



# Brief History of Maps and Cartography

## ES 551 -- James S. Aber

### What is a Map?

A map is a graphic representation or scale model of spatial concepts. It is a means for conveying geographic information. Maps are a universal medium for communication, easily understood and appreciated by most people, regardless of language or culture. Incorporated in a map is the understanding that it is a "snapshot" of an idea, a single picture, a selection of concepts from a constantly changing database of geographic information (Merriam 1996).

Old maps provide much information about what was known in times past, as well as the philosophy and cultural basis of the map, which were often much different from modern cartography. Maps are one means by which scientists distribute their ideas and pass them on to future generations (Merriam 1996).

### Early Maps

**Cartography** is the art and science of making maps. The oldest known maps are preserved on Babylonian clay tablets from about 2300 B.C. Cartography was considerably advanced in ancient Greece. The concept of a spherical Earth was well known among Greek philosophers by the time of Aristotle (ca. 350 B.C.) and has been accepted by all geographers since. Greek and Roman cartography reached a culmination with [Claudius Ptolemaeus](#) (Ptolemy, about A.D. 85-165). His "world map" depicted the Old World from about 60°N to 30°S latitudes. He wrote a monumental work, *Guide to Geography* (*Geographike hyphygesis*), which remained an authoritative reference on world geography until the Renaissance.



Ptolemy's map of the world, about A.D. 150, republished in 1482. Notice the use of latitude and longitude lines and the distinctive projection of this map. Taken from Whitfield (1994, p. 8-9). Click on small image to see full-sized (206 kb) version.

## Medieval Maps

During the Medieval period, European maps were dominated by religious views. The **T-O map** was common. In this map format, Jerusalem was depicted at the center and east was oriented toward the map top. Viking explorations in the North Atlantic gradually were incorporated into the world view beginning in the 12th century. Meanwhile, cartography developed along more practical and realistic lines in Arabic lands, including the Mediterranean region. All maps were, of course, drawn and illuminated by hand, which made the distribution of maps extremely limited.



Hereford Mappa Mundi, about 1300, Hereford Cathedral, England. A classic "T-O" map with Jerusalem at center and east toward the top. Taken from Whitfield (1994, p. 21). Click on small image to see full-sized (159 kb) version.



Al-Idrisi's map of the world, 1456. [Al-Idrisi](#) was a muslim scholar in the court of King Roger II of Sicily. He completed a map of the known world in the 12th century. Drawn with south at the top, this later example has been inverted for easier viewing. Taken from Whitfield (1994, p. 29). Click on small image to see full-sized (117 kb) version.



Northern regions map from S. Munster's *Cosmographia* (1588). North Atlantic region is essentially a [Viking view](#) dating from the 12-14th centuries. One of the last wood-engraved maps, done in the style of copper-plate engraving. Published posthumously by H. Petri (son in law) in Basle, Switzerland. Original map in the collection of the author.

## Renaissance Maps

The invention of printing made maps much more widely available beginning in the 15th century. Maps were at first printed using carved wooden blocks. Printing with engraved copper plates appeared in the 16th century and continued to be the standard until photographic techniques were developed. Major advances in cartography took place during the Age of Exploration in the 15th and 16th centuries. Map makers responded with navigation charts, which depicted coast lines, islands, rivers, harbors, and features of sailing interest. Compass lines and other navigation aids were included. Such maps were held in great value for economic, military, and diplomatic purposes, and so were often treated as national or commercial secrets--classified or proprietary maps.



Genoese nautical chart of the world, 1457. Taken from Whitfield (1994, p. 40-41). Click on small image to see full-sized (135 kb) version.

The first whole world maps began to appear in the early 16th century, following voyages by Columbus and others to the New World. [Gerardus Mercator](#) of Flanders (Belgium) was the leading cartographer of the mid-16th century. He developed a cylindrical projection that is still widely used for navigation charts and global maps. He published a map of the world in 1569 based on this projection. Many other map projections were soon developed.



Waldseemüller's world map, 1507, the first map to incorporate New World discoveries. This map is based on the Ptolemaic projection, but does not show the entire globe. Taken from Whitfield (1994, p. 48-49). Click on small image to see full-sized (148 kb) version.

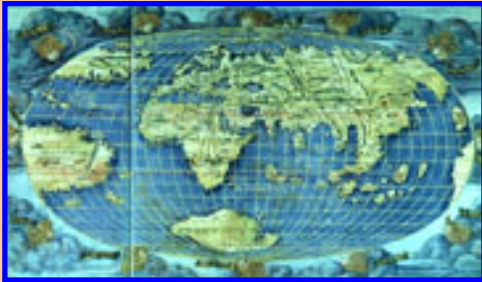




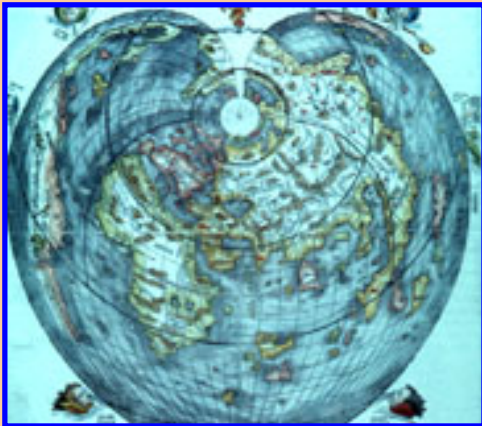
Detail of Ptolemy and "old world" from Waldseemüller's world map, 1507. This detail depicts the Old World in the Ptolemaic projection. Taken from Whitfield (1994, p. 11). Click on small image to see full-sized (126 kb) version.



Detail of Amerigo Vespucci and "new world" from Waldseemüller's world map, 1507. This detail depicts the New World in the Ptolemaic projection. Taken from Whitfield (1994, p. 37). Click on small image to see full-sized (132 kb) version.



World map of Rosselli, 1508, the first map to show the entire globe. A mythical southern continent is shown, and ocean areas are much too small. Nonetheless, it is a true world map. Taken from Whitfield (1994, p. 50-51). Click on small image to see full-sized (194 kb) version.



Heart-shaped world map of Apian, 1530. A fully expanded Ptolemaic projection of the world results in this heart-shaped map. Popular during the Renaissance, this kind of map is a novelty today. Taken from Whitfield (1994, p. 57). Click on small image to see full-sized (163 kb) version.



World map in Mercator projection by van Keulen, about 1720. The ultimate map for navigation of the world, as first devised by [Mercator \(1569\)](#). On this projection, all straight lines are true bearings. This results in great size distortion toward the poles, which cannot be shown. Taken from Whitfield (1994, p. 108-109). Click on small image to see full-sized (148 kb) version.

## Modern Maps

Maps became increasingly accurate and factual during the 17th, 18th and 19th centuries with the application of scientific methods. Many countries undertook national mapping programs. Nonetheless, much of the world was poorly known until the widespread use of aerial photography following World War II. Modern cartography is based on a combination of ground observations and remote sensing.



Map of the Danish Kingdom, 1629, by Janssonius. A high level of geographic accuracy is demonstrated along with marginal illustrations that enhance the map. Reproduction of original map from the Geodetical Institute of Denmark. Click on small image to see full-sized (184 kb) version.



Hondius' world map in two hemispheres, 1630, the quintessential Renaissance map. Taken from Whitfield (1994, p. 75). Click on small image to see full-sized (187 kb) version.

**Geographic information systems** (GIS) emerged in the 1970-80s period. GIS represents a major shift in the cartography paradigm. In traditional (paper) cartography, the map was both the database and the display of geographic information. For GIS, the database, analysis, and display are physically and conceptually separate aspects of handling geographic data. Geographic information systems comprise computer hardware, software, digital data, people, organizations, and institutions for collecting, storing, analyzing, and displaying georeferenced information about the Earth (Nyerges 1993).

## What is a Map?

Are maps realistic representations of the actual world? No--never! Field measurements are subject to errors of accuracy and precision. Aerial photographs and satellite images portray only certain portions of the light spectrum, as filtered through the atmosphere and detection instruments. No map can depict all physical, biological, and cultural features for even the smallest area. A map can display only a few selected features, which are portrayed usually in highly symbolic styles according to some kind of classification scheme. In these ways, all maps are estimations, generalizations, and interpretations of true geographic conditions.

All maps are made according to certain basic assumptions, for example sea-level datum, which are not always true or verifiable. Finally any map is the product of human endeavor, and as such may be subject to unwitting errors, misrepresentation, bias, or outright fraud. In spite of these limitations, maps have proven to be remarkably adaptable and useful through several millennia of human civilization. Maps of all kinds are fundamentally important for modern society.



The fool's cap world map, about 1590. Ptolemaic projection on the face of a clown. Maker, date and place of publication are unknown. Maps are human representations of the world, as seen through the eyes of a fool in this example. Taken from Whitfield (1994, p. 78-79). Click on small image to see full-sized (163 kb) version.

## References

- Merriam, D.F. 1996. Kansas 19th century geologic maps. *Kansas Academy of Science, Transactions* 99:95-114.
- Nyerges, T.L. 1993. Understanding the scope of GIS: Its relationship to environmental modeling. In Goodchild, M.F., Parks, B.O. and Steyaert, L.T. (eds.), *Environmental modeling with GIS*, p. 75-93. Oxford Univ. Press, 488 p.
- Whitfield, P. 1994. *The image of the world: 20 centuries of world maps*. Pomegranate Artbooks, San Francisco, 144 p.

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● For more antiquarian maps, see [Cartographic images](#).

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