



The World in Maps 1400-1600

An exhibition at the Beinecke Rare Book and Manuscript Library, Yale University, July 22, 2022 to January 8, 2023

Co-curated by Raymond Clemens and Kristen Herdman



The World in Maps at the Beinecke Library

Through our maps, we willingly become a part of their boundaries. If our home is included, we feel pride, perhaps familiarity, but always a sense that *this is ours*. If it is not, we accept our roles as outsiders, though we may be of the same mind and culture. In this way, maps can be dangerous and powerful tools.

- Debbie Lee Wesselmann, Trutor & The Balloonist

The World in Maps at the Beinecke Library is designed to share some of Yale University Library's most impressive and important maps, most of which were made by hand in the period from 1400 to 1600. This exhibit is both a recognition and a celebration of the transfer of the pre-1900 maps previously in the Yale Map Collection in Sterling Memorial Library to the Beinecke Library, thus enabling researchers to find all the maps they need in a single, state-of-the-art reading room.

Each map on view demonstrates a specific vision of the world and highlights both the composer's place in the world as well as his or her understanding of the people and lands that surrounded them. Because of the limits of the collection, these maps largely center around the European world, but we have also included examples from the Arab world, which provided the technology, such as the astrolabe, that made European exploration possible. Several Asian printed maps from the eighteenth to the twentieth century, which demonstrate an independent cartographic development, are also included. You will also see a case devoted to forged maps that once were thought to be genuine. Because such maps can distort the history of cartography and so distort our view of the past, they invite us always to be skeptical about claims made by singular documents.

Portolan Joan Riezo, 1590, Beinecke Manuscript 49cea 1590.

The exhibit is divided into four parts. On the ground floor, portolan charts are arranged in roughly chronological order and divided among those that represent the Americas and those that predate significant European contact with the so-called New World. On the second floor are two large, curved cases at the heads of the north and south stairs respectively. On the north side, Asian maps of the world demonstrate perspectives and cartographic innovations that are sometimes distinct and independent of Western ideas. On the south side, modern forgeries of historic maps present both the maps themselves and the science used to prove they are not genuine. The vitrines (eighteen small cases on the east and the west sides of the building) contain "mini-exhibits," each of which focuses on a different historical, cultural, or technological aspect of mapping, from the ancient world to roughly 1600 CE. This pamphlet provides a guide to the materials on exhibit.

Some of the most impressive and historically important portolan charts in the Beinecke's collections are exhibited on the ground floor. The portolan chart began as a wayfinding tool that enabled sailors to cross the Mediterranean Sea and engage in trade among distant ports. The oldest portolan chart-the Carte Pisane, in the collection of the Bibliothèque nationale de France in Paris – dates to the thirteenth century. These charts often look like satellite images, but they were made long before any technology, such as hot-air balloons, enabled humans to gain a bird's-eye view of the terrain. Portolan charts encompass the known world at the time of their composition, and they reflect the ancient concept of an orbis terrarum, a circle of land surrounding the Mediterranean. As Europeans began to explore the world beyond that region, their maps charted their progress. These maps have been chosen because they demonstrate the effect of travel and exploration on maps and an expansion of the European perspective on the world driven by curiosity, greed, and religious zealotry. Like all maps, these tell many stories.



A modern overlay that highlights the territory represented on a typical late portolan map. Portolan Joan Riezo, 1590, Beinecke Manuscript 49cea 1590. Map created by Kristen Herdman.

Because portolans do not have a fixed reference point, they cannot be looked at from the "wrong side." The display cases enable you to view maps from two sides. As you look at them, you will notice that some text always appears right-side up, while other words appear upside down. The small text that follows the line of the coast is a listing of important ports: red indicates a major port, black calls out a minor one. The cluster of black dots near shore indicates rocky shallows a ship's navigator should avoid. To orient yourself, it can be helpful to look for the Straits of Hercules, the point where modern Spain almost touches Morocco. Another focal point is the Red Sea, the body of water between the Arabian Peninsula and Egypt. On early modern maps, the Red Sea is almost always colored red or orange, and a land bridge at its top represents the location where Moses and the Israelites crossed the Red Sea after it was parted for them. Of course, in the biblical Exodus story the sea closes immediately after the last Jews pass, drowning the pursuing Egyptians, but its representation on these maps demonstrates the map's role as an historical as well as geographic document. Some maps also depict Noah's Ark somewhere in the Caucasus Mountains; others locate the mystic Prester John either in Asia or Ethiopia/Africa.

The first map in the case to the left of the guard's desk (on the south side of the building) is the oldest portolan chart in Yale's collection. It is called the Beccari chart after its maker, Francesco Bechario, who lived in Venice but made this map in Savona, Italy (an important seaport and Columbus's childhood home). The next chart in the case is the oldest surviving dated portolan chart from Portugal. It was composed in 1492, and we know that Christopher Columbus carried a map much like this one on his first voyage to the Americas. The Portuguese were instrumental in exploring the coast of Africa for European interests and their maps were jealously guarded by Prince Henry the Navigator. Because the traditional portolan chart did not leave room for the west coast of Africa, the cartographer has added two insets to show the additional coastline.

The Martellus map also dates from just before Columbus's voyage, likely circa 1490. Like the Portuguese chart, the Martellus map demonstrates the success of Portuguese exploration not only as far south as the Cape of Good Hope at the tip of Africa, but around the cape to the east side of the continent as well. Among the numerous maps Columbus is known to have had on this voyage, it is likely one was very much like the one shown here. This helps explain why he thought the world's circumference was smaller than it actually is (and why it took him longer to reach "Asia" than he expected). The original map, which is too large to display in the cases on this floor, is downstairs.



Detail of the Red Sea with the Exodus landbridge, from Judah Abenzara, Safet in Galilee 1505, Beinecke Art Storage 30cea 1505.





Left: Detail of South Africa on a world map made by Henricus Germanus Martellus, Florence, c. 1490. Beinecke Art Storage 1980 157. Above: The same map produced by Chet van Duzer using multispectral imaging to reveal the map's text, which has become obscured by age and wear.

There are two reproductions of the Martellus map in the exhibit: the first is as it appears today, while the second is a false-color map made by Chet Van Duser and his team. Their work, produced as part of a National Endowment for the Humanities–funded grant, used multispectral imaging, which involves taking hundreds of pictures using light from across the spectrum, including infrared and ultraviolet, neither of which are visible to the human eye. This revealed the cartouches that describe the lands, particularly those in East Asia, that became impossible to read as the map darkened over time. A computer assembled the images and made the faded text easier to read.

Both maps at the end of the case are the work of Judah Ben Zara, a Jewish mapmaker who may have lived in Catalonia (or Mallorca) until he, along with the entire Jewish population of Spain, was expelled by order of Ferdinand and Isabella in 1492. His three surviving maps are remarkable for being among the only maps still extant to have been assembled outside of Europe. Two were made in Egypt and this third in Galilee. The reproduction from the Vatican Library shows Judah's

Portolan of Brazil and West Africa. Unknown artist, not earlier than 1667, Portugal(?). Beinecke 21cea 1619.



map from 1497 from Alexandria. The Cincinnati Jewish Theological Seminary has a map that was made in 1500, also in Alexandria. The Beinecke's map, the last surviving map by Judah, shows that he had settled in Safed, Galilee, by 1505, the year of its making. While the map he produced in Galilee looks very much like those he had made years earlier, the materials used here differ from those used by his contemporaries in Europe, who normally worked on skins of calf or sheep. Judah's Galilee map is on goatskin likely because neither calfskin nor sheepskin was available. Judah's map is evidence of craft knowledge typical of the city of Safed, which was well known as a spiritual center of Kabballah, or Jewish mysticism, in the sixteenth century. Judah's story is a remarkable one of challenge and adaptation made necessary by forced migration.

The maps on the north side of the building demonstrate how European mapmakers adapted after their first contact with the Americas in 1492. The Comberford atlases show that portolan charts were no longer the sole privilege of the Italians and Spanish located around the coast of the Mediterranean. By the sixteenth century, the English and Irish had adopted the technical skills necessary for producing portolans. Interestingly, the Comberford maps are square and mounted on boards designed to be folded for their protection.

Later portolans often included insets of the New World depicted as a globe, but interestingly they do not include them in the style of earlier portolans. Instead these maps became hybrids; several different forms were laid over the portolan base. At the far end of the case we see the Americas on specially designed portolan charts. Those maps that include Brazil and Africa appear to delineate what scholars today call the Triangle trade, which encompassed the capturing of West African people, who were taken as slaves to Brazil, where they were forced to produce commodities for the elite – sugar, rum, chocolate, coffee, and cotton – that were shipped from South America to Europe, in turn raising new funding with which more free people were purchased,

then sold into slavery. Each leg of that triangle perpetuated the crushing cycle of violence against African bodies, as enslaved people were traded by Europeans for luxury goods consumed far from where they were produced. Brazil was one of the few Latin American countries that permitted the sale of enslaved people, because papal sanction was "given" to the Portuguese (who allowed slavery). However, the Spanish (who had outlawed slavery, although clearly continued to condone it) were "given" the area west of a line demarcated at 370 leagues west of the Cape Verde islands. In fact, Pope Nicholas V ordered the Portuguese to enslave the "pagan" African people in 1452 and 1455. The Treaty of Tordesillas (1494) carved up the lands that had borders on the southern Atlantic Ocean. Anything west of the demarcation was awarded to Spain, while those people and lands east of it went to Portugal. The last map in this collection shows a part of the Portuguese territory.

As you return to the guard's desk, ascending the stairs to the right will reveal a case labeled "Asian Maps of the World." Manuscript maps of Asia are extremely rare and seldom found outside of China, Japan, and Korea. The Beinecke Library has some printed maps of Asia that are believed to be based on earlier exemplars, and these are on display here. Some are reproductions because the originals are too large to fit into the case.

Up the stairs to the left is a matching case containing the famed Vinland Map and other notable forgeries from recent years. Both curved cases are described below after the section on vitrines.

The vitrines on this floor contain mini-exhibits of materials related to mapping from the ancient world up to the first photographic images of Earth taken from the moon by the Lunar Orbiter 1 in 1966. Some tell of technologies, such as the astrolabe, that were developed as necessities for exploration. Others tell the story of Arabic mapping traditions, which sprang from the same source as ancient European precedents. Highlights in these cases include:

1. Medieval world maps.

ASIA

AFRI

CA

EVRO

PIA

Several cases contain maps that represent the world as medieval Europeans saw it, and usually they are signified as a diagram of a T inscribed within an O. The O represents the waters that surround the three land masses: Asia, Africa, and Europe. Asia, normally represented at the top of the O, is twice the size of Europe or Africa. The stem of the *T* is the Mediterranean, which separates Europe from Africa; the right arm dividing Africa from Asia is the Nile River;

Left: Detail of a diagrammatic T-O map, top, with a representational map of the world, bottom. From Gregorio Dati, Sfera, Florence, post-1450. Beincke MS 328, f. 14v.

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Right: Detail of a T-O map with labels and details. Sallust, Bellum Catilinae and Bellum lugurthinum, France, between 1400 and 1425. Beinecke MS 328, f. 74v.

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2. Ancient "maps"

Although the Beinecke Library does not possess any maps made before the twelfth century, we do have a reproduction of the earliest "road map" of Europe, the Peutinger Table. This long, skinny roll shows all the roads that connected Roman cities to northern Africa, the Middle East, Byzantium, and Europe. No attempt at indicating scale was made. We also have a Renaissance copy of a book called the *Antonine Itinerary*, a listing of cities and the distances between them. This verbal map is typical of most maps used for travel before the thirteenth century. Some early print copies of Ptolemy's maps of the world, which only became available in Europe in the fifteenth century, are also in the collections.

3. Arabic maps

Arab cartographers and scholars continued the classical mapping tradition and elaborated on it with unique visual depictions. The Arab world also forged the development of important scientific instruments necessary for travel and mapping and greatly influenced Europe during the centuries before the Age of Exploration. Their scientific treatises were translated from Arabic into a number of different European languages and even eventually impacted people far apart in time and space, such as the English author Chaucer.

4. Galileo

Our mini-exhibits end with the vitrine holding several copies of Galileo's first printed images of the moon, the first ever made with the benefit of the telescope. For the first time, most Europeans were shown the dark side of the moon. Galileo's sketches also emphasize



[Map of the world] / [Zakarīyā ibn Muḥammad al-Qazwīnī]. [15--?]. Arabic MSS 575.

its barren and rocky nature — well known to us today, but something of a revelation in the sixteenth century, when most people thought of the moon as another planet, thus generating its own light. Galileo was the first person to accurately depict the moons of Jupiter (which he called "Medicean stars," after his patron, the Florentine Medici family). A photograph at the back of the vitrine was taken in 1996, before humans landed on the moon. It shows Earth as seen from the moon — the first time we saw our own planet from another astronomical body. This rough black and white image eerily resembles Galileo's lunar landscape.



Galileo's sketch of the moon as seen through his telescope. Galileo Galilei, *Siderius nuncius*, 1610, p. 18. Beinecke QB41 G33 1610 Copy 1.

5. Renaissance cartography

The Renaissance saw an explosion in mapmaking, which took several different forms. Although portolan charts were extremely popular, the model they provided was also used to produce the first atlases – small portolan charts broken up by region and configured in a codex, often arranged like the regional maps inherited from Ptolemy. The Renaissance also produced new Ptolemaic maps and then broadcast them via the medium of print. Early models, such as the T–O map, persisted as teaching tools although after the discovery of the Americas in 1492 they ceased to have any value in describing the earth's actual landmasses.

Battista Agnese, Portolan Atlas, Venice, 1559. Beinecke MS 560, Map 23.



Asian World Maps

Curved Case North

Asian world maps before the modern period are extremely rare, and Yale has no manuscript maps that date earlier than 1800. From that date forward, we have several printed maps that help to understand how some Asian cultures viewed their position in the world. The maps in the these cases are from China, Korea, and Japan. Korea had an ancient indigenous mapping tradition that was replaced by the importation of Chinese maps during the medieval period. The maps in the left and center cases are derived from a single map that was originally offered to demonstrate a Buddhist pilgrim's route through Asia. As in

Map of Asia and Europe, presumably based on Buddhist or Tibetan sources, c. 1800(?). Beinecke 50 1800A.



the West, most Asian cultures had a verbal tradition rather than one of a graphic-cartographic type, so maps in the premodern period were not common. Maps helped explain the spread of Buddhism from India to China, Korea, and Japan, and many such maps are oriented with East at the top; most in the collection at the Beinecke Library, however, are not. Korea is shown with a great number of mountains and rivers, which is also how the territory was described in literature.

In the same manner that Europeans took Jerusalem or the Mediterranean to be the center of the world, the Chinese chose to depict China at the center of their world maps, with significant regions such as Japan, Korea, and India in close proximity. Like European maps, these examples often highlight areas of religious importance, but they also are less concerned with trade.

The center case contains a very large map of Korea that shows the influence of Chinese and European maps, although it remains within the framework of the premodern mapping tradition. The Korean map on the right was designed to help administer Korea during the Joseon dynasty (1392–1897); the one on the left, like the Chinese maps, is based on a Buddhist pilgrimage account, and it helped place the important areas of the world in a cultural context, even if the regions on the map are vaguely defined.

The maps on the right are Japanese, and although they were made during different periods, each places Japan at its center. North and South America are poorly defined or marginalized, and Japan, especially in the bottom-right example, is inflated well beyond geographic proportion.

Maps and Forgery

Curved Case South

The exhibit ends with the second case at the top of the stairs, which is devoted to the forgery of maps. With early maps, forgery continues to consistently pose a problem because they carry such symbolic weight, thus pushing their prices increasingly higher. Luckily, science has played an outsized role in detecting these forgeries, and the Yale Institute for the Preservation of Cultural Heritage (YIPCH) has conducted several experiments that not only determine when, but also how maps were made. For example, we use a test that determines from which animal skins the parchment in our portolan charts were made. Most were made of calfskin or sheepskin, as expected, but the one by Judah Ben Zara in Galilee was made on goatskin, likely reflecting the paucity of calfskin in Palestine.

The most famous map forgery is certainly the Vinland Map, which Paul Mellon gave to Yale in 1965. The map purports to show Viking settlements on Newfoundland and, if genuine, would be the first and only cartographic representation of the Viking discovery of the New World. Interestingly, archeologists had proven that, sometime in the eleventh century, Vikings had a community at L'Anse aux Meadows, Newfoundland, Canada, so there is no doubt that Vikings were the first Europeans to establish settlements in the Americas. Yale's announcement of the map stirred immediate controversy because it seemed to slight the role of Christopher Columbus and, by extension, to dismiss the Italian-American place in America's Europeanization.

Early analysis by Walter McCrone in 1972 proved that the ink used to draw the map was a modern type that contained a manufactured form of titanium dioxide. Carbon dating placed the parchment in the fifteenth century, and later testing has shown that the leaves were taken from another book, also in the Beinecke Library, the *Speculum historiale* of Vincent of Beauvais (Beinecke MS 350). Recent testing by YIPCH has shown that the ink containing titanium dioxide is not just in the samples taken by Walter McCrone, but everywhere there is ink on the manuscript. We have no doubt the forger copied his or her map onto medieval parchment, but using modern inks. Interestingly, John Paul Floyd has independently discovered that the forger's model for the map was an eighteenth-century hand-drawn facsimile published in 1783 of Andrea Bianco's 1436 world map rather than Andrea Bianco's map itself, as early historians had previously thought. This means the map cannot be dated before 1783 (the facsimile's date of publication).

Some recent fakes shown in this case confirm that forgery is still practiced, likely as a way to make money from gullible investors. The Maggiolo portolan shown here is a fake modeled on the real Maggiolo portolan – also in Yale's collections – which is displayed in facsimile beside it. Carbon dating revealed its parchment to have been produced in the 1950s. Another recent forgery exhibited is the Waldseemüller globe gores. These were printed on a single sheet in order to be cut out and shaped into a globe. The paper would have been glued onto a globe and covered in varnish for protection. The gores are valuable not only because of their extreme rarity (only six copies survive), but also because they are the first cartographic survival on which the American continents are labeled as "America." Before it was discovered to be a forgery, in 2019 the Waldseemüller gores were estimated to bring in from \$800,000 to \$1,200,000 at auction. However, sharp-eyed cartographers noticed that the pictures in the auction catalogue showed that a small shadow left when making a repair to the paper was actually printed onto the paper, indicating that the gore had been made from a photograph of the original (at the Bell Library in Wisconsin). The item was removed from sale and acquired by the Beinecke Library for study purposes.

Forgeries are not just harmful because they con buyers; they also can distort the historical record. The Vinland Map, for example, has muddied the waters since its discovery, even though Yale itself announced that it was a forgery in 1973. Because controversy around the map's authenticity continued to swirl, careful writers note that its authenticity is doubtful, but they still include the map in their study just in case it might be real. We hope that recent work done by YIPCH will put the question to rest and, toward that end, a symposium on October 10, 2022, at the Beinecke Library is intended to bring together historians, such as John Paul Floyd, and scientists to discuss the collaborative nature of their work and why continued testing, which provides new scientific data, is so important to historians of cartography.

We hope you have enjoyed the many maps presented in this exhibition. For additional information about any of the materials shown here, please use the QR code on the last page of this booklet to find the associated website, which includes a bibliography and additional images of many of the materials included in the exhibit.

Top: Vinland Map as it appears today. Beinecke MS 350A.

Bottom: Vinland Map. False color image produced by YIPCH demonstrating where modern titanium dioxide is found on the Vinland Map, thus revealing that only those places with such ink have the modern form of the compound.







beinecke.library.yale.edu/worldinmaps

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Cover: Detail of a sixteenth-century facsimile of a thirteenth-century copy of a possibly Roman original map of the *Orbis terrarum* showing the interconnected roads that linked the cities in the Roman Empire. Commonly known as the Peutinger Table after its sixteenth-century owner. Antwerp, 1598. Beinecke 2016 +333.



