to the newest and most exact observations	John Carter Brown	Accession Number: 13794; File Name: 13794-2; Call Number D657 W948c

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
geographer. 1719.									
Atlas methodicus explorandis juvenum profectibus in studio geographico ad methodum Hubnerianam accomodatus	1719	Germany	Atlas	n/a	Globular	Reference - Education	Norman B Leventhal Map Center	Mapping Boston Collection	
A new map of the north parts of America claimed by France under ye names of Louisiana, Mississipi, Canada, and New France with ye adjoining territories of England and Spain	1720	n/a	Single Sheet	Map	Mercator	Reference		National Library of Australia	Bib ID: 304419; Call Number: MAP Ra 10 Held in Manuscripts Strong Room
A General Chart of the Sea Coast of Europe, Africa and America. According to E. Wrights or Mercator's Projection By H. Moll, Geographer	1720	Britain	Single Sheet	Chart	Wright's Mercator	Navigation		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~277666~90050681:Nova-Et-Accvratissima-Totius-Terrar?sort=SortID%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:pub_list_no%3D%2210017.000%22;sort:SortID%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=602&trs=663
A Mapp of the Known World, According to Mercator's Projection, with a	1722	Britain	Single Sheet	Chart	Mercator	Reference		Norman B Leventhal Map Center	Call Number: G3200 1680.P5x

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
New Scale to Measure Distances thereon									
Atlas Novus sive Tabulae Geographicae Totius Orbis Faciem, Partes, Imperia, Regna et Provincias Exhibentes Exactissima Cura Juxta Recentissimas Observation Aeri Incisae et Venum Expositae a Matthaeo Seutter Chalcogr. Augustae Vindelicorum.	1730	Germany	Atlas	n/a	Globular	Reference		Osher Map Library	49900
Atlas de Geographie	1731	France	Atlas	Map	Globular	Reference		National Library of Australia	Bib ID: 3308160; Call Number: MAP RM 89
A new map of the world according to Wrights alias Mercators projection &c. [cartographic material] : drawn from the newest and the most exact observations together with a view of the general and coasting trade winds, monsoons or the shifting	1732	Britain	Single Sheet	Map	Wright's Mercator	Thematic	Newest; exact observations	National Library of Australia	Bib ID: 2316027; MAP RM: 3086

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
trade winds with other considerable improvements &c. by Ier: Seller and Cha: Price Hydrographers to the Queen at the Hermitage staires and at their shopp nex't the Fleece Taverne in Cornhill / H: Moll fecit									
The World Described; or, A New and Correct Sett of Maps	1732	Britain	Atlas	Map	Mercator and Globular	Reference	new and correct	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~280870~90053708:World-Map-or-Description-of-Terrest?sort=pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no&qvq=q:pub_list_no%3D%229741.000%22;sort:pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no;lc:RUMSEY~8~1&mi=115&trs=350
Atlas de Poche, a l'Usage des Voyageurs et des Officiers. Avec un Traite de la Sphere, de la Geographie, & de l'Hydrographie. A Amsterdam. Chez Henri du Sauzet, M.DCC.XXXIV. Profiles ou Vues des Principales	1734	Low Countries	Atlas	Map	Globular	Navigation		National Library of Australia	Bib ID: 3308428; MAP RM 90

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Villes de l'Europe, &c. A Amsterdam. Chez Henri du Sauzet, M.DCC.XXXIX									
Atlas minor	1736	Britain	Atlas	Map	Globular	Thematic		John Carter Brown	Accession Number: C-7302; File Name: C-7301-000; Call Number G702 MoR
A new generall chart for the West Indies of E. Wrights projection vul. Mercators chart	1737	Britain	Single Sheet	Chart	Wright's Mercator	Navigation		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~283801~90056436:Carta-Hydrographica-oder-Algemeine-?sort=pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no&qvq=q:pub_list_no%3D%2211170.000%22;sort:pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no;lc:RUMSEY~8~1&mi=8&trs=107
A New Map, or (illegible) in Mercator's Projection, of the Western or Atlantic Ocean, with part of Europe, Africa and America 1739	1739	n/a	Single Sheet	Map	Mercator	Reference		Norman B Leventhal Map Center	Call Number: G1015.C65 1630
Descripcion de las costas de tierra firme de la America Septentrional--por el theniente de fragata y piloto de la Real Armada Dn.	1740	n/a	Single Sheet	n/a	Mercator	Navigation		Osher Map Library	580

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Antonio de Matos año de 1740									
Atlas nouveau	1742	Low Countries	Atlas	Map	Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~284557~90056993:Mappe-Monde-Geo-Hydrographique-?sort=pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no&qvq=q:pub_list_no%3D%2212178.000%22;sort:pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no;lc:RUMSEY~8~1&mi=21&trs=220
A new and correct mapp of the world according to Mr. Edward Wright commonly called Mercators Projection with a view of the winds and variations	1743	Britain	Single Sheet	Map	Mercator	Thematic		Osher Map Library	4244
Atlas Minor	1744	Germany	Atlas	n/a	Globular	Reference		National Library of Australia	Bib ID: 4838651; MAP RM 4430
A complete system of geography	1747	Britain	Atlas	Chart	Mercator	Reference	new and accurate	Osher Map Library	7390
Essay d'une carte réduite contenant les parties connuées du globe terrestre, dedié a M le Comte de Maurepas, Commandeur des Ordres du Roy	1748	n/a	Atlas	Map	Mercator	Thematic		Osher Map Library	600

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Ministre et Secretaire d'Etat / par N. Bellin, Ingénieur ordinre. de la Marine									
A New & Correct Chart of all the Known World Laid down according to Mercator's Projection. Exhibiting all the late Discoveries & Improvements: The whole being Collected from the most Authentic Journals, Charts &c. By Eman. Bowen	1748	Britain	Single Sheet	Chart	Mercator	Reference	late discoveries and improvements; collected from the most authentic journals	John Carter Brown	Accession Number: 16803; File Name: 16803-000; Call Number Cabinet A719/1
Atlas ou Recueil de Cartes Geographiques Dressees Sur les Nouvelles Observations de Mrs. de L'Academie Royale des Sciences Par N. de Fer, Geographe de sa Majeste Catolique et de Monseigneur le Dauphin. A Paris chez l'Auteur dans l'Isle du Palais sur le	1748	France	Atlas	Map	Globular	Reference - Education	Norman B Leventhal Map Center	Call Number: G1015.M65 1709	

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Quay de l'Orloge a la Sphere Royal, avec privilege du Roy 1709									
A new & correct chart of the Indian Sea from Cabo Bonea Esperanca to Japan according to Mr. Edward Wrights projection vulgarly called Mercators chart [cartographic material]	1750	Britain	Single Sheet	Map	Mercator	Navigation	new and correct	Norman B Leventhal Map Center	Mapping Boston Collection
Composite Seutter Atlas	1755	Germany	Atlas	n/a	n/a	Reference		Osher Map Library	4244
Accuratissima totius terrarum orbis tabula nautica [cartographic material] : indice variationes magneticas denotante ad observationes circiter annu 1756 / celeberrimo viro, Edmd. Halley, LLD., anno 1700, constructa ; habitas, renovata, Gulielmo Mountaine et Jacobo Dodson, R.S. Sociis = A	1756	Britain	Single Sheet	Map	Mercator	Thematic	correct chart	Norman B Leventhal Map Center	Call Number: G1015.M65 1709

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
correct chart of the terraqueous globe, according to Mercator's, or more properly Wright's projection : on which are describ'd lines, shewing the variation of the magnetic needle, according to observations made about the year 1756									
Atlas universel	1757	France	Atlas	n/a	Globular	Reference		Osher Map Library	11806
A New and Generall Chart for the West Indies of E. Wright's Projection vut Mercator's chart. Sold by W. andI Mount and T. Page on Tower Hill London	1761	Britain	Single Sheet	Chart	Mercator	Navigation	new	Osher Map Library	37358
Le Petit Atlas Maritime Recueil De Cartes et Plans Des Quatre Parties Du Monde. en Cinq Volumes. I. Volume. Amerique Septentrionale et Isles Antilles. II. Volume. Amerique Meridionale.	1764	France	Atlas	Chart	Mercator	Navigation		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~283522~90056098:Diversi-Globi-Terr-Aquei-Statione-V?sort=pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no&qvq=q:pub_list_no%3D%2212041.000%22;sort:pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no;lc:RUMSEY~8~1&mi=13&trs=114

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Mexique, Terra-Ferme, Bresil, Perou, Chily. III. Volume. Asia et Afrique. IV. Et V. Volumes. Europe et les Etats Qu'elle contient									
L'Hydrographie Francoise Recueil des Cartes Generales et Particulieres qui ont ete Faites pour le Service des Vaisseaux du Roy. Par ordre des Ministres de la Marine depuis 1737. jusqu'en 1765. Par le S. Bellin Ingenieur de la Marine et du Depost des Cartes, Plans et Journaux de la Marine, Censeur Royal, de l'Academie de Marine et de la Societe Royale de Londres. Premiere Partie Contenant Les Cartes Marines pour l'Europe et l'Asie. Seconde Partie Contenant Les Cartes Marines pour l’Afrique et	1765	France	Atlas	Chart	Mercator	Navigation		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~2832~290019:Mappe-monde-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274764.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=2&trs=105

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
l'Amérique. A Paris chez M. Bellin, rue du Doyennen pres St. Louis du Louvre									
A new map of the world on Mercators projection [cartographic material] / Prinald sculp	1766	n/a	n/a	Map	Mercator	Reference	new	National Library of Australia	Bib ID: 3988791; MAP RM 4030
A new & correct chart of all the known world [cartographic material] : laid down according to Mercator's projection, exhibiting all the late discoveries & improvements / the whole being collected from the most authentic journals charts &c by Emanl. Bowen	1767	Britain	Single Sheet	Chart	Mercator	Navigation	new; discoveries; improvements	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~277413~90050454:A-New-&-Correct-Map-of-the-Whole-Wo?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:pub_list_no%3D%229729.000%22;sort:Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=4&trs=32
Atlas general	1771	France	Atlas	Map	Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~283984~90056325:Mappe-Monde-ou-Carte-Generale-du-Gl?sort=pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no&qvq=q:pub_list_no%3D%2212062.000%22;sort:pub_list_no%2Cpub_list_no%2Cseries_no%2Cs

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									eries_no;lc:RUMSEY~8~1 &mi=23&trs=96
Geographical exercises; calculated to facilitate the study of geography	1777	Britain	Atlas	Chart	1 Mercator; 1 Globular; 1 Polar	Reference - Education	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~3713~430044:A-new-map-of-the-whole-world-with-t?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%275580.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=2&trs=64	
Planisphere suivant la projection de Mercator	1780	France	Single Sheet	Map	Mercator	Reference		Norman B Leventhal Map Center	Call Number: G1106.P5.E54 1737
A new map or chart in Mercators projection, of the Western or Atlantic Ocean, with part of Europe, Africa and America	1781	n/a	Single Sheet	Map	Mercator	Navigation	new	Osher Map Library	642
Atlas des enfans, ou nouvelle methode pour apprendre la geographie, avec un nouveau traite de la Sphere, et XXIV cartes enluminees. Nouvelle edition, corrigee & augmentee	1784	France	Atlas	Map	Globular	Reference - Education	John Carter Brown	Accession Number: 35136; File Name: 35136-000; Call Number Cabinet B740/1 Ms OVERSIZE	
A chart of the world according to Mercators	1785	Britain	Single Sheet	Chart	Mercator	Reference	latest discoveries	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~31159~1150188

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
projection shewing the latest discoveries of Capt. Cook									:Mappemonde-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274638.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=27&trs=145
Geographie moderne avec une introduction	1787	France	Atlas	Map	Globular	Reference		National Library of Australia	Bib ID: 1785823; MAP RM 2968
Chart of the world on Mercator's projection	1790	Britain	Atlas	Chart	Mercator	Navigation	most recent and authentic sources	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~269322~90043382:Planisphaerium-coeleste--A-C--Seutt?sort=pub_date%2Cpub_list_no%2Cseries_no%2Cseries_no&qvq=q:pub_list_no%3D%228270.000%22;sort:pub_date%2Cpub_list_no%2Cseries_no%2Cseries_no;lc:RUMSEY~8~1&mi=4&trs=63
A general atlas, describing the whole universe	1790	Britain	Atlas	Map	Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~2551~270003:Chart-of-the-World-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%273733.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=4&trs=73
A Mercators chart	1791	America	Single Sheet	Chart	Mercator	Reference		National Library of Australia	Bib ID: 6421068
Atlas moderne	1791	France	Atlas	Map	Globular	Reference		Osher Map Library	1900
A chart on Mercator's projection [cartographic	1793	Britain	Atlas	Chart	Mercator	Navigation		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~279501~90052595:Introduction-a-la-

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
material] : containing the track and soundings of the Lion, the Hindostan and tenders, from Turon-Bay in Cochin-China to the mouth of the Pie-ho River in the Gulph of Pe-tche-lee or Pekin / by J. Barrow ; engraved by B. Baker, Islington									Geographie-De-La-?sort=pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no&qvq=q:pub_list_no%3D%2210022.000%22;sort:pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no;lc:RUMSEY~8~1&mi=4&trs=107
A new chart of the world on Wright's or Mercator's projection [cartographic material] : in which are exhibited all the parts hitherto explored or discovered with the tracks of the British circumnavigators Byron, Wallis, Carteret and Cook, &c	1794	Britain	Atlas	Chart	Wright's Mercator	Reference	new; explored or discovered	National Library of Australia	MAP T 916; Bib ID 1188352
A general chart, on Mercator's projection, to shew the track of the Lion and Hindostan from England to the Gulph of Pekin	1796	Britain	Single Sheet	Chart	Mercator	Reference	used as a political document	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~282913~90055926:1--Germaniam-?sort=pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no&qvq=q:pub_list_no%3D"12040.000";sort:pub

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
in China, and of their return to England [cartographic material] : with the daily statement of the barometer and thermometer as observed at noon: containing also the limits of the Chinese Empire as extended by the conquests of the present Emperor Tchien-Lung / B. Baker sculpt. ; J. Barrow delt									_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no;lc:RUMSEY~8~1&mi=5&trs=121
Carey's general atlas	1796	America	Atlas	Map	Globular; Mercator	Reference		National Library of Australia	Bib ID: 4702044
A chart of the world on Wright's or Mercator's projection, exhibiting the whole of the discoveries of Cook, Byron, Bougainville, Cartaret, Wallis and other circumnavigators with the tracks of Captain Cook ; also that of the late Lord Mulgrave towards the North Pole	1797	Britain	Single Sheet	Chart	Mercator	Reference	discoveries	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~3904~480106:Orbis-Vetus-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%273353.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=5&trs=114

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
[cartographic material] / by R. Rowe									
A General Chart of the World on Mercator's Projection, exhibiting all the New discoveries and the Tracks of the Different Great Navigators	1797	n/a	Single Sheet	Chart	Mercator	Reference	new discoveries	Osher Map Library	733
A new chart of the world on Wright's or Mercator's projection [cartographic material] : in which are exhibited all the parts hitherto explored or discovered with the tracks of the British circumnavigators Byron, Wallis, Carteret and Cook, &c. and the track of La Perouse in the Pacific Ocean	1799	Britain	Single Sheet	Chart	Mercator	Reference	new; explored or discovered	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~232594~5509294:Carte-Reduite-Du-Globe-Terrestre?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:6903.000;sort:Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=8&trs=619
A new chart of the world on Wright's or Mercator's projection in which are exhibited... tracks ... Byron, Wallis, Carteret	1800	Britain	Single Sheet	Map	Mercator	Reference	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~284068~90056575:Carte-Reduite-des-Parties-Connues-d?sort=pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no&qvq=q:pub_list_no%3D%2212059.000%22;

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
and Cook ... La Perouse [cartographic material]									sort:pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no;lc:RUMSEY~8~1&mi=8&trs=132
A chart of the world, according to Mercators projection, shewing the latest discoveries	1800	n/a	Single Sheet	Chart	Mercator	Reference	latest discoveries	National Library of Australia	Bib ID: 1773664; MAP RM 2929
Petit atlas moderne ou collection de cartes elementaires dedie a la jeunesse	1800	France	Atlas	Map	Globular	Reference - Education	National Library of Australia	Bib ID: 1686965; MAP RM 2758	
Chart of the world on Mercator's projection [cartographic material] : showing the direction of the ocean currents, with the routes and distances between the principal parts / by Keith Johnston	1800	Britain	Atlas	Chart	Mercator	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~24624~410001:Hemisphere-Occidental-ou-du-Nouveau?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272603.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=2&trs=50
Bowles's new four-sheet map of the world on Mercator's projection, exhibiting the several quarters of the globe divided into their respective	1800	Britain	Single Sheet	Map	Mercator	Reference	new; latest treaties; new discoveries and most interesting tracks	National Library of Australia	Bib ID: 216872; MAP RM 2395

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
empires, kingdoms, states, &c., agreeable to the latest treaties and political regulations now existing [cartographic material] : together with all the new discoveries and most interesting tracks of those eminent circumnavigators, Cook, Byron, Bougainville, Perouse, Vancouver &c									
A new chart of the world, on Mercator's projection [cartographic material] : exhibiting the tracks & discoveries of the most eminent navigators to the present period	1801	Britain	Atlas	Chart	Mercator	Reference	new; tracks and discoveries, most eminent navigators	Norman B Leventhal Map Center	Call Number: G9110 1781.N49
Chart of the World according to Mercators projection [cartographic material] / showing the tracks & discoveries of Capt Cook	1801	Britain	Single Sheet	Chart	Mercator	Reference		National Library of Australia	Bib ID: 1350687MAP RM 2819

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Russell Junior Sculpt									
Map of the world on Mercators projection	1802	Britain	Single Sheet	Map	Mercator	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~29416~1130458:La-Terre-en-generale-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274757.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=11&trs=72
General chart on Mercator's projection	1802	Britain	Atlas	Chart	Mercator	Reference		National Library of Australia	Bib ID: 367300; MAP T 1605
A new universal atlas, exhibiting all the empires, kingdoms, states, republics, &c. &c. in the whole World; being a complete collection of the most approved maps extant; corrected with the greatest care, and augmented from the last edition of D'Anville and Robert (de Vaugondy) with many improvements by Major James Rennel, and other eminent geographers, including all the	1802	Britain	Atlas	Chart	2 Mercator; 2 Globular	Reference	most approved maps; corrected with the greatest care; eminent geographers, new discoveries	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~3626~420001:A-general-map-of-the-world-or-terra?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270411.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=2&trs=49

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
tracks and new discoveries of the British circumnavigators , Biron, Wallis, Carteret, Captain James Cook, Vancouver, Perouse, &c. &c. 6th Ed. ... London, R. Laurie & J. Whittle									
World map in Mercator's projection	1803	Turkey	Single Sheet	Map	Mercator	Reference		Norman B Leventhal Map Center	Call Number: G3200 1791.S2
Atlas des ganzen Erdkreises nach den besten astronomischen Bestimmungen neusten Entdeckungen und eigenen Untersuchungen in der Central-Projection	1803	Germany	Atlas	n/a	n/a	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?q=Pub_List_No%3D%272612.000%27%22+LIMIT%3ARUMSEY~8~1&sort=Pub_List_No_InitialSort%2CPub_Date&os=0
A new and elegant general atlas	1804	America	Atlas	n/a	1 Mercator; 1 Globular	Reference	new; elegant	National Library of Australia	BIB ID 3772824; MAP RM 3964
A general and classical atlas	1804	Britain	Atlas	n/a	2 Globular	Reference - Education	National Library of Australia	Bib ID: 2140784; MAP RM 2188	
A new and accurate chart of the world according to Mercators projections	1808	Britain	Atlas	Chart	Mercator	Reference	new and accurate	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~23886~860052:A-Chart-of-the-World-According-to-M?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272862.000%27%22%2B;sort:P

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									ub_List_No_InitialSort%2 CPub_Date;lc:RUMSEY~8 ~1&mi=3&trs=47
Werldskarta / af G.F. Billberg enligt Bowles's New four sheet map of the world ; med tillägg grav. af P.A	1808	Sweden	Single Sheet	Map	Mercator	Navigation		National Library of Australia	Bib ID: 3288311; MAP RM 42
Cary's new universal atlas	1808	Britain	Atlas	New Chart	1 Mercator; 2 Globular	Reference		Osher Map Library	43673
Pacific Ocean on Mercator's projection	1809	Britain	Single Sheet	n/a	Mercator	Reference		National Library of Australia	Bib ID: 586690; MAP RM 3488
A chart of the world on Mercators projection with the tracks of the more distinguished modern navigators ... [cartographic material] / John Purdy	1810	Britain	Single Sheet	Chart	Mercator	Reference	distinguished modern navigators	National Library of Australia	Bib ID: 1694941; MAP RM 3074
A general atlas done by Frances Bowen under the care of her sister Eliza in the year 1810	1810	n/a	Atlas	Map	Mercator	Reference - Education	Norman B Leventhal Map Center	Call Number: G1015.C3 1800x	
A new chart of the world, on Mercator's projection : exhibiting the tracks & discoveries of the most eminent navigators, to the	1811	Britain	Single Sheet	Chart	Mercator	Reference	new; discoveries; most eminent navigators	National Library of Australia	Bib ID: 3125013

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
present period / by John Cary, engraver									
Hydrographical chart of the world [cartographic material] : according to Wrights, or Mercators projection / delineated by A. Arrowsmith ; engraved by Edw'd Jones	1811	Britain	Single Sheet	Chart	Mercator	Navigation		National Library of Australia	Bib ID: 505279; MAP RM 2961
General atlas	1811	Britain	Atlas	Chart	1 Mercator; 2 Globular; 2 Azimuthal	Reference		National Library of Australia	Bib ID: 2909346; MAP RM 3207
Carey's general atlas	1811	America	Atlas	Chart	1 Mercator; 1 Globular	Reference		National Library of Australia	Bib ID: 117534; MAP RM 2339
The world on Mercators projection [cartographic material] : eastern part / drawn under the direction of Mr. Pinkerton by L. Hebert ; Neele sculpt, 352 Strand	1812	Britain	Single Sheet	n/a	Mercator	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~31507~1151089:World-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272310.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=2&trs=93
A new and elegant general atlas	1812	America	Atlas	n/a	1 Mercator; 1 Globular	Reference		National Library of Australia	MAP RM 3871
Atlas Complet Du Precis De La Geographie Universelle De M. Malte-Brun; Dresse	1812	France	Atlas	Map	1 Mercator; 2 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~33848~1171564:Title-Page--Atlas-des-ganzen-Erdkre?sort=Pub_List_No_

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Conformement Au Texte De Cet Ouvrage Et Sous Les Yeux De L'Auteur, Par M. Lapie, Capitaine Ingenieur Geographe. (Cet Atlas est forme de 75 Cartes.) A Paris, Chez Francois Buisson, Libraire-Editeur, Rue Gilles-Coeur, No. 10.									InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%275762.000%2B%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=1&trs=8
Union atlas, containing new and improved maps of all the empires, kingdoms, & states, in the known world	1813	Britain	Atlas	Chart	1 Mercator; 2 Globular	Thematic	new and improved	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~31602~1150078:World-Mercator-s-projection-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272436.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=4&trs=66
The world on Mercators projection [cartographic material] : drawn & engraved for Dr. Playfair's atlas	1814	Britain	Atlas	n/a	Mercator	Reference		National Library of Australia	Bib ID: 3581522
Atlas to the Ancient geography by M. D'Anville	1814	America	Atlas	n/a	Ptolemaic	Reference		National Library of Australia	Bib ID: 6297540

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Carey's general atlas, improved and enlarged	1814	America	Atlas	Chart	1 Mercator; 1 Globular	Reference	improved; enlarged	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~21496~630110:World-On-Mercator-s-Projection-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%271657.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=5&trs=66
A New General Atlas, Ancient and Modern	1814	Britain	Atlas	n/a	2 Globular	Reference		National Library of Australia	Bib ID: 3536817; MAP RM 563
A New Juvenile Atlas, And Familiar Introduction To The Use Of Maps: With A Comprehensive View Of The Present State Of The Earth	1814	America	Atlas	n/a	Mercator	Reference - Education	National Library of Australia	Bib ID: 1253213; MAP NK 10628	
East India islands on Mercator's projection	1814	Britain	Atlas	none	Mercator	Reference		National Library of Australia	Bib ID: 7384788; MAP RM 4922
A chart of the world on Mercator's projection, with the tracks of the more distinguished modern navigators, &c [cartographic material] : regulated throughout according to the	1815	Britain	Single Sheet	Chart	Mercator	Reference	distinguished modern navigators; best scientific determinations	National Library of Australia	Bib ID: 2974572

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
best scientific determinations / by John Purdy									
A modern atlas	1815	Britain	Atlas	World	2 Mercator; 2 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~24809~960017:General-chart-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272104.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=6&trs=62
Australien [cartographic material] : Nach Mercators Projection / entw. u. gez. v. C.G. Reichard ; Gest. v. L. Hess	1816	Germany	Atlas	n/a	Mercator	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~24364~890053:Chart-of-the-World,-According-to-Me?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274863.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=3&trs=52
A New and Elegant General Atlas Containing Maps of each of the United States	1816	America	Atlas	World	2 Globular	Reference	new; elegant	National Library of Australia	Bib ID: 2734090; MAP NK 10439
Grand atlas universel	1816	France	Atlas	Map	1 Mercator; 1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~31668~1150463:World-Mercator-s-projection-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270028.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPu

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									b_Date;lc:RUMSEY~8~1&mi=4&trs=66
A General Atlas, Being A Collection Of Maps Of The World And Quarters, Their Principal Empires, Kingdoms, &c.	1816	America	Atlas	Chart	1 Mercator; 1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~267782~90041992:Mappe-Monde-sur-la-Projection-Redui?sort=pub_list_no%2Cpub_list_no%2Cpub_list_no%2Cseries_no&qvq=q:pub_list_no%3D%222631.000%22;sort:pub_list_no%2Cpub_list_no%2Cpub_list_no%2Cseries_no;lc:RUMSEY~8~1&mi=27&trs=80
The World on Mercator's Projection [cartographic material] / drawn by A. Arrowsmith ; engraved by Sidney Hall	1817	Britain	Atlas	Map	Mercator	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~34190~1171103:World-Mercator-s-proj-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274767.000%2B%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=38&trs=41
A new general atlas	1817	Britain	Atlas	Chart	Mercator	Reference		National Library of Australia	Bib ID: 2136714; MAP RM 2003
A New General Atlas, Constructed from the latest Authorities, By A. Arrowsmith, Hydrographer to the Prince Regent	1817	Britain	Atlas	n/a	1 Mercator; 1 Globular	Reference	latest authorities	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~29128~112071:Orbis-Veteribus-Notus-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%273276.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=1&trs=11
World on Mercator's projection	1818	Britain	Single Sheet	n/a	Mercator	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~611~50050:Char

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									t-of-the-World-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274577.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=5&trs=62
The world on Mercator's projection, with all the latest discoveries	1818	Britain	Single Sheet	n/a	Mercator	Navigation	latest discoveries	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~35253~1180878:Western-Hemisphere-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274462.000%2B%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=13&trs=46
Carey's General Atlas	1818	America	Atlas	Chart	1 Mercator; 1 Globular	Reference		National Library of Australia	Bib ID: 3259940; MAP RM 29
School atlas to Adams' Geography	1819	America	Atlas	n/a	Globular	Reference - Education	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~3840~370032:The-World-On-Mercator-s-Projection-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270732.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=66&trs=67	
Harriet E. Baker's Book of Penmanship & Maps. At Mr. Dunham's School Windsor Vermont March 31, 1819.	1819	America	Atlas	n/a	none	Reference - Education	National Library of Australia	Bib ID: 2100609; MAP NK 1538	

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Carey's school atlas	1820	America	Atlas	n/a	Globular	Reference - Education	David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?q=+Pub_List_No%3D%274534.000%20%27%22%20LIMIT:RUMSEY~8~1&sort=Pub_List_No_InitialSort,Pub_Date	
Atlas to Morse's School geography	1820	America	Atlas	n/a	Globular	Reference - Education	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~25548~1030035:Composite--Mappe-monde?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274614.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=11&trs=54	
Melish's universal school atlas	1820	America	Atlas	n/a	1 Globular; 1 Mercator	Reference - Education	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~218603~5504225:Chart-Of-The-World-On-Mercators-Pro?sort=Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:Pub_Title%3D%22A%2BGeneral%2BAtlas%2C%2BBeing%2BA%2BCollection%2BOf%2BMaps%2BOf%2BThe%2BWorld%2BAnd%2BQuarters%2C%2BTheir%2BPrincipal%2BEmpires%2C%2BKingdoms%2C%26c.%2BContaining%2BFifty%2BEight%2BMaps%2BAnd%2BCharts.%2BPhiladelphia%3A%2BPublished%2BBy%2BM.%2BCarey%2C%2BAnd%2BB.%2BWarner.%2B1816.%22;sort:Pub_Date%2CPub_Date%2CP	

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
								ub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=3&trs=54	
Pacific Ocean on Mercators projection	1821	Britain	Single Sheet	n/a	Mercator	Reference		National Library of Australia	Bib ID: 4360807;
A new general atlas, chiefly intended for the use of schools and private libraries	1821	America	Atlas	Chart	Mercator	Reference - Education	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~28322~1120755:Hydrographical-chart-of-the-World-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%271007.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=5&trs=86
Allgemeiner Hand-Atlas der Ganzen Erde	1821	Germany	Atlas	n/a	1 Globular; 2 Azimuthal	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~222212~5505856:The-World-on-Mercator-s-Projection?sort=Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:Pub_Title%3D%22A%2BNew%2BGeneral%2BAtlas%2C%2BConstructed%2Bfrom%2Bthe%2Blatest%2BAuthorities%2C%2BBy%2BA.%2BArrowsmith%2C%2BHydrographer%2Bto%2Bthe%2BPrince%2BRegent%2C%2BExhibiting%2BThe%2BBoundaries%2BAnd%2BDivisions%2C%2BAlso%2BThe%2BChains%2Bof%2BMountains%2Band%2Bother%2BGeographical%2BFeatures%2BOf%2BAll%2BThe%2BKnown%2

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									BCountries%2BIn%2BThe%2BWorld%22;sort:Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=4&trs=60
School atlas to Cummings' ancient & modern geography	1821	America	Atlas	n/a	Globular	Reference - Education	National Library of Australia	Bib ID: 1677272; MAP T 1566	
A complete course of geography, by means of instructive games, invented by the Abbe Gaultier	1821	Britain	Atlas	Map	1 Globular; 1 Mercator	Reference - Education	National Library of Australia	Bib ID: 3260361; MAP RM 33	
Woodbridge's Larger Atlas. Atlas On A New Plan, Exhibiting The Prevailing Religions, Forms Of Government, Degrees Of Civilization, And The Comparative Size Of Towns, Rivers And Mountains	1821	America	Atlas	Chart	1 Globular; 1 Mercator	Thematic - Education	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~207265~3002990:Chart-of-the-World-?qvq=q:Pub_List_No%3D"2721.000";lc:RUMSEY~8~1&mi=6&trs=63	
Worcester's modern atlas	1821	America	Atlas	n/a	Globular	Reference - Education	National Library of Australia	Bib ID: 1253172; MAP NK 10631	
Neuer Hand-Atlas uber alle Theile der Erde	1822	Germany	Atlas	Chart	Mercator	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~29398~1130441:General-chart,-Mercator-proj-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:P

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									ub_List_No%3D%274536.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=26&trs=28
The world on Mercators projection	1823	America	Atlas	n/a	Mercator	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?q=pub_list_no%3D%229535.000%22&sort=SortID%2CPub_Date%2CPub_List_No%2CSeries_No&pgs=250&res=1
A General Atlas, Of All The Known Countries In The World	1823	America	Atlas	Chart	2 World Maps: 1 Mercator and 1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~33015~1170378:Weltcharte-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270844.000%2B%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=3&trs=30
A general atlas containing distinct maps of all the known countries in the world	1823	America	Atlas	Chart	Mercator	Reference		National Library of Australia	Bib ID: 2065507; MAP RM 2009
A new American atlas containing maps of the several states of the North American Union	1823	America	Atlas	n/a	Mercator	Reference	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~35984~1201186:Mercator-s-Chart-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274866.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=6&trs=71
A New General Atlas	1824	America	Atlas	n/a	1 Mercator; 2 Globular	Reference	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUM

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									SEY~8~1~16~10078:Mercator-s-Chart-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274584.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=15&trs=104
A General Atlas, Containing Maps illustrating some important periods in Ancient History; and distinct Maps of the several Empires, Kingdoms and States In The World	1824	Britain	Atlas	Chart	1 Mercator; 2 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~1351~100119:World-on-Mercators-Projection-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%275388.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=15&trs=39
A General Collection Of Maps, Charts, Views, &c	1824	America	Atlas	n/a	Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~203765~3002076:World-on-Mercator-s-Projection-?qvq=q:Pub_List_No%3D%222680.000%22;lc:RUMSEY~8~1&mi=5&trs=64
Modern Atlas On A New Plan; To Accompany The System Of Universal Geography, By William Channing Woodbridg	1824	America	Atlas	Chart	2 Mercator; 1 Globular	Thematic - Education	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~225776~5506474:Chart-of-the-World,-on-Mercators-Pr?sort=Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:Pub_List_No%3D%222713.000%22;sort:Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=27&trs=77	

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
School atlas to accompany Woodbridge's rudiments of geography	1824	America	Atlas	Chart	2 Mercator; 1 Globular	Thematic - Education	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~36139~1200527:Map-of-the-World?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272803.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=2&trs=30	
The World on Mercator's projection [cartographic material] : with the new discoveries of Capt. Parry / Alex MacPherson del. Cooper sculp	1825	Britain	Single Sheet	n/a	Mercator	Reference	new discoveries	National Library of Australia	Bib ID: 116511; MAP RM 2375
A new American atlas containing maps of the several states of the North American Union	1825	America	Atlas	n/a	Mercator	Reference	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~26015~1100418:The-World-On-Mercators-Projection-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272755.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=14&trs=32
Carey's School atlas	1825	America	Atlas	n/a	1 Globular	Reference - Education	National Library of Australia	Bib ID: 1390005; MAP RM 3194	
Allgemeiner Schulatlas	1825	Germany	Atlas	n/a	4 Mercator; 3Globular	Reference - Education	National Library of Australia	Bib ID: 3550390	
Australien nach Krusenstern u. A.	1826	Germany	Atlas	n/a	Mercator	Navigation		David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
in Mercators Projection entworfen u. gez. v. Ad. St. 1826									?q=+Pub_List_No%3D%275532.000%20%27%22%20LIMIT:RUMSEY~8~1&sort=Pub_List_No_InitialSort, Pub_Date
Australien nach Krusenstern u. A. in Mercators Projection entworfen u. gez. v. Ad. St. 1826	1826	Germany	Atlas	n/a	Mercator	Navigation		David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?q=+Pub_List_No%3D%272212.000%27%22%20LIMIT:RUMSEY~8~1&sort=Pub_List_No_InitialSort,Pub_Date
An Atlas of Ancient Geography	1826	America	Atlas	n/a	n/a	Reference		David Rumsey	
An atlas accompanying Worcester's Epitome of geography	1826	America	Atlas	n/a	1 Globular	Reference - Education	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~33916~1170069:Mappemonde-physique-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270096.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=20&trs=72	
Ancient Atlas, To Accompany The Universal Geography	1826	America	Atlas	n/a	n/a	Reference - Education	National Library of Australia	Bib ID: 241546; MAP Ra 105	
Atlas universel de geographie physique, politique, statistique et mineralogique	1827	Low Countries	Atlas	n/a	n/a	Thematic		National Library of Australia	Bib ID: 1575753; MAP T 1335
Atlas Universel Pour servir a l'Etude De La Geographie Et De L'Histoire	1827	France	Atlas	Map	Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~21780~670013:World,-Mercator-s-projection-?sort=Pub_List_No_InitialS

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Anciennes et Modernes									ort%2CPub_Date&qvq=q:Pub_List_No%3D%274224.000%27%22%2B;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=5&trs=57
Atlas universel de geographie physique, politique, ancienne & moderne	1828	France	Atlas	Map	1 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~26325~1100385:Terre,-Mercator-proj-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272486.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=15&trs=47
Modern atlas, adapted to Morse's School geography	1828	America	Atlas	n/a	Globular	Reference - Education	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~279618~90052651:Carte-generale-du-globe-terrestre?sort=pub_list_no%2Cseries_no%2Cseries_no%2Cseries_no&qvq=q:pub_list_no%3D%2211124.000%22;sort:pub_list_no%2Cseries_no%2Cseries_no%2Cseries_no;lc:RUMSEY~8~1&mi=13&trs=45	
Frances H. Henshaw's book of penmanship executed at the Middlebury Female Academy	1828	America	Atlas	n/a	n/a	Reference - Education	National Library of Australia	Bib ID: 4561228	
Modern Atlas On A New Plan; To Accompany The System Of Universal Geography	1828	Britain	Atlas	Chart	2 Mercator; 1 Globular	Reference - Education	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~31282~1150535:World-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:P	

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
								ub_List_No%3D%270436.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=5&trs=70	
Atlas behoorende tot de verhandeling	1829	Low Countries	Atlas	Map	Mercator	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~461~60003:World-On-Mercator-s-Projection-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270285.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=6&trs=77
School atlas to Cummings' ancient and modern geography improved	1829	Britain	Atlas	n/a	Globular	Reference - Education	National Library of Australia	Bib ID: 1493073; MAP RM 2639	
A Series of Maps to Willard's History of the United States	1829	Britain	Atlas	n/a	n/a	Reference - Education	National Library of Australia	Bib ID: 1493073; MAP RM 2639	
Australien nach Krusenstern, Flinders, Freycinet, Oxley, Cross u.A in Mercator's Projection entworfen and gezeichnet	1830	Germany	Single Sheet	n/a	Mercator	Reference		National Library of Australia	Bib ID: 4513626
A new general atlas	1830	Britain	Atlas	n/a	1 Mercator; 2 Globular	Reference		National Library of Australia	Bib ID: 53658; MAP RM 3230
Atlas classique et universel de geographie	1830	France	Atlas	n/a	1 Mercator; 1 Globular	Thematic		Osher Map Library	3570

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
ancienne et moderne									
Atlas de choix ou Recueil de cartes de geographie ancienne et moderne dressees par nos meilleures auteurs. Paris. Chez J. Andriveau-Goujon Geographe-Editeur, Rue Du Bac, No.6, Pres le Pont - Royal.	1830	France	Atlas	n/a	1 Mercator; 1 Globular	Thematic		National Library of Australia	MAP RM 3598; Bib ID 2963073
The world on Mercators projection	1831	Britain	Atlas	n/a	Mercator	Reference		Osher Map Library	13102
The Edinburgh geographical and historical atlas	1831	Britain	Atlas	n/a	1 Mercator; 2 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~28680~1120917:Mappe-monde-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272174.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=19&trs=54
A new general atlas	1831	America	Atlas	n/a	1 Mercator; 2 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~35567~1201138:World-on-Mercators-Projection-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274862.000%20%27%22%20;sort:Pub_List_No_InitialSort%2

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									CPub_Date;lc:RUMSEY~8~1&mi=22&trs=46
East India islands on Mercator's projection	1832	Britain	Atlas	n/a	Mercator	Reference		National Library of Australia	Bib ID: 1769935
East India islands on Mercator's projection	1832	Britain	Atlas	n/a	Mercator	Reference		John Carter Brown	Accession Number: C-6862; File Name: C-6862-000; Call Number: Cabinet A835 ArA
Mappe Monde sur la Projection du Mercator [cartographic material] / par A. H. Brué, géographe de S.A.R. Monsieur	1832	France	Atlas	Map	Mercator	Reference		National Library of Australia	Bib ID: 793568; MAP RM 3102
Mappe-monde sur la projection de Mercator [cartographic material] / dressee par Mr.Lapie Lieut. Colonel et Mr. Lapie fils Capitaine d'Etat Major	1832	France	Atlas	Map	Mercator	Reference		National Library of Australia	Bib ID: 4926829
The world on Mercator's projection	1832	America	Atlas	Map	Mercator	Reference		Osher Map Library	7553
Mappe-monde sur la projection de Mercator a l'usage des colleges et maisons d'education [cartographic material]	1833	France	Atlas	Map	Mercator	Reference - Education	Osher Map Library	4545	
Atlas universel de geographie	1833	France	Atlas	Map	1 Mercator; 1 Globular	Thematic		Osher Map Library	993

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
ancienne et moderne, precede d'un abrege de geographie physique et historique									
A New American Atlas Containing Maps Of The Several States of the North American Union	1833	America	Atlas	n/a	1 Mercator; 1 Globular	Reference	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?q=Pub_List_No%3D%274628.000%27%22%20LIMIT%3ARUMSEY~8~1&sort=Pub_List_No_InitialSort%2CPub_Date&os=0
The World, on Mercators projection	1834	Britain	Atlas	n/a	Mercator	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?search=Search&sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&q=0254.000+&pgs=250&res=1
The world on Mercators projection by J. Arrowsmith	1835	Britain	Single Sheet	n/a	Mercator	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~537~60175:Map-Of-The-World-on-the-Globular-Pr?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270977.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=5&trs=74
The world on Mercators projection	1835	Britain	Atlas	n/a	Mercator	Reference		National Library of Australia	Bib ID: 1403330; MAP RM 2271
The world on Mercators projection	1835	Britain	Atlas	n/a	Mercator	Reference		National Library of Australia	Bib ID: 1825925; MAP NK 2456/66
Atlas, designed to illustrate the Geography of the	1835	America	Atlas	Map	Mercator	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~34600~1180212

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Heavens, comprising the following Maps or Plates.									:Mappe-monde-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270458.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=38&trs=84
Atlas Designed to Illustrate the Geography of the Heavens	1835	America	Atlas	Atlas	Mercator	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~34899~1180512:Planisphere-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272359.000%20%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=4&trs=34
Carte Hydrographique des Parties Connues de la Terre Dressee sur la Projection de Mercator, par C.L. Gressier, Ingenieur Hydrographique de la Marine. Publiee par ordre du Roi, Sous le Ministre d M. le Baron Duperre, Amiral, Pair de France, Secretaire d'Etat au departement de la Marine et des Colonies Au Depot-general de	1835	France	Single Sheet	Map	Mercator	Reference		National Library of Australia	Bib ID: 3513338; MAP RM 611

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
la Marine en 1835.									
A new universal atlas	1835	America	Atlas	n/a	2 Globular; 2 Polar	Reference	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~203552~3001705:World,-Mercators-projection-?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:0036.000;sort:Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=4&trs=53
Atlas Universel d'Histoire et de Geographie anciennes et modernes	1835	France	Atlas	n/a	n/a	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~202784~3001085:Mappemonde-?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:0940.000;sort:Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=4&trs=33
A new universal atlas	1836	America	Atlas	n/a	1 Mercator; 1 Globular	Reference	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~266061~90040428:The-World-on-Mercator-s-Projection?sort=pub_list_no%2Cseries_no%2Cseries_no%2Cseries_no&qvq=q:pub_list_no%3D%222120.000%22;sort:pub_list_no%2Cseries_no%2Cseries_no%2Cseries_no;lc:RUMSEY~8~1&mi=151&trs=189
Australien oder Polynesien	1837	n/a	Atlas	n/a	Mercator	Reference - Education	Osher Map Library	38103	

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
[cartographic material] : nach den besten u. neuesten Quellen in Mercator's projection / entworfen und gezeichnet von Carl Glase									
Pacific Ocean on Mercators projection	1837	Britain	Single Sheet	n/a	Mercator	Reference		National Library of Australia	MAP RM 3672
Atlas Complet Du Precis De La Geographie Universelle De M. Malte-Brun	1837	France	Atlas	Map	1 Mercator; 1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?q=+Pub_List_No%3D%274850.000%27%22%20LIMIT:RUMSEY~8~1&sort=Pub_List_No_InitialSort,Pub_Date
Atlas Classique Et Universel De Geographie Ancienne Et Moderne	1837	France	Atlas	n/a	1 Mercator; 1 Globular	Reference		National Library of Australia	Bib ID: 4367398
Australien [cartographic material] : nach Krusenstern, Flinders, Freycinet, Oxley, King, Sturt and Mitchell in Mercator's Projection entworfen and gezeichnet / von C.F. Weiland	1838	Germany	Single Sheet	n/a	Mercator	Navigation		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~2669~250042:Western-Hemisphere-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274453.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=3&trs=52
The London atlas of universal geography	1838	Britain	Atlas	n/a	1 Mercator; 1 Globular	Reference		National Library of Australia	Bib ID: 2108329
Atlas Elementaire	1838	France	Atlas	Map	1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUM

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Simplifie De Geographie Ancienne Et Moderne,									SEY~8~1~35028~1180653:Mappemonde-aux-la-projection-de-Mer?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272741.000%20%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=19&trs=71
A Comprehensive Atlas, Geographical, Historical & Commercial. By T.G. Bradford. Boston: American Stationers' Company. Entered ... 1835, by Thos. G. Bradford ... Massachusetts. (title page) Drawn by E. Tisdale, Landscapes by W. Croome. Eng. by J. Andrews	1838	America	Atlas	n/a	1 Mercator; 2 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~280020~90053290:Die-Erde--World-?sort=pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no&qvq=q:pub_list_no%3D%229074.000%22;sort:pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no;lc:RUMSEY~8~1&mi=5&trs=73
An accompaniment to Mitchell's map of the world on Mercator's projection : containing an index to the various countries, cities, towns, islands,	1839	America	Single Sheet	Map	Mercator	Reference		National Library of Australia	Bib ID: 4084985

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
&c., represented on the map ... also, a general description of the five great divisions of the globe, America, Europe, Africa, Asia, and Oceanica, with their several empires, kingdoms, states, territories, &c									
Carte comparative et synchronique de l'etendue territoriale des trois grandes puissances France, Angleterre, Russie, pendant le dernier siecle 1740-1840 [cartographic material]	1840	France	Single Sheet	Chart	Mercator	Reference - Education	National Library of Australia	Bib ID: 4550315	
A new universal atlas	1840	America	Atlas	n/a	2 Globular	Reference	new	Osher Map Library	3041
The world on Mercator's projection [cartographic material] / J. & C. Walker, sculpt	1841	Britain	Atlas	n/a	Mercator	Reference - Education	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~20841~520034:World,-Mercator-s-projection-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270890.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=6&trs=218	

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
A general atlas of the world	1841	America	Atlas	n/a	2 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~35087~1180712:World-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272745.000%20%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=5&trs=49
New chart of the world on Mercators projection with the tracks of the most celebrated & recent navigators [cartographic material] / engraved by John Dower Pentonville	1842	Britain	Single Sheet	Chart	Mercator	Reference - Education	new; most celebrated and recent navigators	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~2722~260002:The-World,-on-Mercators-Projection-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274613.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=4&trs=68
Atlas universel de geographie physique, politique, ancienne & moderne	1842	France	Atlas	Map	1 Mercator; 1 Globular; 1 Azimuthal	Thematic		National Library of Australia	Bib ID: 1916; MAP T 1203
Allgemeiner Hand Atlas der Ganzen Erde nach den besten astronomischen Bestimmungen neuesten Entdeckungen und Kritischen Untersuchungen entworfen. Weimar, Im	1842	Germany	Atlas	n/a	1 Mercator; 1 Globular; 1 Azimuthal	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~33598~1171302:W--Hemisphere-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%275745.000%20%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=4&trs=65

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Verlage des geographischen Instituts									
The world on Mercator's projection	1843	Britain	Single Sheet	Map	Mercator	Reference - Education	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~36651~1201367:Map-Of-The-World-on-the-Globular-Pr?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%275363.000%20%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=5&trs=76	
The world, on Mercator's projection [cartographic material] / engd. by G. Aikman, Edinr	1844	Britain	Atlas	n/a	Mercator	Reference - Education	National Library of Australia	Bib ID: 3260346; MAP RM 32	
The World on Mercator's Projection engraved by Charles Copley	1844	America	Single Sheet	World	Mercator	Reference		National Library of Australia	Bib ID: 153251
Maps of the Society for the Diffusion of Useful Knowledge	1844	Britain	Atlas	n/a	1 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~1966~150002:A-New-Map-Of-The-World-on-the-Globu?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270537.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=4&trs=75
A New General Atlas Of The World	1844	Britain	Atlas	n/a	1 Mercator; 2 Globular	Reference		National Library of Australia	Bib ID: 1881; MAP T 1202

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
The London atlas of universal geography	1844	Britain	Atlas	n/a	1 Mercator	Reference		National Library of Australia	Bib ID: 4936002; MAP Ra 233 Plate 7
Australien nach Krusenstern u. A. in Mercators Projection entworfen u. gez. v. Ad. St. 1826 [cartographic material]	1845	Germany	Atlas	n/a	Mercator	Reference - Education	National Library of Australia	MAP RM 3334	
A new general atlas, comprising a complete set of maps representing the grand divisions of the globe, together with the several empires, kingdoms and states in the world	1845	America	Atlas	n/a	2 Globular	Reference	new	Osher Map Library	15100
A New Universal Atlas	1845	America	Atlas	n/a	Globular	Reference	new	National Library of Australia	Bib ID: 3544055; MAP RM 798 (Copy 2)
A chart of the world upon Mercator's projection, with the new discoveries [cartographic material]	1846	Britain	Single Sheet	Chart	Mercator	Reference	new discoveries	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~35914~1200620:Western-Hemisphere-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272866.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=4&trs=68
Australien nach Krusenstern, Flinders, Freycinet, Oxley, King, Sturt und Mitchell in	1846	Germany	Single Sheet	n/a	Mercator	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~35699~1200925:The-World-on-the-Globular-Projectio?sort=Pub_List_N

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Mercator's Projection entworfen and gezeichnet [cartographic material] / von C.F. Weiland									o_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274578.000%20%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=3&trs=75
A New Universal Atlas	1846	America	Atlas	n/a	Globular	Reference	new	National Library of Australia	Bib ID: 3415250; MAP RM 2163
Australien nach Krusenstern u.A. in Mercators Projection entworfen u. gez. v. Ad. St. 1826 [cartographic material]	1847	Germany	Atlas	n/a	Mercator	Reference		National Library of Australia	MAP RM 1
An emigrant's atlas : containing maps of the United States, Canadas, New Brunswick, Nova Scotia, Cape of Good Hope, New South Wales, South Australia, Western Australia, Port Philip, Van Diemen's Land, and New Zealand, with geographical, topographical, and statistical descriptions	1847	Britain	Atlas	n/a	Mercator	Thematic - Education	National Library of Australia	Bib ID: 575346; MAP F 507	
Australien nach Krusenstern u.A. in Mercators Projection entworfen u. gez.	1847	Germany	Atlas	n/a	Mercator	Reference - Education	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~37479~1210470:World-in-Mercador-s-Projection-	

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
v. Ad. St. 1826 [cartographic material]								?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272175.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=7&trs=61	
Australien nach Krusenstern u.A. in Mercators Projection entworfen u. gez. v. Ad. St. 1826 Nachträge bis 1847.	1847	Germany	Atlas	n/a	Mercator	Reference - Education	David Rumsey		
Das Austral-Continent oder Neu Holland [cartographic material] : Nach Krusenstern, King, Flinders, Freycinet, Oxley, Sturt, Mitchell in Mercators Projection entworfen / von C.F. Weiland und Nach den Entdeckungen von Eyre, Frome, Grey, Stokes, Leichardt und Strzelecki vervollständigt von H. Kiepert	1848	Germany	From Verlag des Geographischen Instituts, 1848	n/a	Mercator	Reference - Education	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~26325~1100385:Terre,-Mercator-proj-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272486.000%20%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=15&trs=47	
A New Universal Atlas; Comprising Separate Maps Of all the Principal	1848	n/a	Atlas	n/a	Globular	Thematic	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~780~60085:The-World-On-Mercator-s-Projection-?sort=Pub_List_No_InitialS

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Empires, Kingdoms & States Throughout the World									ort%2CPub_Date&qvq=q:Pub_List_No%3D%270466.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=5&trs=85
A New Universal Atlas	1848	America	Atlas	n/a	Globular	Reference	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~224885~5506528:New-Map-Of-The-World-on-the-Globula?sort=Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:Pub_List_No%3D%223803.000%22;sort:Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=4&trs=77
New chart of the world on Mercators projection with the tracks of the most celebrated & recent navigators [cartographic material] / engraved by John Dower Pentonville	1849	Britain	Single Sheet	Chart	Mercator	Reference	new; most celebrated and recent navigators	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~284484~90057026:Planisphere-Terrestre-?sort=pub_list_no%2Cseries_no&qvq=q:pub_list_no%3D%2212050.000%22;sort:pub_list_no%2Cseries_no;lc:RUMSEY~8~1&mi=19&trs=70
Chart of the world on Mercator's projection [cartographic material] / by A.K. Johnston, F.R.G.S	1849	Britain	Atlas	Chart	Mercator projection	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~37546~1210531:The-World-On-Mercator-s-Projection-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272305.000%27%22%20;sort:Pub_List_No_InitialSort%2CPu

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									b_Date;lc:RUMSEY~8~1&mi=13&trs=83
Geographical and physical map of the world on Mercators projection shewing the British possessions ... Australia via Panama [cartographic material] / by Smith Evans 1849 ; Engraved by B. R. Davies	1849	Britain	Single Sheet	Map	Mercator	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~33452~1170938:Christlichen-Staaten-Systems-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274765.000%20%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=7&trs=134
Sharpe's Corresponding Atlas, Comprising Fifty-Four Maps, Constructed Upon A System Of Scale And Proportion, From the most Recent Authorities	1849	Britain	Atlas	n/a	1 Mercator; 2 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~220390~5505058:A-New-Map-of-the-World,-on-the-Glob?sort=Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:Pub_List_No%3D%224328.000%22;sort:Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=4&trs=75
Atlas of Physical Geography	1850	Britain	Atlas	n/a	9 Mercator; 2 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~22725~770013:Descrizione-del-globo-in-due-emisfe?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274714.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=9&trs=51

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Atlas classique et universel de geographie ancienne et moderne.	1850	France	Atlas	n/a	1 Mercator; 1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~24733~940066:Erdkarte,-Mercators-Proj-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272077.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=4&trs=73
The illustrated atlas, and modern history of the world	1851	America	Atlas	n/a	1 Mercator; 1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~1649~130008:Colton-s-Map-Of-The-World-On-Mercat?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270149.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=12&trs=111
A New Universal Atlas Containing Maps of the various Empires, Kingdoms, States and Republics Of The World	1853	America	Atlas	n/a	1 Globular	Reference	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~203071~3001377:Western-Hemisphere--Eastern-Hemisph?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:1690.000;sort:Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=10&trs=290
Atlas de Choix, ou Recueil des Meilleures Cartes de Geographie Ancienne et	1854	France	Atlas	n/a	1 Mercator; 3 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~36414~1200777:The-World-on-the-Globular-

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Moderne Dressees par Divers Auteurs. Table. Paris. Chez J. Andriveau-Goujon									Projectio?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274557.000%20%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=4&trs=79
General Atlas Of The World: Containing Upwards Of Seventy Maps	1854	Britain	Atlas	n/a	12 Mercator	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~2041~120039:Map-Of-The-World-On-The-Mercator-Pr?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270565.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=4&trs=46
Vollstandiger Hand-Atlas der neueren Erdbeschreibung uber alle Theile der Erde in 82 Blattern herausgegben von Dr. K. Sohr	1855	Germany	Atlas	n/a	1 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~21840~670073:Welt-Karte,-Mercators-Proj-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274807.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=8&trs=176
A New Universal Atlas Containing Maps of the various Empires, Kingdoms, States and Republics Of The World	1855	America	Atlas	n/a	1 Globular	Reference	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?q=Pub_List_No%3D%272905.000%27%22%20LIMIT%3ARUMSEY~8~1&sort=Pub_List_No_InitialSort%2CPub_Date&os=0
Atlante geografico	1856	Italy	Atlas	n/a	1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~21292~610098:World-Mercators-proj-

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270373.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=8&trs=62
Allgemeiner Hand-Atlas der Erde und des Himmels	1856	Germany	Atlas	Map	1 Mercator; 1 Globular; 1 Azimuthal	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?q=Pub_List_No%3D%275023.000%27%22%20LIMIT%3ARUMSEY~8~1&sort=Pub_List_No_InitialSort%2CPub_Date&os=0
Colton's Atlas of the world	1856	America	Atlas	n/a	7 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~34867~1180480:Handels-u--Colonial-Karte-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272227.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=7&trs=31
Colton's Illustrated Cabinet Atlas	1859	America	Atlas	n/a	1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~220189~5504940:World-on-Mercators-Projection?sort=Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:Pub_List_No%3D%220352.000%22;sort:Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=12&trs=82
A New Universal Atlas	1859	America	Atlas	n/a	1 Globular	Reference	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~208585~500339

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									5:World-in-Mercator-s-Projection--?sort=Pub_List_No%2CSeries_No&qvq=q:Pub_Title%3D%22Colton%27s%20General%20Atlas%2C%20Containing%20One%20Hundred%20And%20Eighty%20Steel%20Plate%20Maps%20And%20Plans%2C%20On%20One%20Hundred%20And%20Eight%20Imperial%20Folio%20Sheets%2C%20Drawn%20By%20G.%20Woolworth%20Colton.%20Letter-Press%20Descriptions%2C%20Geographical%2C%20Statistical%2C%20And%20Historical%2C%20By%20Richard%20Swainson%20Fisher.%20New%20York%3A%20J.H.%20Colton%2C%20No.%20172%20William%20Street.%20London%3A%20Bacon%20%26%20Co.%2C%2048%20Paternoster%20Row.%201865.%20Entered%20...%201863%2C%20by%20J.H.%20Colton%20...%20New%20York.%22;sort:Pub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=12&trs=109
Mitchell's new general atlas	1860	America	Atlas	n/a	1 Mercator; 1 Globular	Reference	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~206571~3002668:World-on-Mercators-Projection-?sort=Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:0535.000;

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									sort:Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=11&trs=85
Grosser Hand-Atlas uber alle Theile der Erde in 170 Karten	1860	Germany	Atlas	n/a	1 Mercator; 1 Globular; 1 Azimuthal	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~210672~5003721:Western-Hemisphere--Eastern-Hemisph?sort=Pub_List_No%2CSeries_No&qvq=q:Pub_Title%3D%22Schonberg%27s%20Standard%20Atlas%20Of%20The%20World.%20New%20York%2C%20Schonberg%20And%20Company.%201865.%20Boston%3A%20Benj.%20B.%20Russell%2C%20515%20Washington%20St.%20Chicago%3A%20R.R.%20Landon%2C%20Agent%2C%2088%20Lake%20St.%20(on%20verso)%20...%20Entered%20...%201863%2C%20by%20Schonberg%20%26%20Co.%20...%20New%20York.%22;sort:Pub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=4&trs=49
Johnson's new illustrated (steel plate) family atlas with descriptions, geographical, statistical and historical	1860	America	Atlas	n/a	1 Globular	Thematic	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?q=+Pub_List_No%3D%271626.000%27%22%20LIMIT:RUMSEY~8~1&sort=Pub_List_No_InitialSort,Pub_Date
The royal atlas of modern geography	1861	Britain	Atlas	Chart	4 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~35169~1180794:Hemisphaeren-

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%273134.000%20%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=3&trs=32
Atlas spheroidal et universel de geographie	1862	France	Atlas	n/a	10 Mercator	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~210344~5004042:Colton-s-Map-of-the-World-?sort=Pub_List_No%2CSeries_No&qvq=q:Pub_Title%3D%22Colton%27s%20General%20Atlas%2C%20Containing%20One%20Hundred%20And%20Eighty%20Steel%20Plate%20Maps%20And%20Plans%2C%20On%20One%20Hundred%20And%20Nineteen%20Imperial%20Folio%20Sheets%2C%20Drawn%20By%20G.%20Woolworth%20Colton.%20Letter-Press%20Descriptions%2C%20Geographical%2C%20Statistical%2C%20And%20Historical%2C%20By%20Richard%20Swainson%20Fisher.%20New%20York%3A%20G.W.%20%26%20C.B.%20Colton%2C%20No.%20172%20William%20Street.%20London%3A%20Bacon%20%26%20Co.%2C%2048%20Paternoster%20Row.%201866.%20Entered%20...%201863%2C%20by%20J.H.%20Colton%20...%20New%20York.%22;sor

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									t:Pub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=11&trs=105
Geographischer Atlas uber alle Theile der Erde bearbeitet nach der ritterschen Lehre und dem Andenken Dr. Carl Ritter gewidmet	1864	Germany	Atlas	Map	1 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~208927~5003930:World-in-Mercator-s-Projection-?sort=Pub_List_No%2CSeries_No&qvq=q:0152.000;sort:Pub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=11&trs=110
Illustrated (Steel Plate) Family Atlas, With Physical Geography, And With Descriptions Geographical, Statistical, And Historical	1864	America	Atlas	n/a	7 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~30380~1140419:World-Mercator-proj-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272483.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=5&trs=95
Colton's General Atlas	1864	America	Atlas	n/a	8 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~219357~5504594:World-on-Mercators-Projection-?sort=Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:Pub_List_No%3D%220358.000%22;sort:Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=15&trs=71
Johnson's New Illustrated (Steel Plate) Family Atlas	1865	America	Atlas	n/a	7 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~3388~390002:World-On-Mercator-s-Projection-

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%273007.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=7&trs=82
Schonberg's Standard Atlas of the World	1865	America	Atlas	n/a	2 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~225911~5506442:World-in-Hemispheres-?sort=Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:Pub_List_No%3D%222307.000%22;sort:Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=9&trs=54
Spruner-Menke atlas antiquus	1865	Germany	Atlas	n/a	n/a	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~209986~5003816:World-on-Mercator-s-Projection-?sort=Pub_List_No%2CSeries_No&qvq=q:4587.000;sort:Pub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=11&trs=112
Neuer Atlas der ganzen Erde fur die Gebildeten aller Stande und fur hohere Lehranstalten	1865	Germany	Atlas	n/a	1 Mercator; 1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~35507~1200859:World-On-Mercator-s-Projection-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%274574.000%20%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=14&trs=70

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Colton's General Atlas	1866	America	Atlas	n/a	7 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~206901~3003058:Western-and-Eastern-Hemisphere-?sort=Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:4740.000;sort:Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=11&trs=60
Colton's General Atlas	1869	America	Atlas	n/a	7 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/view/search?q=+Pub_List_No%3D%271753.000%27%22%20LIMIT:RUMSEY~8~1&sort=Pub_List_No_InitialSort,Pub_Date
Mitchell's new general atlas, containing maps of the various countries of the World, plans of cities, etc., embraced in sixty-three quarto maps	1870	America	Atlas	Map	1 Mercator; 1 Globular	Reference	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~288644~230005:Welt-Karte-zur-Ubersicht-der-Luft-S?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%272449.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=7&trs=102
Johnson's New Illustrated Family Atlas Of The World	1870	America	Atlas	n/a	10 Mercator; 1 Globular	Thematic	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~202237~3001006:Planisphere-sur-la-Projection-de-Me?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:4607.000;sort:Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									%2CSeries_No;lc:RUMSEY~8~1&mi=23&trs=73
The royal illustrated atlas of modern geography	1872	Britain	Atlas	n/a	1 Mercator; 1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~207718~3003443:Western-Hemisphere--Eastern-Hemisph?sort=Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:3888.000;sort:Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=4&trs=90
The Peoples' Pictorial Atlas. Being A Complete And Popular Account Of All The Countries Of The World, In Their Geographical, Statistical, Topographical And Commercial Aspects.	1873	America	Atlas	n/a	1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~37084~1210122:World-on-Mercators-Projection-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270377.000%20%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=8&trs=62
Colton's General Atlas	1874	America	Atlas	n/a	7 Mercator; 1 Globular	Thematic		National Library of Australia	Bib ID: 1674415; MAP RM: 2604
Johnson's New Illustrated Family Atlas Of The World	1874	America	Atlas	n/a	7 Mercator; 1 Globular	Thematic	new	David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~30476~1140003:World-Mercator-proj-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270586.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=6&trs=76

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Gray's Atlas Of The United States	1874	America	Atlas	n/a	1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~218729~5504283:Chart-of-the-World-on-Mercator-s-Pr?sort=Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:Pub_List_No%3D%222490.000%22;sort:Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=5&trs=91
Mitchell's ancient atlas, classical and sacred, containing maps illustrating the geography of the ancient World, as described by the writers of antiquity	1875	America	Atlas	n/a	n/a	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~30749~1150686:W-,-E--Halbkugel-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%271494.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=4&trs=75
Hand Atlas uber alle Theile der Erde und uber das Weltgebaude	1875	Germany	Atlas	Map	3 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~38185~1211202:Planisphere-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%275785.000%20%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=4&trs=43
Atlas Universel De Geographie Physique, Politique, Ancienne Et Moderne	1875	France	Atlas	n/a	5 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~31361~1150308:The-world-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%275371.

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=5&trs=158
The National Atlas. Containing Elaborate Topographical Maps Of The United States And The Dominion of Canada	1878	America	Atlas	n/a	1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~209631~5003616:World-in-Mercator-s-Projection-?sort=Pub_List_No%2CSeries_No&qvq=q:1550.000;sort:Pub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=10&trs=109
The Royal Atlas Of Modern Geography	1879	Britain	Atlas	Chart	2 Mercator; 1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~207073~3003126:World-On-Mercator-s-Projection-?sort=Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:4828.000;sort:Pub_Date%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=19&trs=78
Chart of the world on Mercator's projection [cartographic material] : showing the direction of the ocean currents, with the routes and distances between the principal parts	1880	Britain	Single Sheet	Chart	Mercator	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~37206~1210186:World-Mercator-proj-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270592.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=6&trs=76
Mitchell's new general atlas	1880	America	Atlas	World	2 Mercator; 1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~213083~550085

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									2:World-on-Mercator-s-Projection-?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:Pub_Title%3D%22Cram%27s%20Standard%20American%20Atlas%20Of%20The%20World.%20Accompanied%20By%20A%20Complete%20And%20Simple%20Index%20...%20Maps%20Of%20The%20United%20States%20Are%20The%20Largest%20Scale%20And%20Clearest%20Print%20Of%20Any%20Atlas%20Maps%20Published.%20Foreign%20Maps%20Are%20Compiled%20Largely%20From%20Charts%20Of%20The%20Royal%20Geographical%20Society%2C%20And%20Are%20Geographically%20Correct.%20George%20F.%20Cram%2C%20No.%2019%20Park%20Place%2C%20New%20York.%20Wm.M.%20Goldthwaite%2C%20Manager.%22;sort:Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=97&trs=136
Sonnenschein & Allen's Royal Relief Atlas of All Parts of the World.	1880	America	Atlas	Chart	1 Mercator	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~30552~3000130:World-Mercator-proj-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270594.

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									000%20%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=6&trs=72
Allgemeiner Handatlas in sechsundachtzig Karten mit erlauterndem Text	1881	Germany	Atlas	n/a	8 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~217328~5503706:-World-Map-labeled-Arbuckles--Arios?sort=Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No&qvq=q:Pub_List_No%3D%222703.000%22;sort:Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=13&trs=15
Atlas Universel de Geographie Moderne	1882	France	Atlas	n/a	1 Mercator	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~36059~1200205:Planisphere-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%270507.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=11&trs=70
Letts's popular atlas	1883	Britain	Atlas	n/a	1 Mercator; 1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~37957~1210958:World-on-Mercators-Projection-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%273287.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=9&trs=67

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Colton's General Atlas	1886	America	Atlas	Map	7 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~30687~1150604:W-,-E--Hemispheres-?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%271010.000%20%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=5&trs=82
Johnson's New Illustrated Family Atlas Of The World	1886	America	Atlas	n/a	8 Mercator; 1 Globular	Thematic		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~281292~90054071:Nr--1--Verbreitung-der-Deutschen-ue?sort=pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no&qvq=q:pub_list_no%3D%228772.000%22;sort:pub_list_no%2Cpub_list_no%2Cseries_no%2Cseries_no;lc:RUMSEY~8~1&mi=8&trs=52
Mitchell's New General Atlas	1886	America	Atlas	Map	3 Mercator; 1 Globular	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~20680~560110:Title-Page--Indexed-atlas-of-the-wo?sort=Pub_List_No_InitialSort%2CPub_Date&qvq=q:Pub_List_No%3D%273565.000%27%22%20;sort:Pub_List_No_InitialSort%2CPub_Date;lc:RUMSEY~8~1&mi=2&trs=163
Cram's Standard American Atlas of the World	1889	America	Atlas	Chart	1 Mercator	Reference		David Rumsey	https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~213606~5501065:Distances-Saved-by-the-Interoceanic?sort=Pub_List_No_InitialSort%2CPub_D

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
									ate%2CPub_List_No%2CSeries_No&qvq=q:Pub_Title%3D%22Cram%27s%20Standard%20American%20Railway%20System%20Atlas%20Of%20The%20World.%20Accompanied%20with%20a%20Complete%20and%20Simple%20Index%20of%20the%20United%20States%20...%20Maps%20Of%20The%20United%20States%20Are%20The%20Largest%20Scale%20And%20Clearest%20Print%20Of%20Any%20Atlas%20Maps%20Published.%20Foreign%20Maps%20Are%20Compiled%20Largely%20From%20Charts%20Of%20The%20Royal%20Geographical%20Society%2C%20And%20Are%20Geographically%20Correct.%20Published%20by%20George%20F.%20Cram%2C%2061-63%20Plymouth%20Place%2C%20Chicago%2C%20Ill.%20130%20Fulton%20Street%2C%20New%20York.%201901.%20(on%20verso)%20Copyright%20Secured%20By%20George%20F.%20Cram%2C%201901.%22;sort:Pub_List_No_InitialSort%2CPub_Date%2CPub_List_No%2CSeries_No;lc:RUMSEY~8~1&mi=169&trs=170
Mitchell's New General Atlas	1890	America	Atlas	Map	2 Mercator; 1 Globular	Reference		Osher Map Library	1841

Title	Year	Place of Publication	Atlas or Single Sheet	Map or Chart	Projection	Type	Key Words	Archive	ID Number
Arbuckles' Illustrated Atlas of Fifty Principal Nations of The World	1890	America	Atlas	n/a	1 Globular	Reference		National Library of Australia	MAP RM 2604
Nouvel Atlas Illustre Geographie Universelle	1892	France	Atlas	n/a	2 Mercator; 2 Globular	Reference		National Library of Australia	Bib ID: 1674415; MAP RM 2604
The Royal Atlas Of Modern Geography	1893	Britain	Atlas	Chart	3 Mercator; 1 Globular	Reference		National Library of Australia	Bib ID: 3262557; MAP RM 35
The Times atlas	1895	Britain	Atlas	n/a	6 Mercator; 1 Globular	Thematic		National Library of Australia	Bid ID: 1493073; MAP RM 2639
Deutscher Kolonial-Atlas. 30 Karten mit 300 Nebenkarten, entworfen, bearbeitet und herausgegeben von Paul Langhans.	1897	Germany	Atlas	n/a	3 Mercator	Thematic		National Library of Australia	Bib ID: 1674415; MAP RM: 2604
Rand, McNally & Co.'s indexed atlas of the world	1897	America	Atlas	Map	2 Mercator; 1 Globular	Thematic		National Library of Australia	Bib ID: 1674415
Cram's Standard American Railway System Atlas of the World	1901	America	Atlas	Chart	3 Mercator	Thematic		National Library of Australia	Bib ID: 1674415; MAP RM 2604