CARTOGRAPHY

III B.SC GEOGRAPHY

DATE : 28/09/2020

TIME : 11.30 TO 12.30

TOPIC : HISTORICAL DEVELOPMENT OF CARTOGRAPHY

DR.K.INDHIRA

GUEST LECTURER

DEPARTMENT OF GEOGRAPHY

GOVERNMENT COLLEGE FOR WOMEN (A)

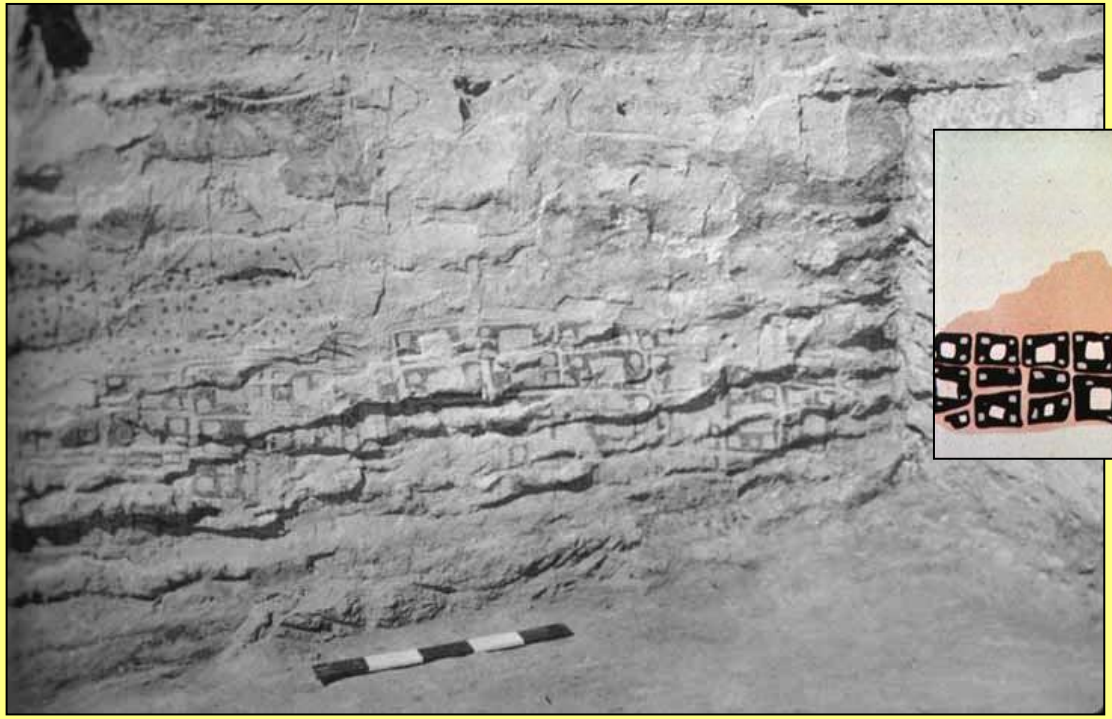
KUMBAKONAM

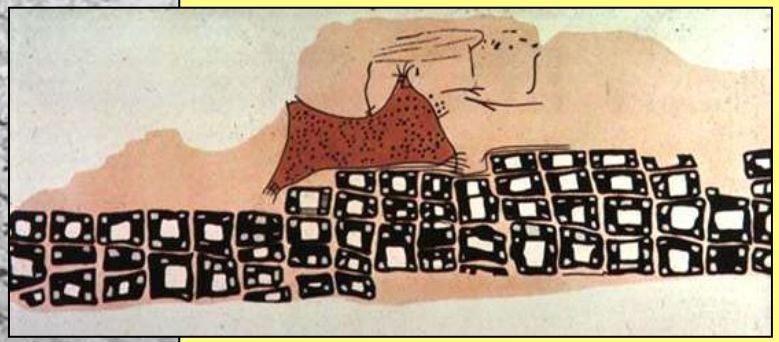
HISTORY of CARTOGRAPHY

THE OLDEST EXISTING MAP

THE OLDEST MAP

- Oldest existing map (6200 BCE)*
  - Wall painting at Catal Huyuk (Turkey)
  - Depict the town plan, with erupting volcano





*Your textbook references a far younger map…

Leopard pattern?

DISCLAIMER

- Ancient cartographic history is spotty
  - Few ancient maps remain
- Many have been lost to time
- Many have been destroyed
  - Clay is easily broken
  - Paper and wood decompose and catch fire
  - Bronze maps were often melted down

DISCLAIMER

- Many ancient maps have been "reconstructed"
- Reconstructions are suspect
  - Many were reconstructed based upon manuscripts, which often included vague, or poetic language
  - Many were copied graphically by medieval monks, who knew little of what they were copying

DISCLAIMER

- This presentation is far from complete
  - How can thousands of years of cartography be summed up in a single lecture?
  - Emphasis is given to groups of people and periods of time that the instructor is most familiar with
  - I urge you to explore what I don’t cover here

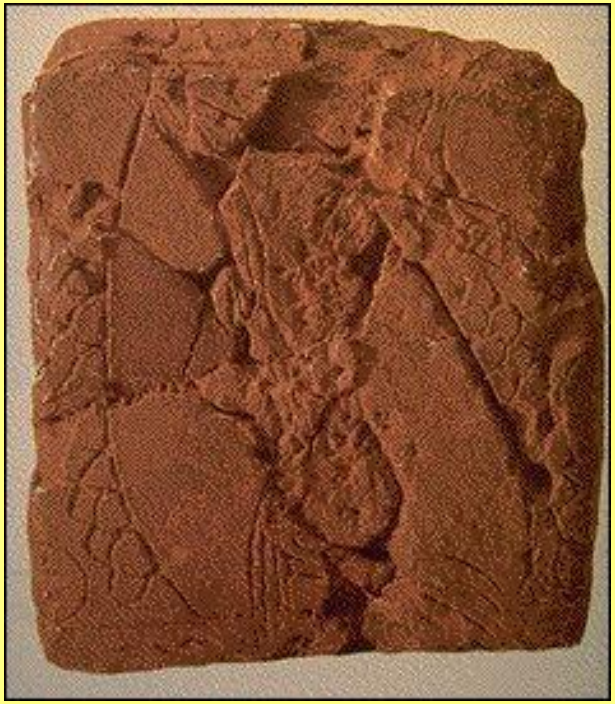
BABYLONIAN MAPS

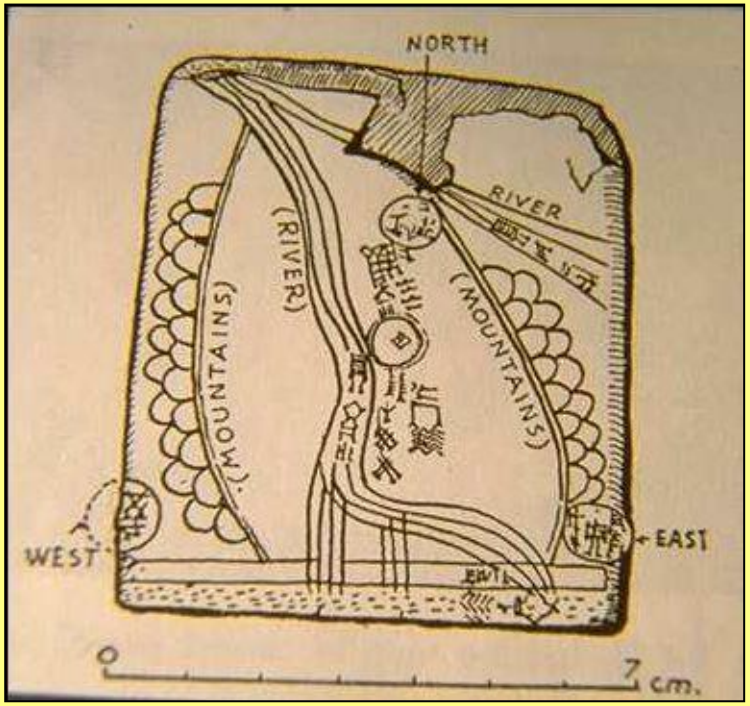
BABYLONIAN MAPS

- Ancient Babylonians had a relatively advanced culture
  - Developed written language in the 4th millennium BCE
  - Had a well-defined measurement system
  - Used the Pythagorean Theorem almost 1,000 years before Pythagoras
  - Used a sexigesimal number system and divided the circle into 360 degrees

BABYLONIAN MAPS

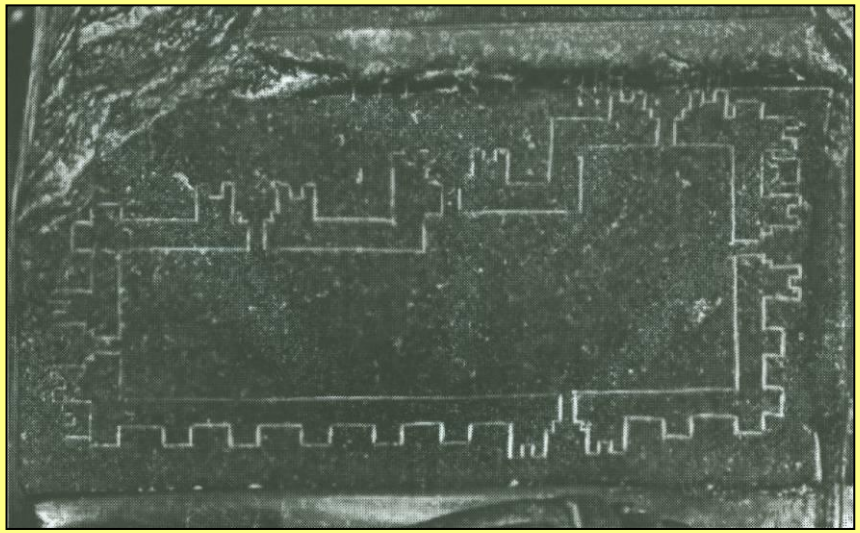
- The Gasur Map (2300 BCE)
  - Mountains, water course, place names
  - First known example of a topographic map labeled with cardinal directions





BABYLONIAN MAPS

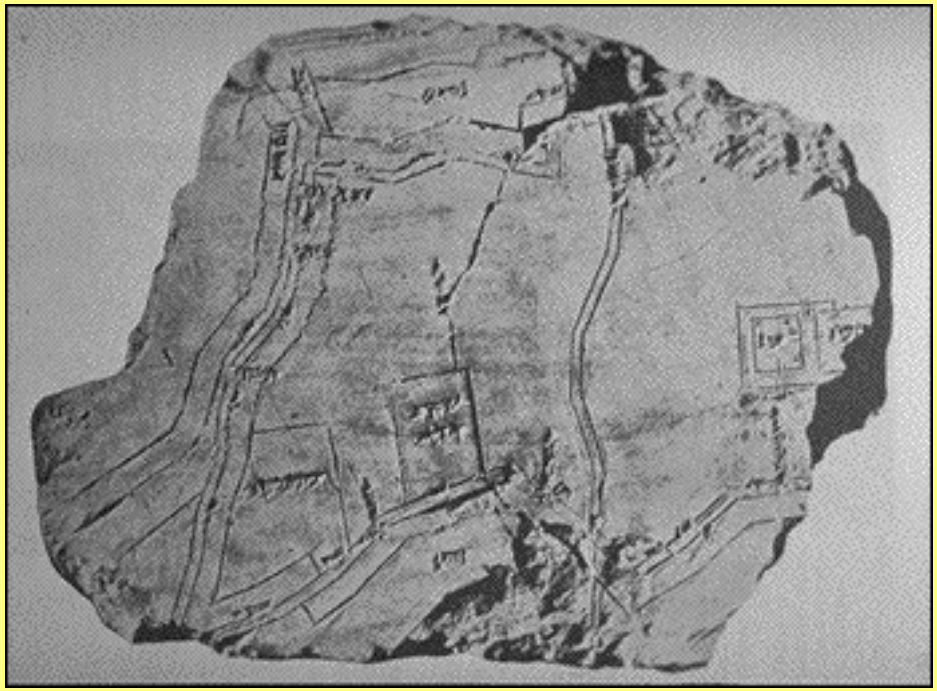
- Statue of Prince Gudea (2100 BCE)
  - Perhaps the first map with a bar scale



Gudea holding temple plan

BABYLONIAN MAPS

- Town Plan of Nippur (1500 BCE)
  - City wall, canal, park
  - Appears to be to scale (archaeological evidence unclear)

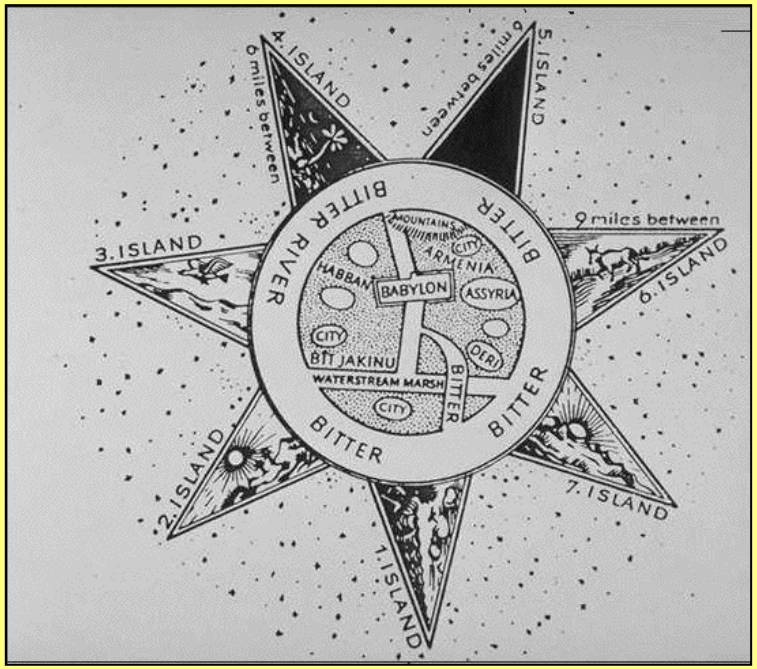


BABYLONIAN MAPS

- Babylonian “World Map” (600 BCE)
  - Small-scale map of the known world
  - Babylon & Euphrates
  - Encircling ocean is a recurring theme
  - Lands beyond were visited by legendary heroes

BABYLONIAN MAPS

- Babylonian “World Map” (600 BCE)
  - Reference to the 4 winds or 4 directions
  - Map is an attempt to explain ideas in the accompanying text



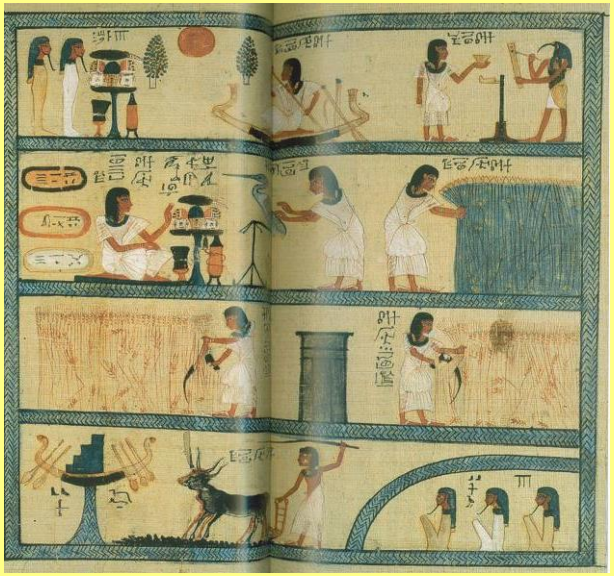
EGYPTIAN MAPS

EGYPTIAN MAPS

- Egyptians were advanced for their time
  - Developed written language in the 4th millennium BCE
  - Advanced the fields of mathematics, agriculture, quarrying, medicine, art, and architecture
- They left us even less cartographic evidence than the Babylonians
  - Used papyrus and wood instead of clay

EGYPTIAN MAPS

- Maps on coffin lids
  - Lids from 2000 BCE illustrate both water and land routes to the “Underworld”
- Idealized plots of land and gardens
  - Example from 1400 BCE



Land was to be tended to in the afterlife

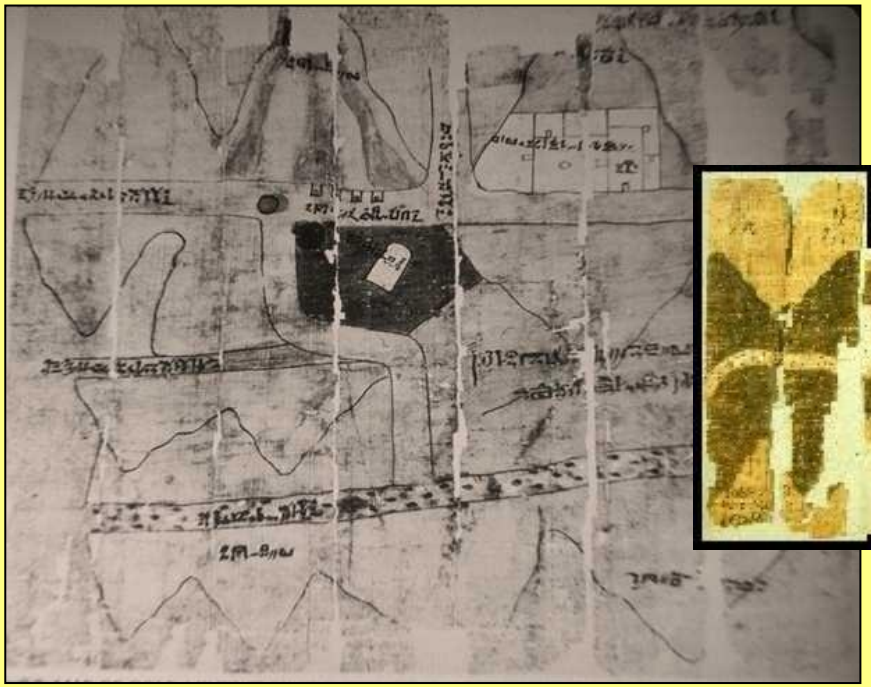
Curious combination of perspectives: plan and profile

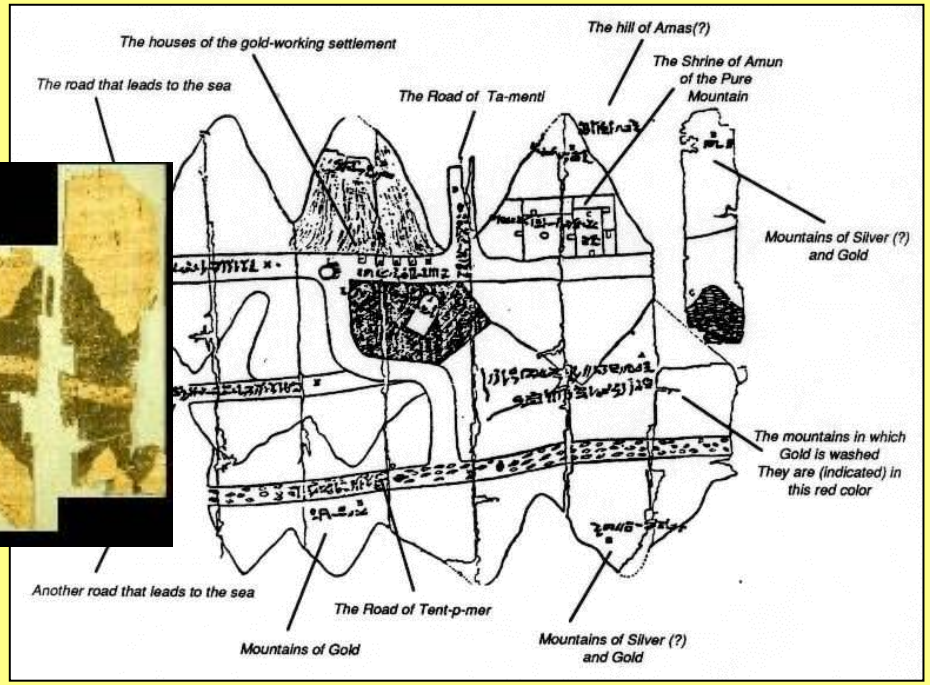
EGYPTIAN MAPS

- Survey maps were perhaps the most common Egyptian maps
  - Annual flooding of the Nile necessitated accurate maps to re-establish boundaries
  - Maps were used for taxation purposes
  - There are no surviving examples; we know about them from Egyptian manuscripts

EGYPTIAN MAPS

- Turin Papyrus (Map of the Gold Mines)
  - Topographic map (1300 BCE)
  - Located between the Nile & Red Sea
  - Had two legends





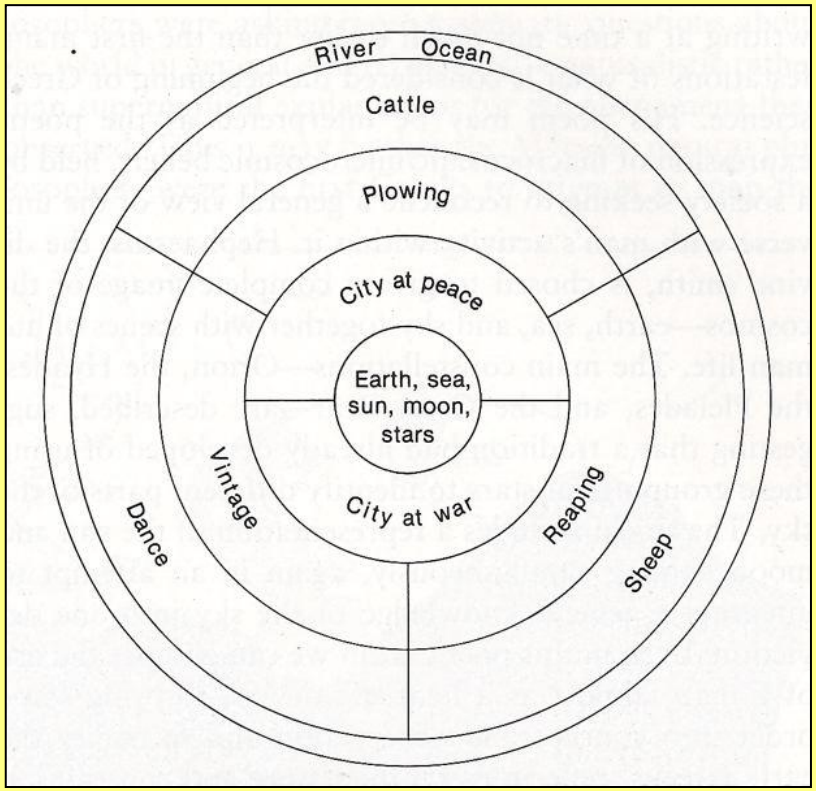
GREEK MAPS

GREEK MAPS

- Greek culture and scholarship spans thousands of years
  - Greek literature has an unbroken history of nearly 3,000 years
- Reflect a gradual transition from theoretical to practical cartography
  - From idealized concepts of the shape of the known world and “climata,” to map projections and coordinate geometry
- Reconstructions aplenty

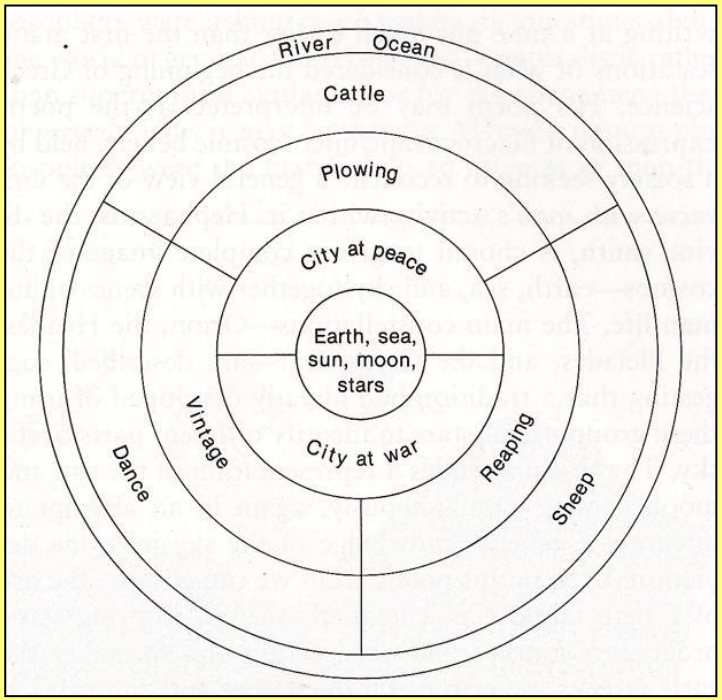
GREEK MAPS

- Achilles Shield (800 BCE)
  - From Homer's *Illiad*
  - Not a geographical representation, but a general view of the world and man's place in it



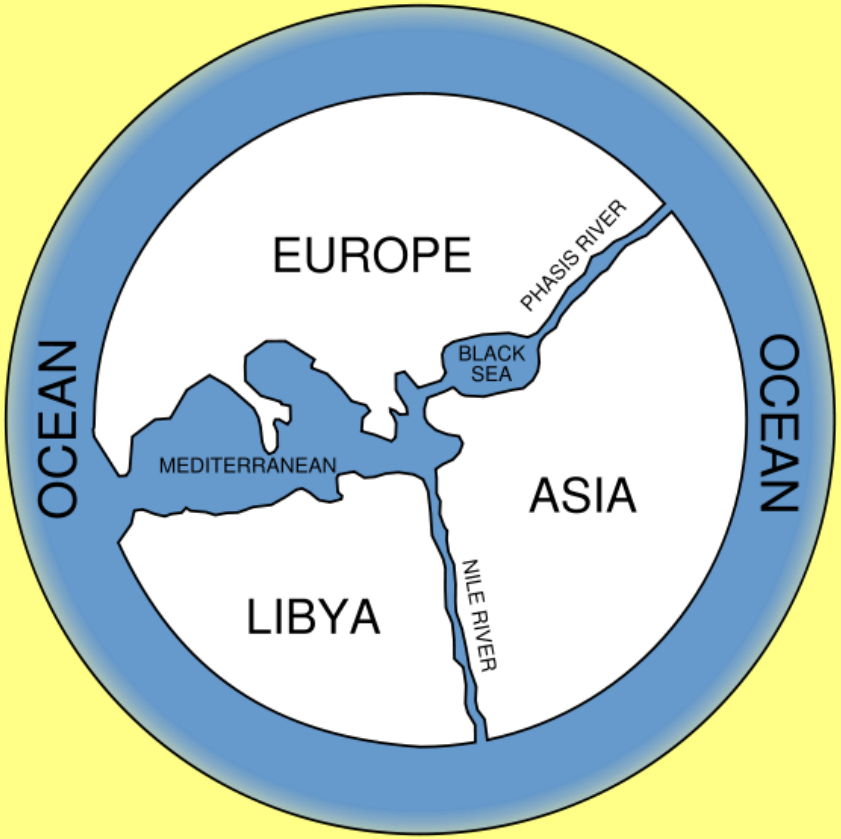
GREEK MAPS

- Achilles Shield (800 BCE)
  - Encircling ocean (again)
  - Was ridiculed by later writers, but acted as a framework for subsequent world maps



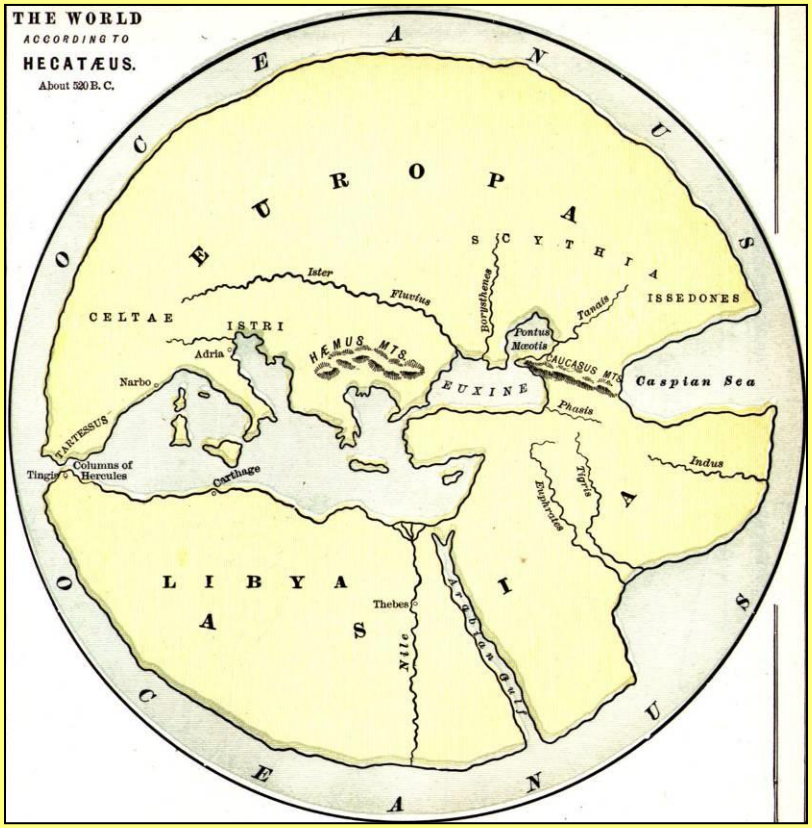
GREEK MAPS

- Anaximander's World Map (6th BCE)
  - Considered to be the first world map drawn to scale



GREEK MAPS

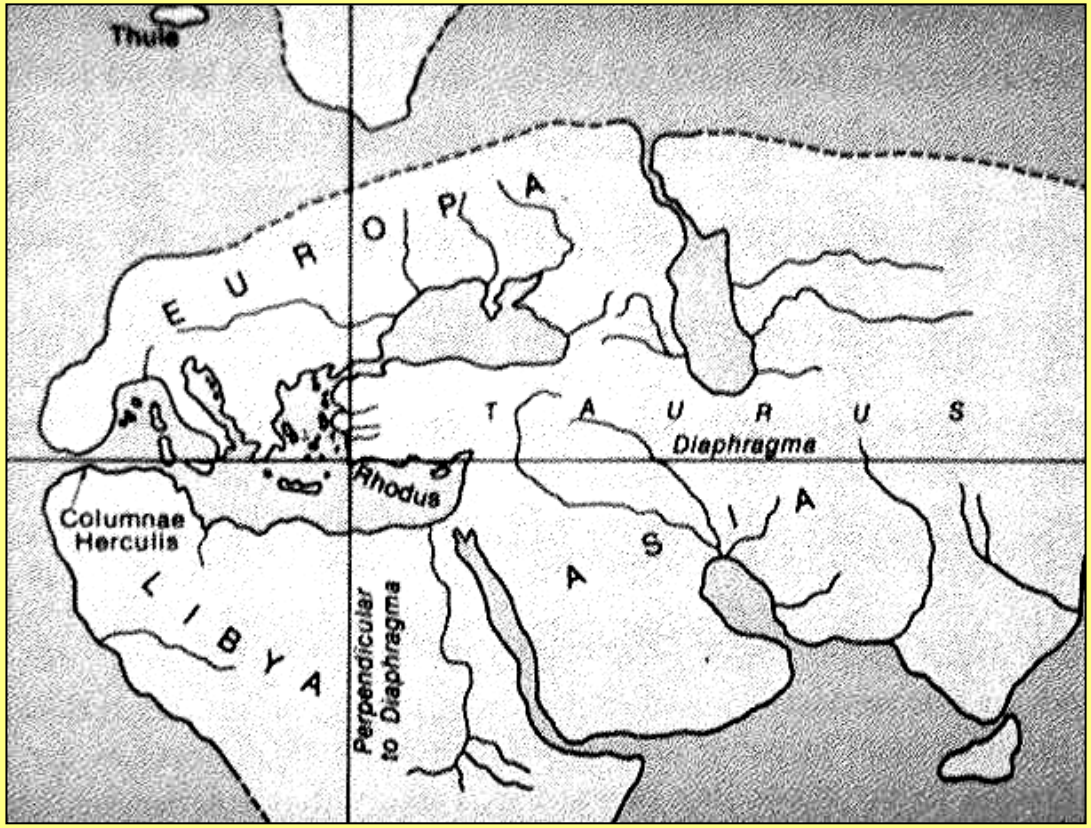
- Hecataeus' World Map (500 BCE)
  - Part of *Circuit of the Earth*, the first systematic description of the known world



GREEK MAPS

- Dicaearchus' World Map (3rd BCE)
  - First meridian and parallel (diaphragma)
  - Encircling ocean gone (for now)

An explosion of geographic information occurred during Hellenistic times

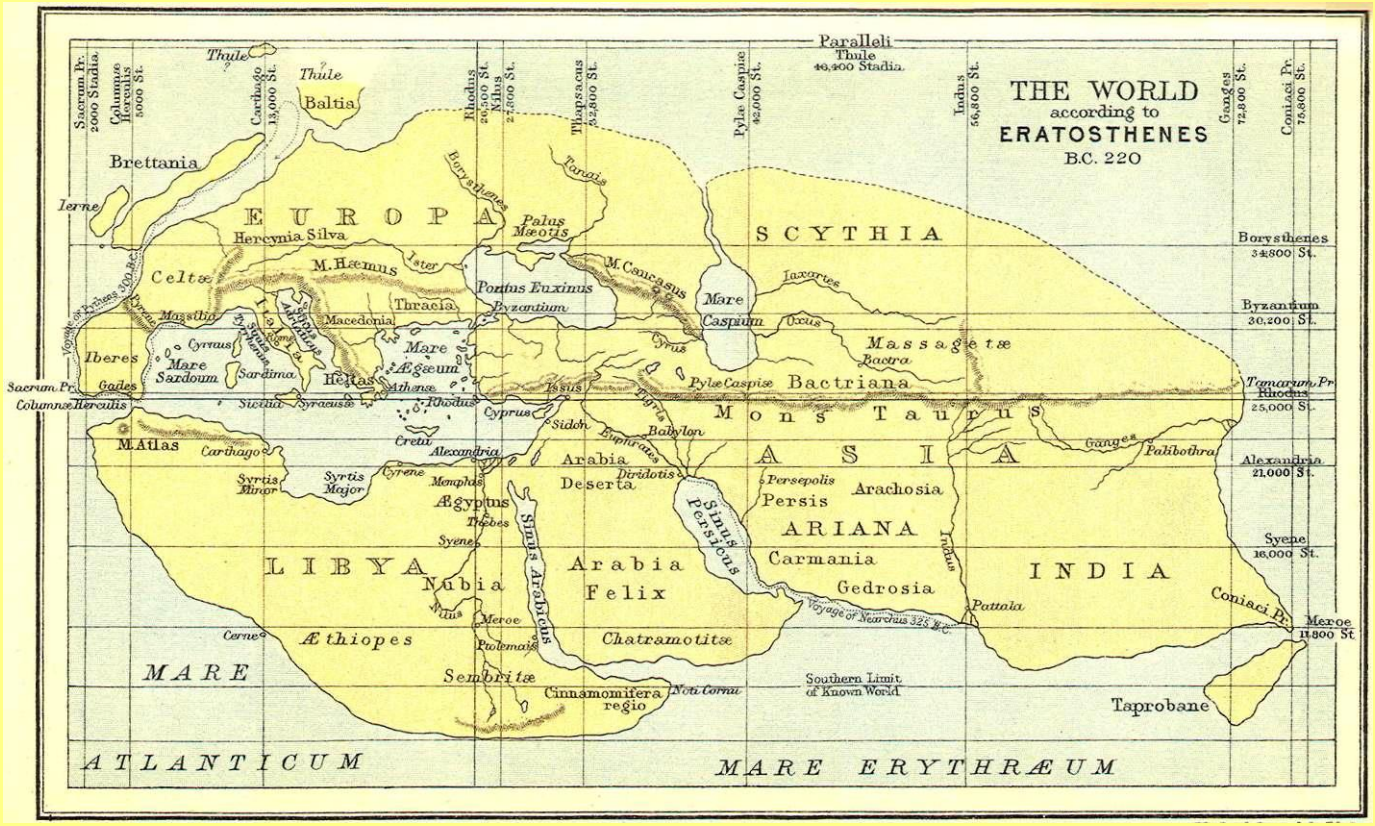


Alexander's exploits produced volumes of information

The Great Library at Alexandria was a premier storehouse

GREEK MAPS

- Eratosthenes' World Map (220 BCE)
  - The father of scientific cartography, and first to calculate Earth's circumference



GREEK MAPS

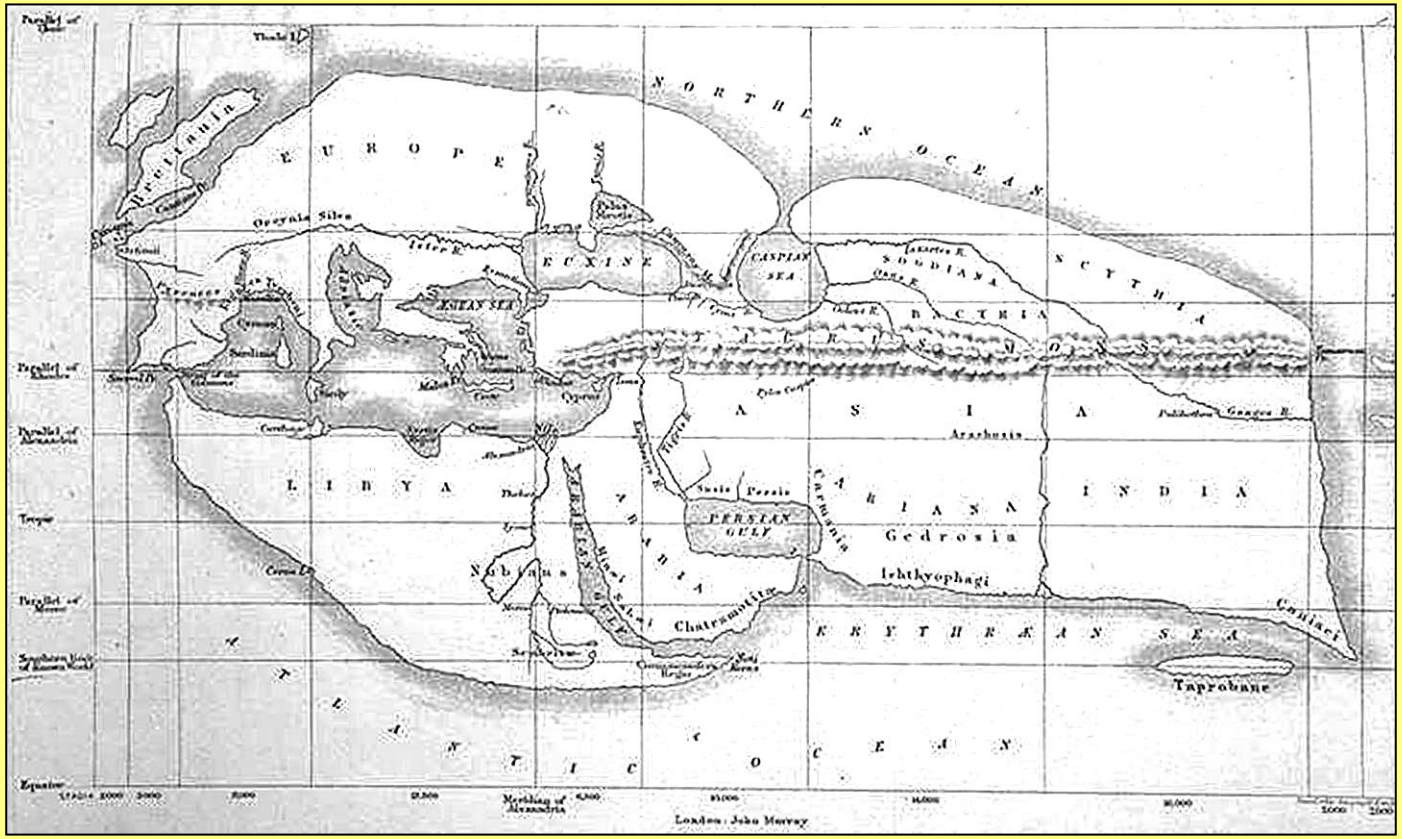
- Orb of Crates (150 BCE)
  - Based on Homer's *Ulysses*
  - Originally a 10 foot wide globe

Influence shifted from Alexandria to Rome during the Greco-Roman period

Greek cartography was incorporated into the Roman world, and distributed beyond

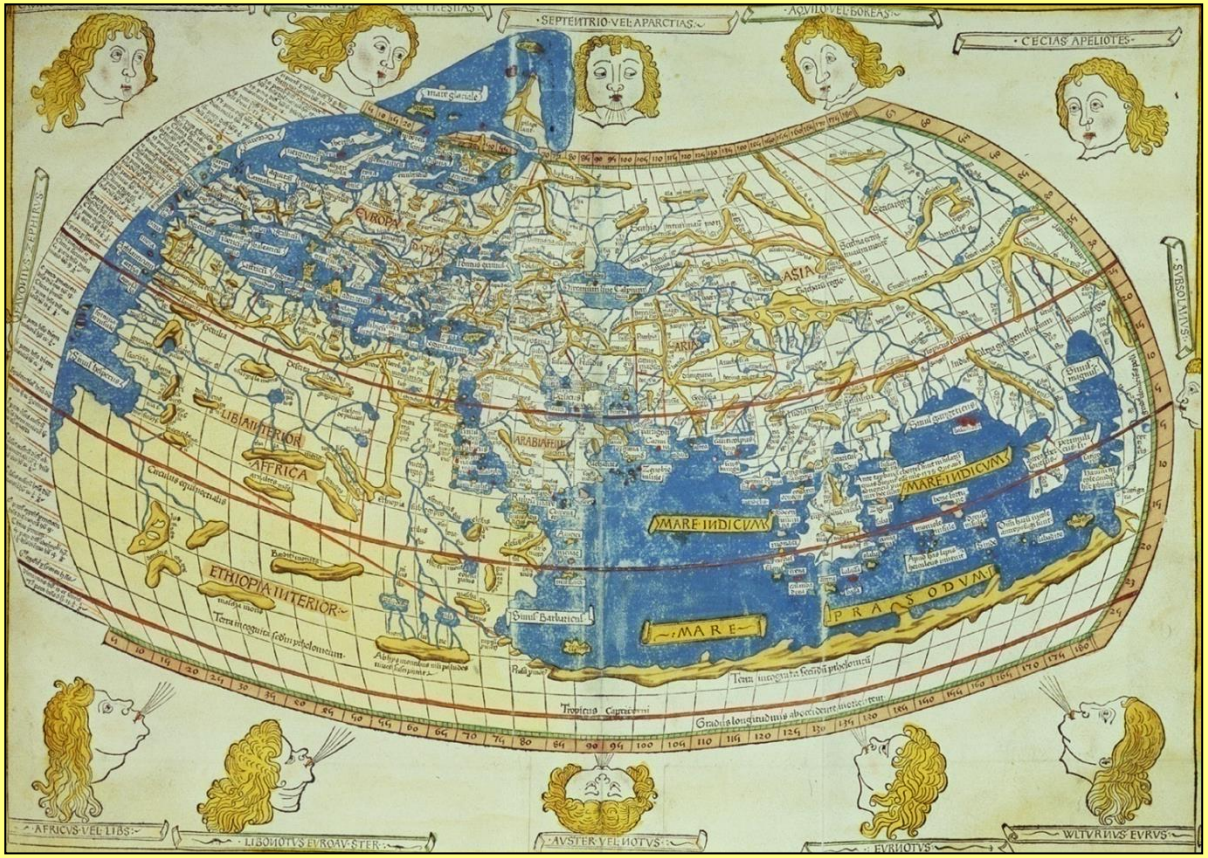
GREEK MAPS

- Strabo's World Map (beginning of CE)
  - We have his 17 volume *Geography* intact
  - Recommended construction on a globe



GREEK MAPS

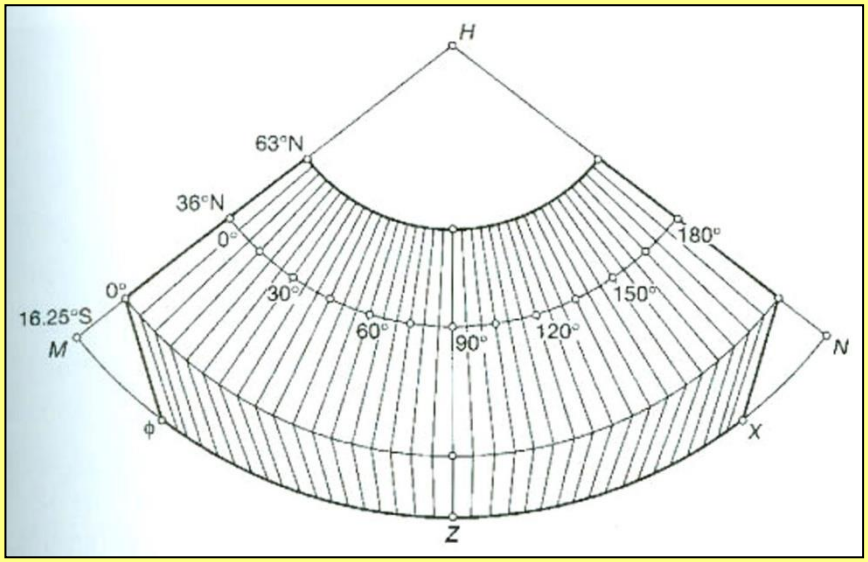
- Ptolemy's World Map (150 CE)
  - The World Map for over 1,000 years



- Based on a projection
- Derived from lon/lat tables
- No more encircling ocean
- Caspian Sea enclosed
- Most complete geography
- Enclosed Indian Ocean

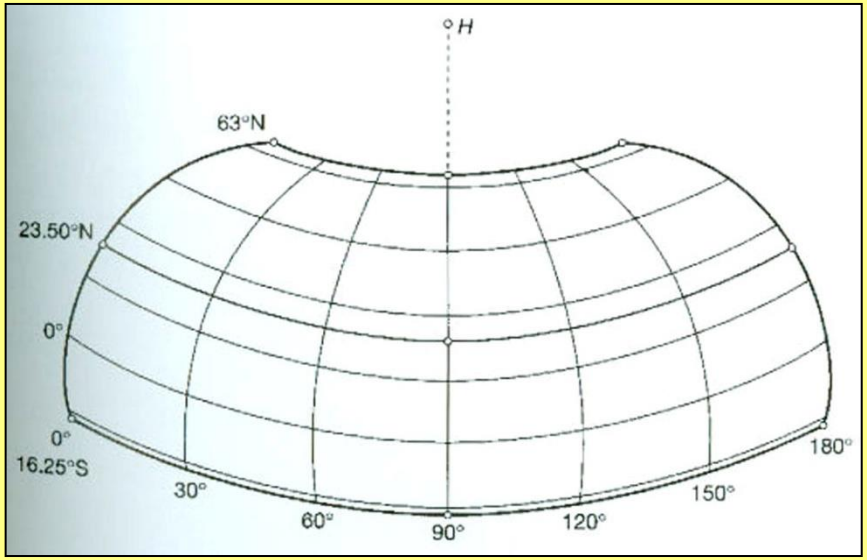
GREEK MAPS

- Ptolemy's Projections (150 CE)
  - A major cartographic breakthrough



Conic Projection

Resulted in far less areal and angular distortion than orthogonal grids used previously. With slight modifications, this projection is still in use today.



Pseudoconic Projection

Reduced distortion even further, but was more difficult to construct. Ptolemy recommended this second projection to *all but the lazy*.

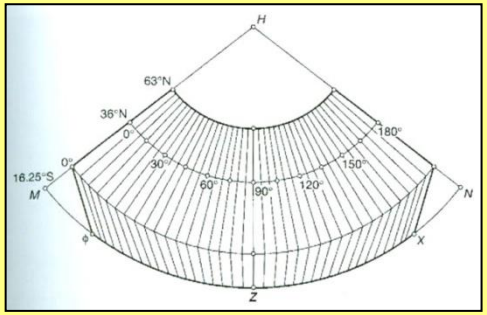
GREEK MAPS

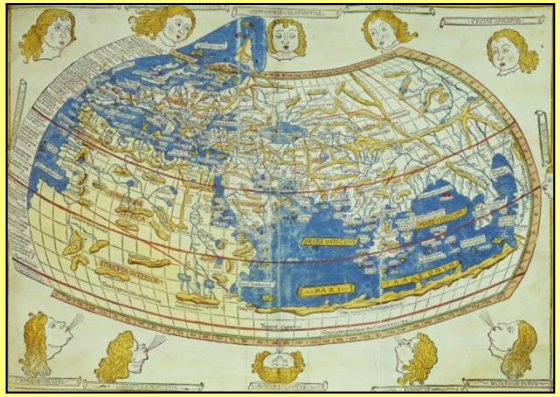
- Ptolemy's Regional Maps (150 CE)
  - Larger scale maps of smaller regions

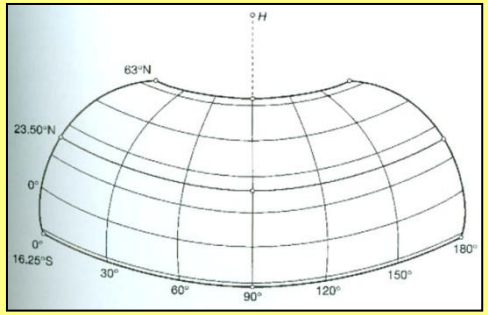
This version produced during the renaissance using woodcut techniques

GREEK MAPS

- Ptolemy's World Map remained as "truth" until the renaissance
  - It was scientifically-based
  - Ptolemy's reputation as an astronomer was beyond reproach
  - The Roman empire peaked around the time of Ptolemy; an intellectual vacuum ensued



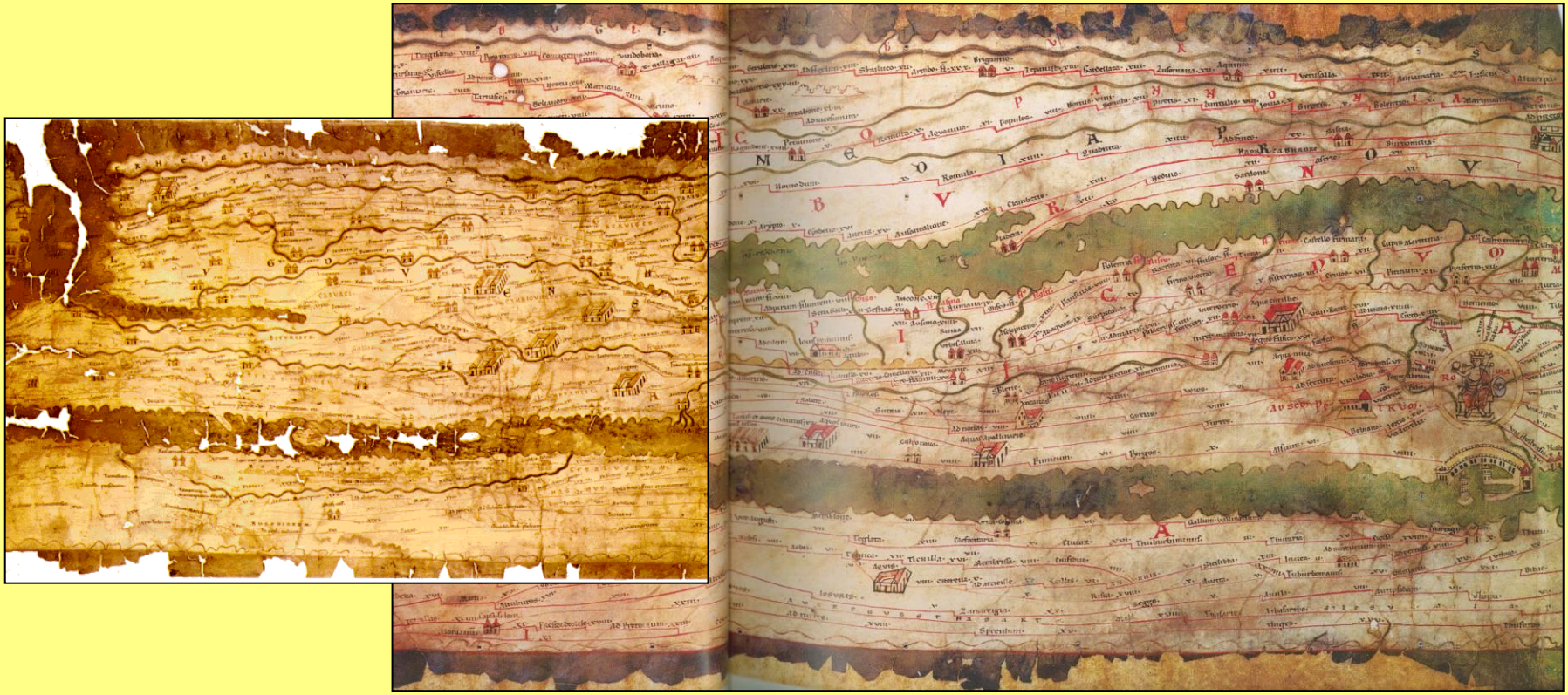




ROMAN MAPS

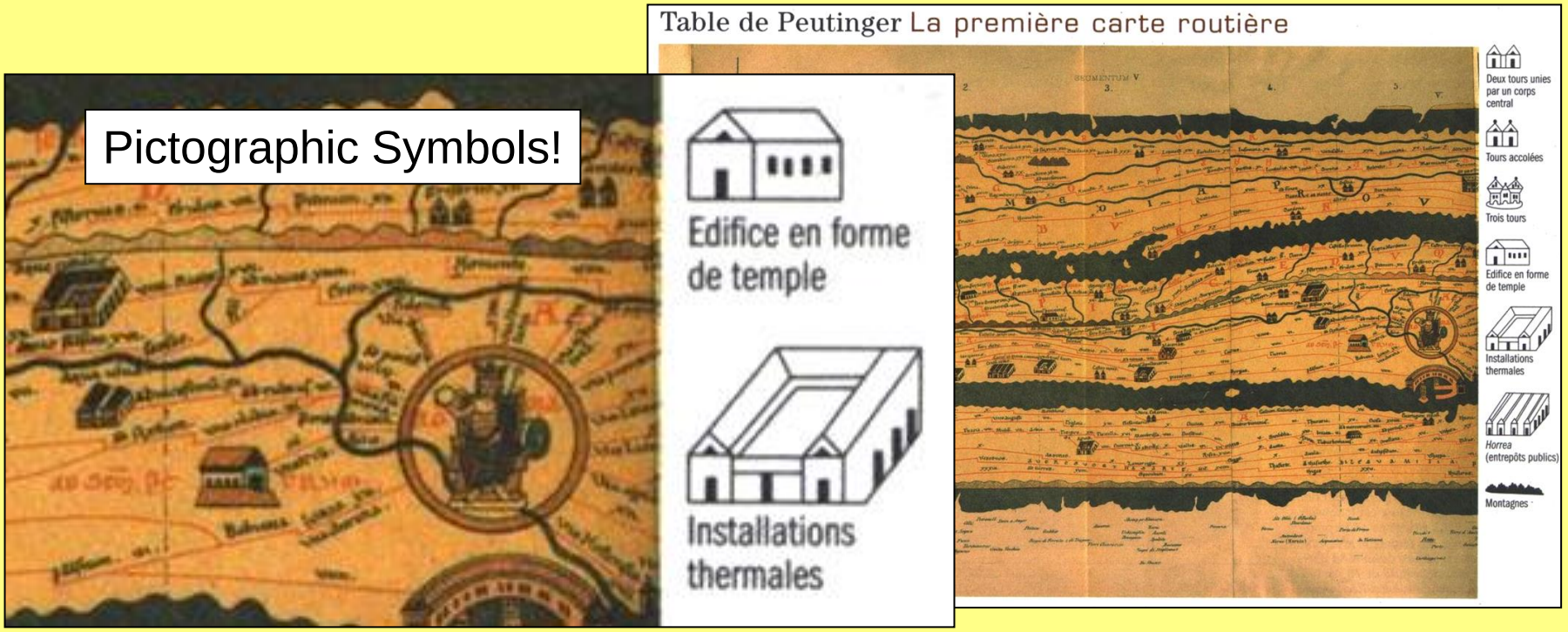
ROMAN MAPS

- Peutinger Road Map (335 CE)
  - 22 ft long, 1 ft wide
  - For use with a written itinerary



ROMAN MAPS

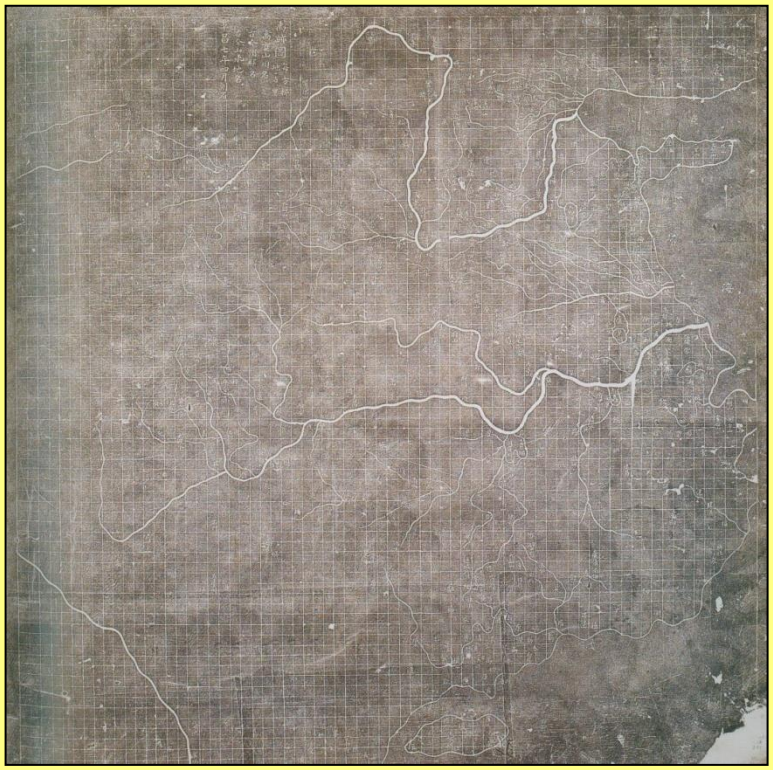
- Peutinger Road Map (335 CE)
  - Entire Roman road network is laid out as parallel routes
  - Extends into Asia and North Africa



CHINESE MAPS

CHINESE MAPS

- Stone map of China (1140 CE)
  - Engraved stone maps were transferred to paper by ink rubbing
  - Used to educate school children and emperors
  - Highly accurate representations of rivers and locations



CHINESE MAPS

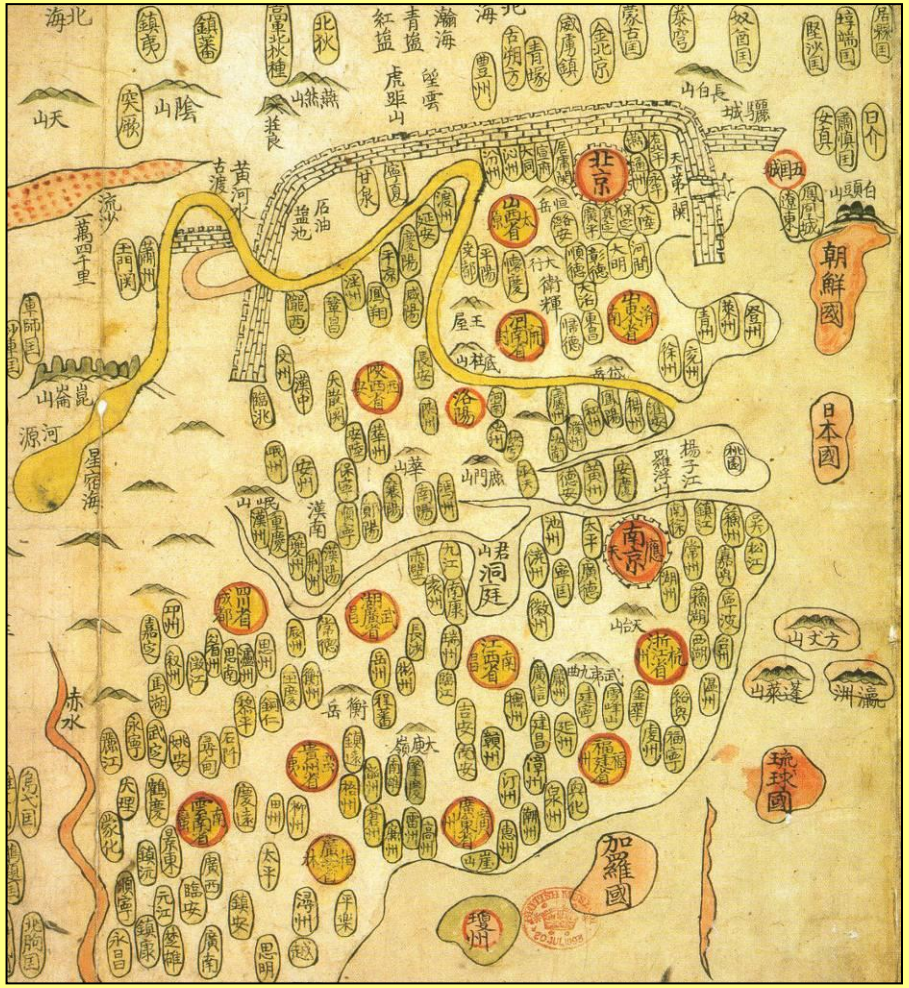
- Stone map of China (1140 CE)
  - Graticule squares represent 100 li (33 mi)
  - Represents a cartographic sophistication unknown in the West at the time

CHINESE MAPS

- Silk map of China (1470 CE)
  - Used to demonstrate the new Confucian dynasty's "cosmic legitimacy"
  - Spans Korea to Europe (!?)

CHINESE MAPS

- Paper map of China (1800s)
  - Used for bureaucratic control of the empire, beginning in the 7th CE
  - Yellow River (Hwang Ho)
  - Great Wall



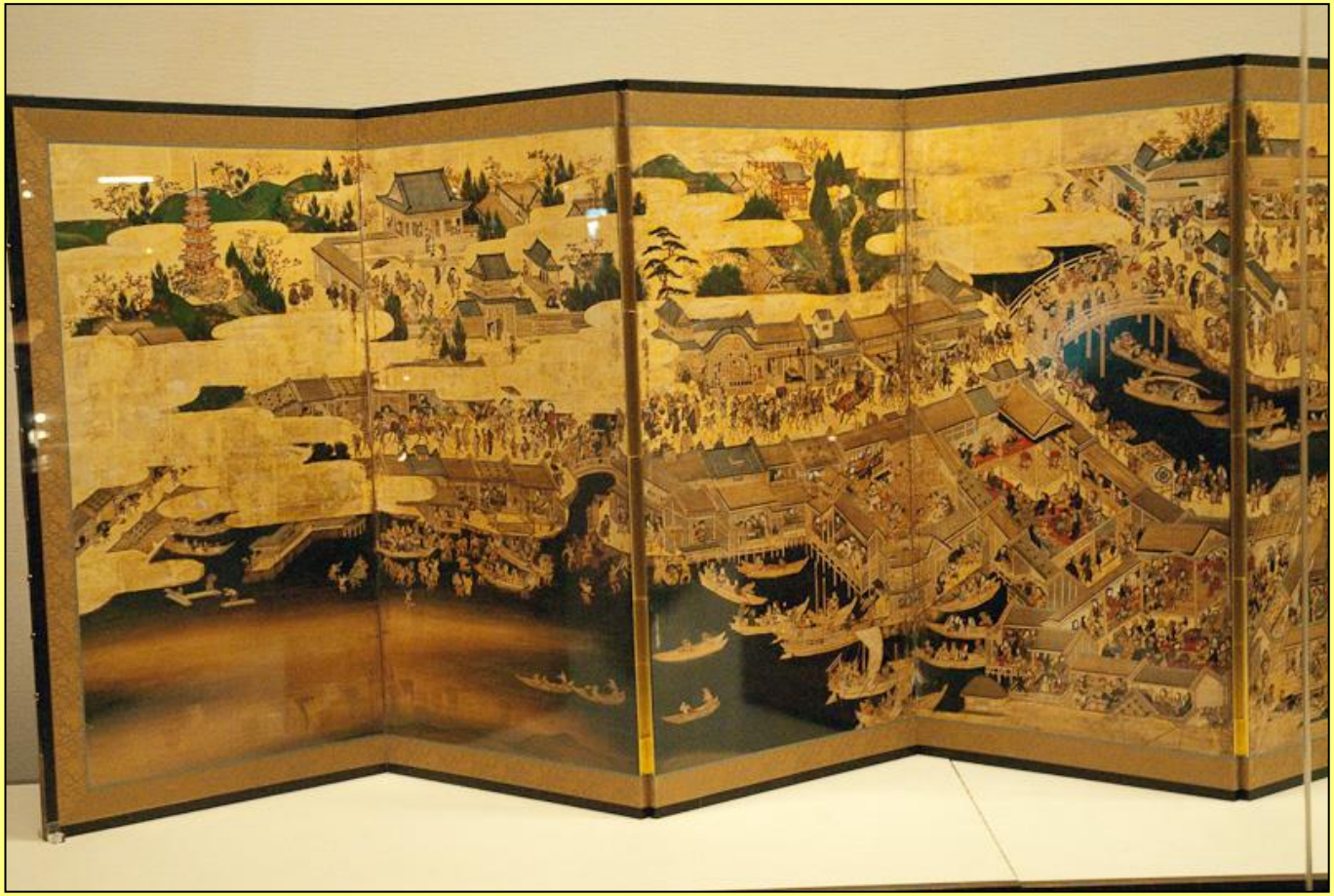
JAPANESE MAPS

JAPANESE MAPS

- Clouds used to compress distance or time

JAPANESE MAPS

- Clouds used to compress distance or time



MAPS of the MIDDLE AGES

MAPS of the MIDDLE AGES

- al-Idrisi's World Map (1154)
  - Based on Ptolemaic principles, but incorporating Islamic characteristics
  - South at top

MAPS of the MIDDLE AGES

- al-Gharaib's World Map (1481)
  - Reflects religious views of 10th century Islam
  - Centered on Mecca
  - South at top

MAPS of the MIDDLE AGES

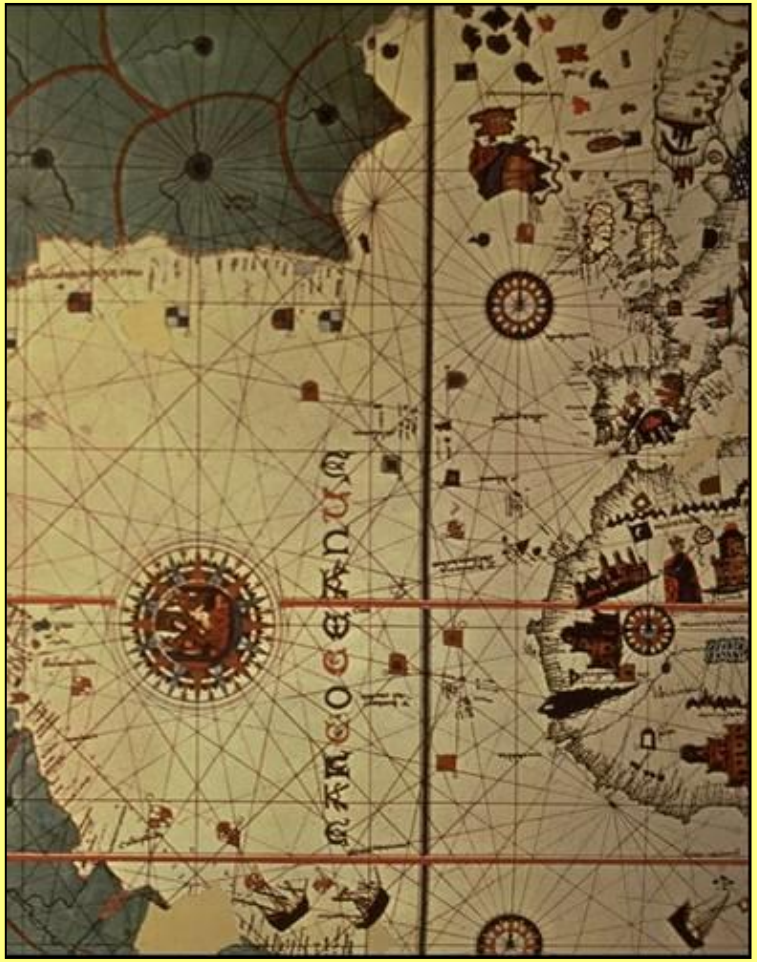
- "T-O" Mappaemundi
  - Religious maps devised and promoted by the early Christian Church
  - "O" is the known world with encircling ocean, and "T" divides the continents
  - East is at top
  - "T" represents the cross
  - The first map printed in Europe (1472)

MAPS of the MIDDLE AGES

- The Psalter Map (1260)
  - A less obvious T-O map
  - Jerusalem at center; biblical stories abound
  - Christ at top, holding a T-O globe
  - Red sea in red

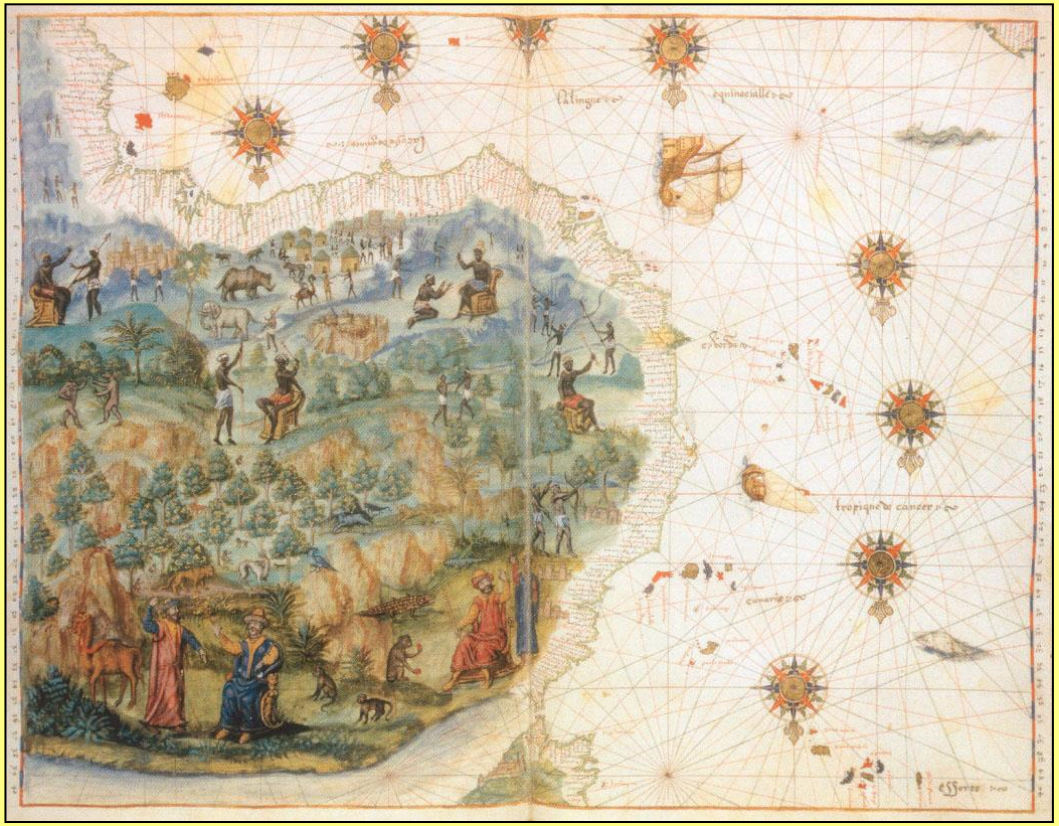
MAPS of the MIDDLE AGES

- Portolan Chart (1500)
  - Sea chart that began the tradition of "orienting" maps with north at top
  - Radiating lines correspond to compass directions, but were identified by wind directions



MAPS of the MIDDLE AGES

- Portolan Chart (1547)
  - Prized, but prone to error (didn't take into consideration the spherical earth)



"Luxury Edition" charts were sold to the wealthy

Scenes on land were partly based in truth, and partly in myth

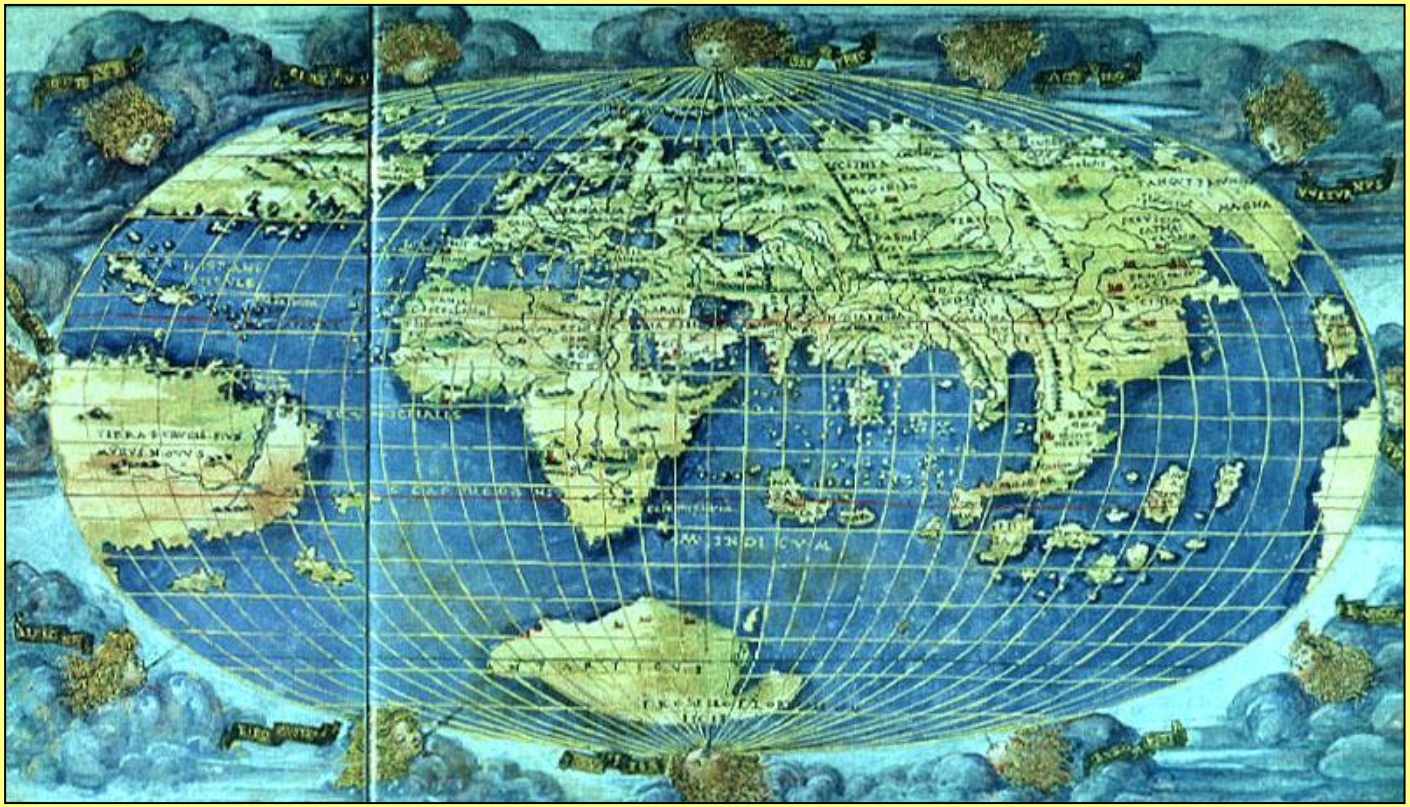
MAPS of the RENAISSANCE

MAPS of the RENAISSANCE

- After 1,000 years, Ptolemy is rediscovered in Europe
  - Revisions accompanied translations

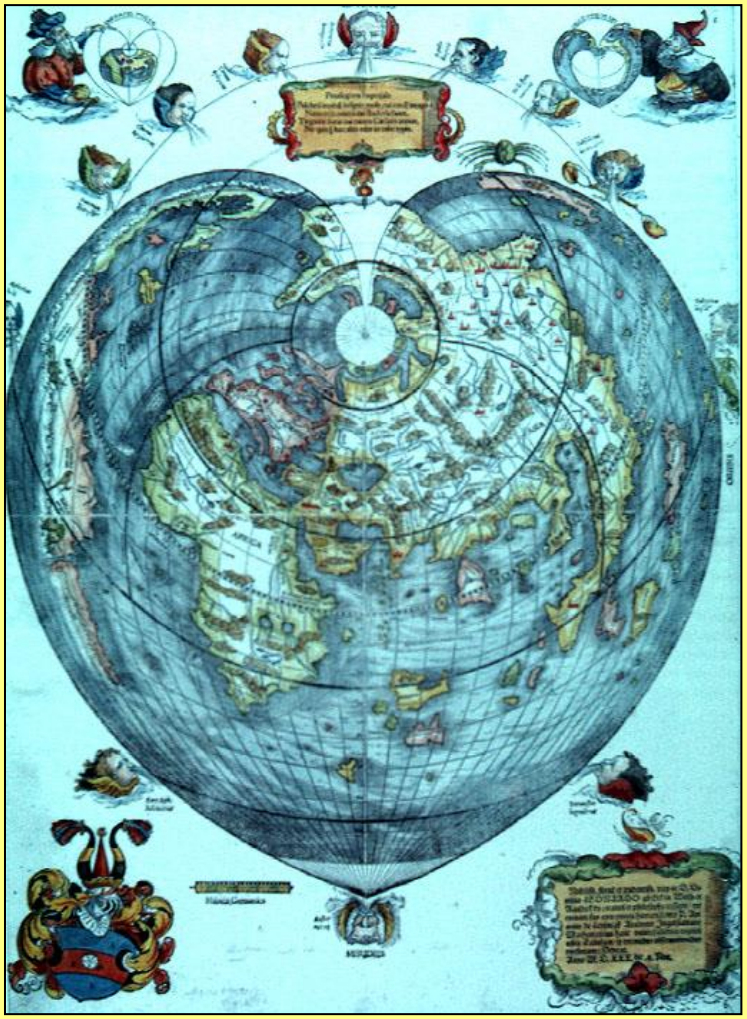
MAPS of the RENAISSANCE

- Roselli's World Map (1508)
  - The first "whole world" map
  - Mythical southern continent (disc. 1820)



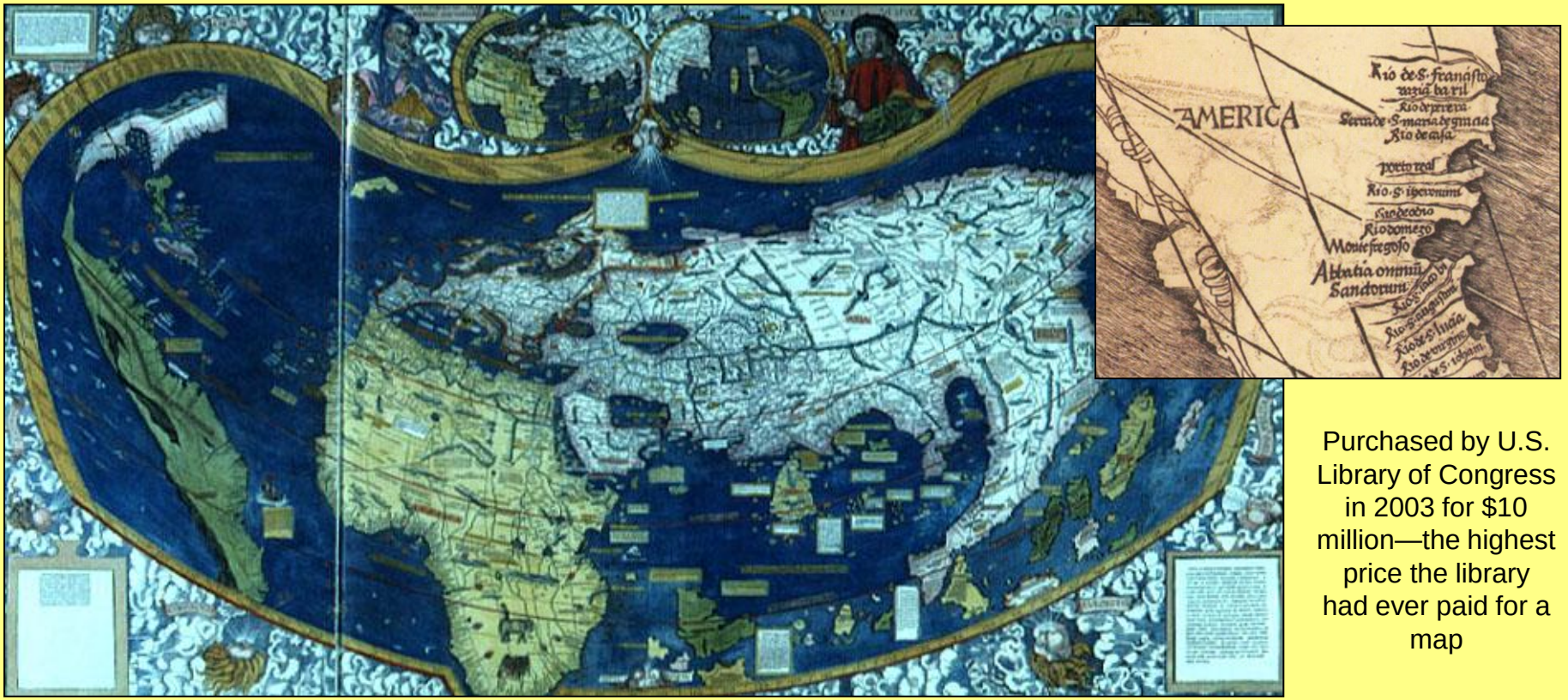
MAPS of the RENAISSANCE

- Apian's World Map (1530)
  - "Heart-shaped world" resulted by expanding Ptolemy's projection to the entire world
  - Quite popular during the renaissance



MAPS of the RENAISSANCE

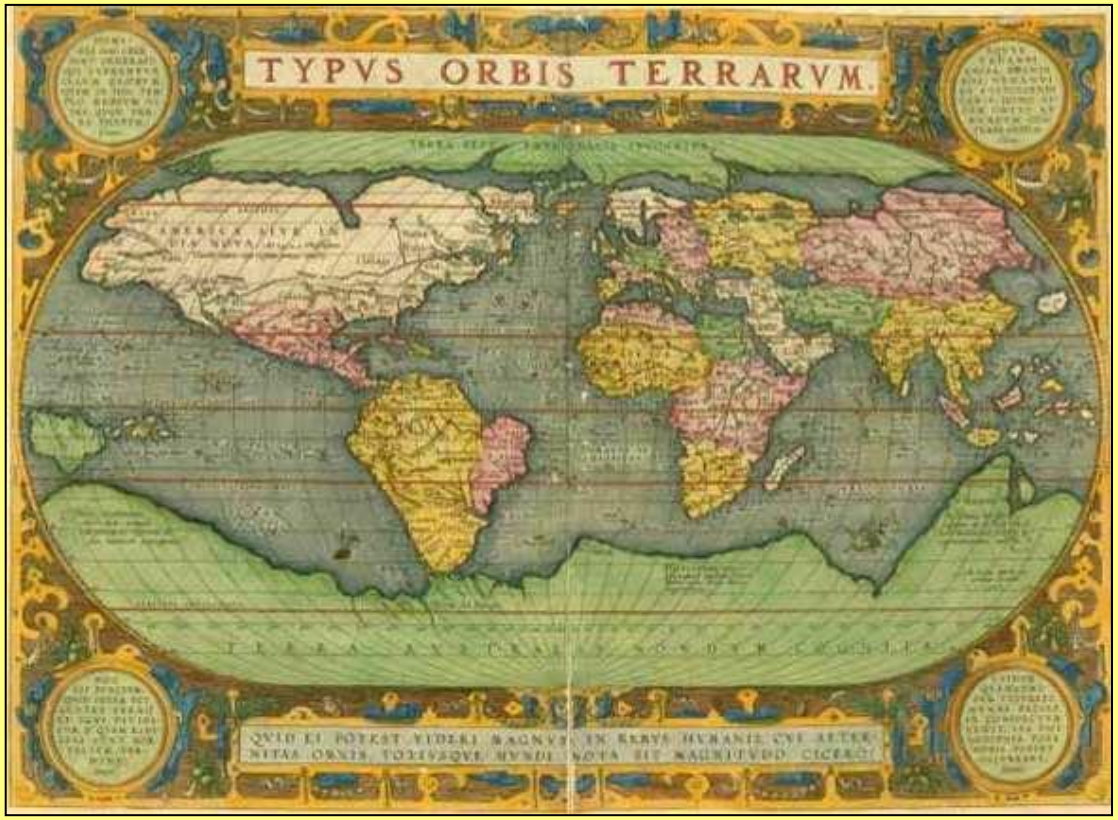
- Waldseemüller's World Map (1507)
  - First to name "America" (Vespucci? Ameryk?)
  - Name was later removed…



Purchased by U.S. Library of Congress in 2003 for $10 million—the highest price the library had ever paid for a map

MAPS of the RENAISSANCE

- Ortelius' World Map (1570)
  - From the first modern atlas: *Theatrum Orbis Terrarum* (Theater of the World)



MAPS of the 17th-19th CENTURIES

MAPS of the 17th-19th Centuries

- Janssonius' Danish Map (1629)
  - High level of accuracy and detail
  - He published the 11 volume *Atlas Major*, containing the work of a hundred people

MAPS of the 17th-19th Centuries

- Hondius' World Map (1630)
  - The quintessential renaissance map
  - He improved and reissued Mercator's atlas

MAPS of the 17th-19th Centuries

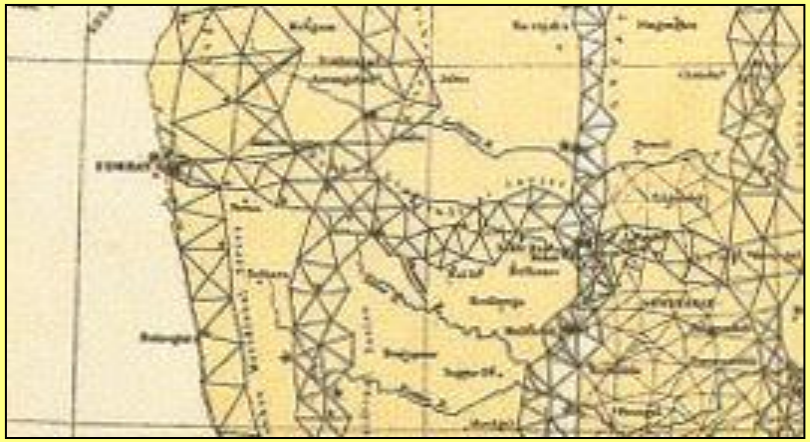
- van Kuelen's World Map (1720)
  - Based on Mercator's projection
  - Portolan lines are finally correct (rhumb)

MAPS of the 17th-19th Centuries

- California as an island (1650)
  - Idea came from a 1510 romance novel
  - Reinforced by Ascension's 1602 voyage
  - Outlawed by Ferdinand VII in 18th century

MAPS of the 17th-19th Centuries

- Great Trigonometrical Survey (1837)
  - Funded by the East India Company
  - Built from a single baseline
  - George Everest completed the central spine



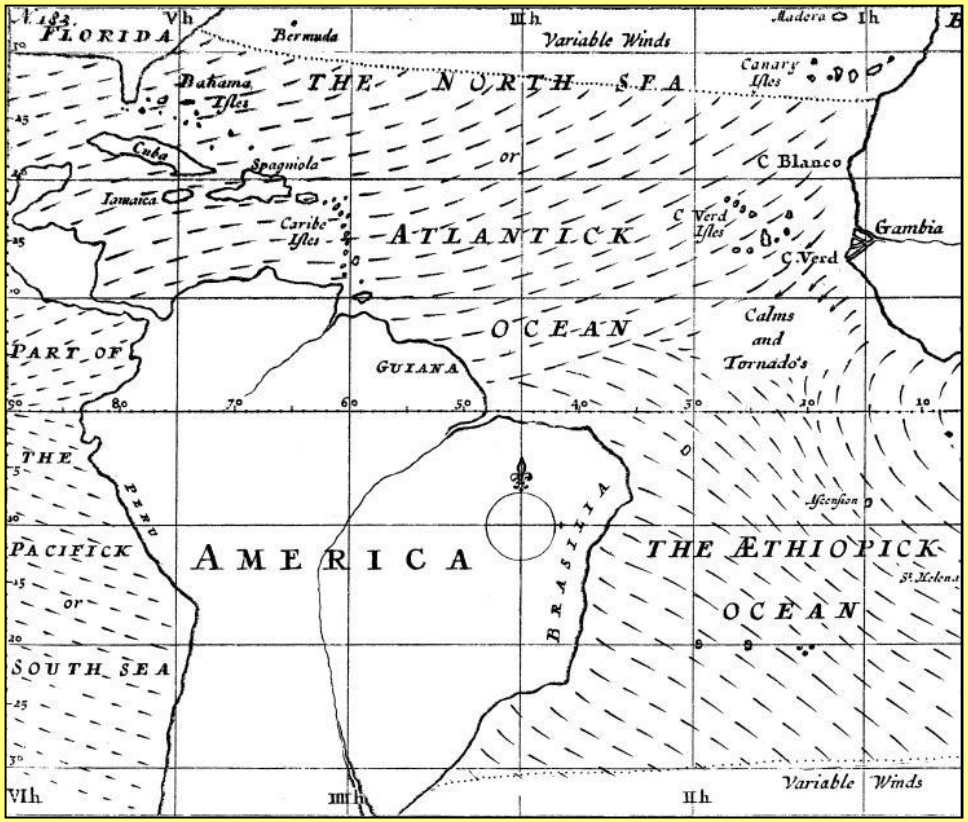
EARLY
THEMATIC MAPS

EARLY THEMATIC MAPS

- Thematic mapping is only about 300 years old
  - Developed primarily in Europe
- Used in conjunction with new statistical tools to describe
  - The physical world (trade winds, magnetic declination, topography, etc.)
  - The social world (population, disease, ethnicities, etc.)

EARLY THEMATIC MAPS

- Halley's Wind Map (1686)
  - The first weather map illustrates prevailing winds



EARLY THEMATIC MAPS

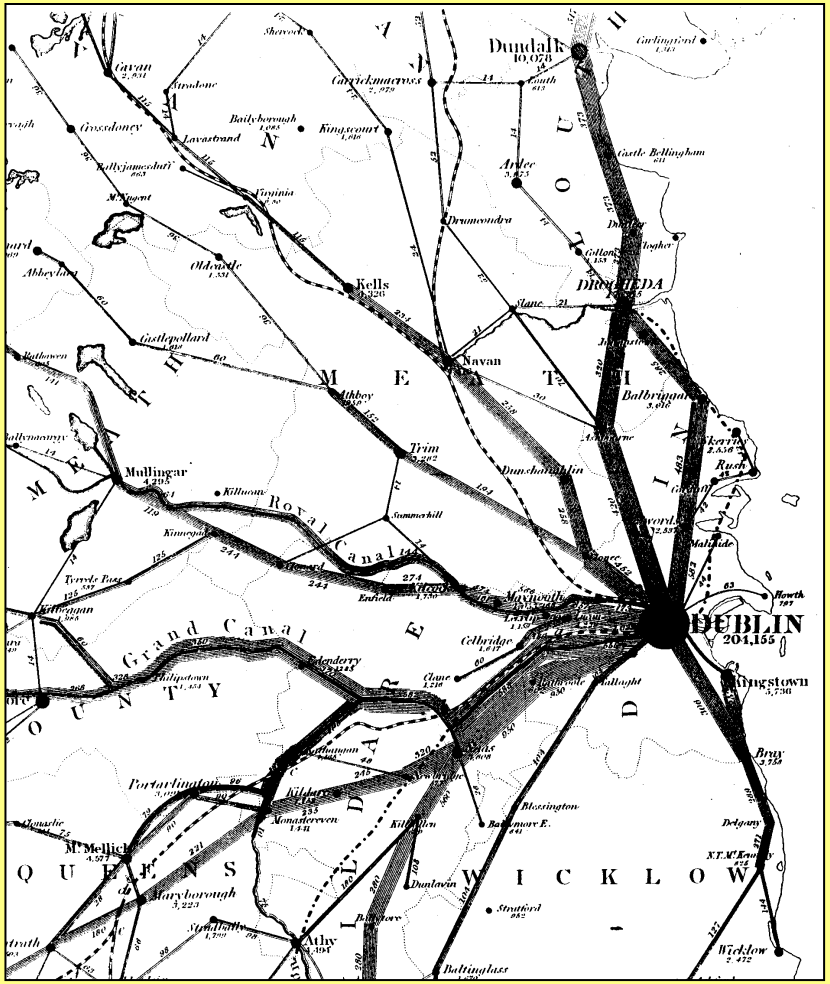
- Halley's Declination Map (1701)
  - Isogons identify variations in magnetism

EARLY THEMATIC MAPS

- Smith's Geological Map (1815)
  - First geological map of Britain, and the basis for all subsequent geological maps
  - William "Strata" Smith developed the "principle of faunal succession"

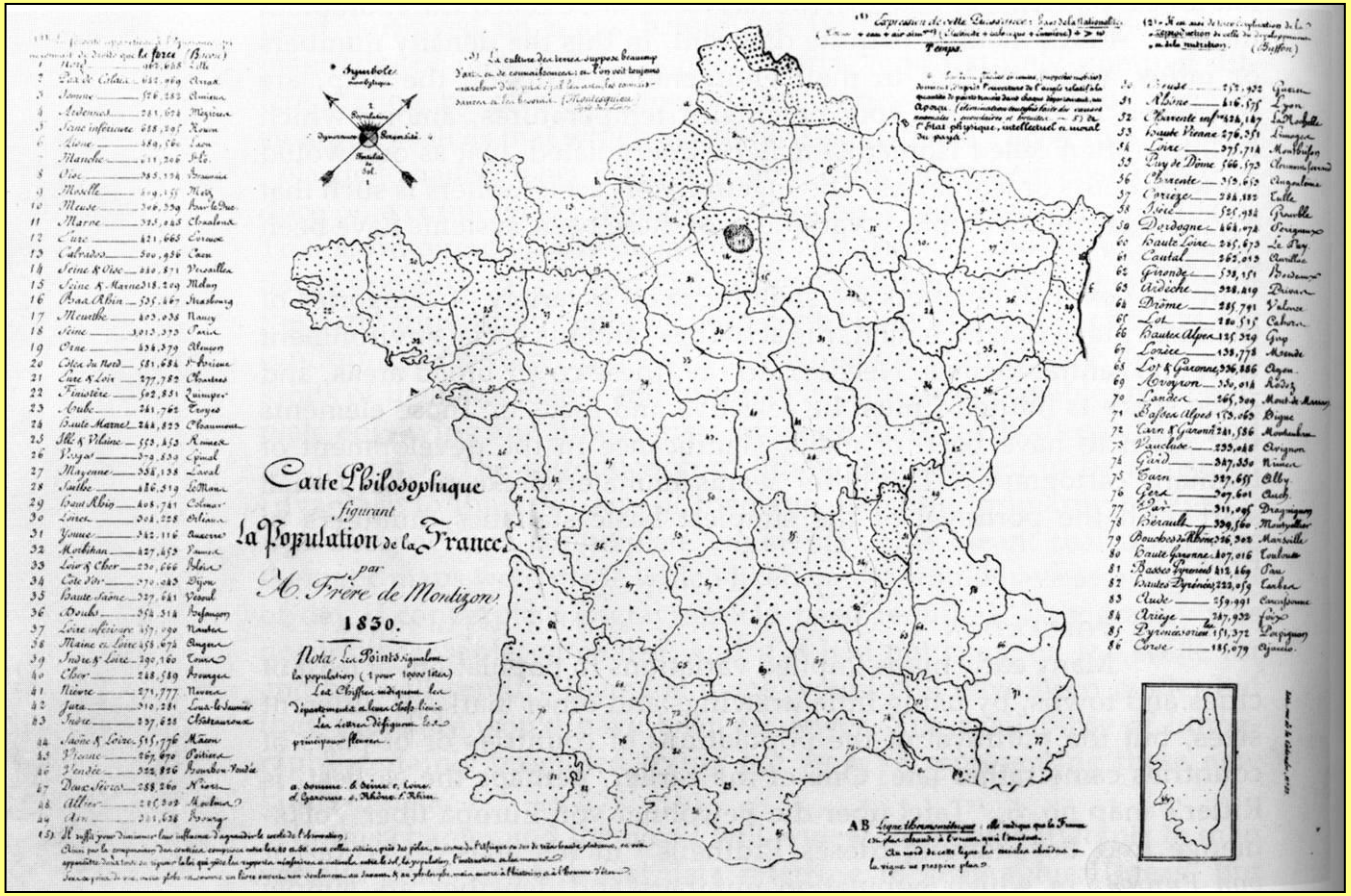
EARLY THEMATIC MAPS

- Harness' Transportation Map (1837)
  - The first flow map illustrates transportation magnitudes via proportionally scaled lines



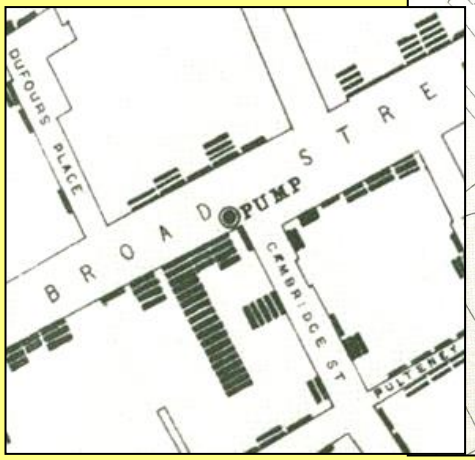
EARLY THEMATIC MAPS

- Montizon's Population Map (1830)
  - The first population dot density map



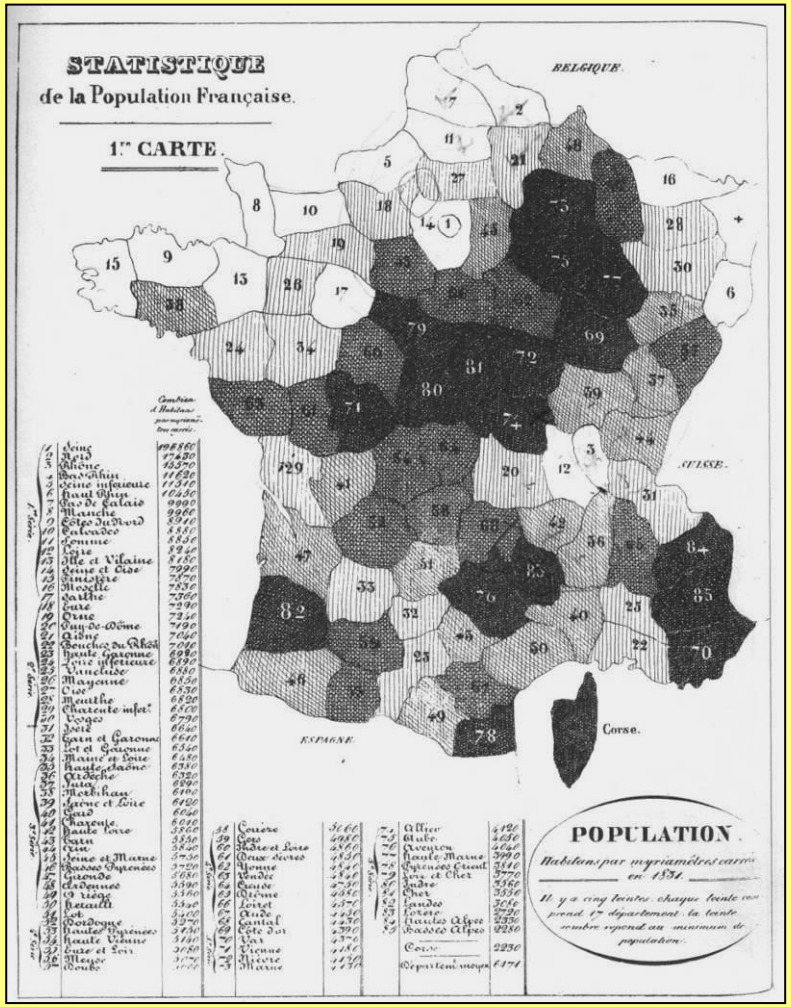
EARLY THEMATIC MAPS

- Snow's Cholera Map (1855)
  - The first epidemiological map (dot density) illustrates cholera cases in relation to water pumps



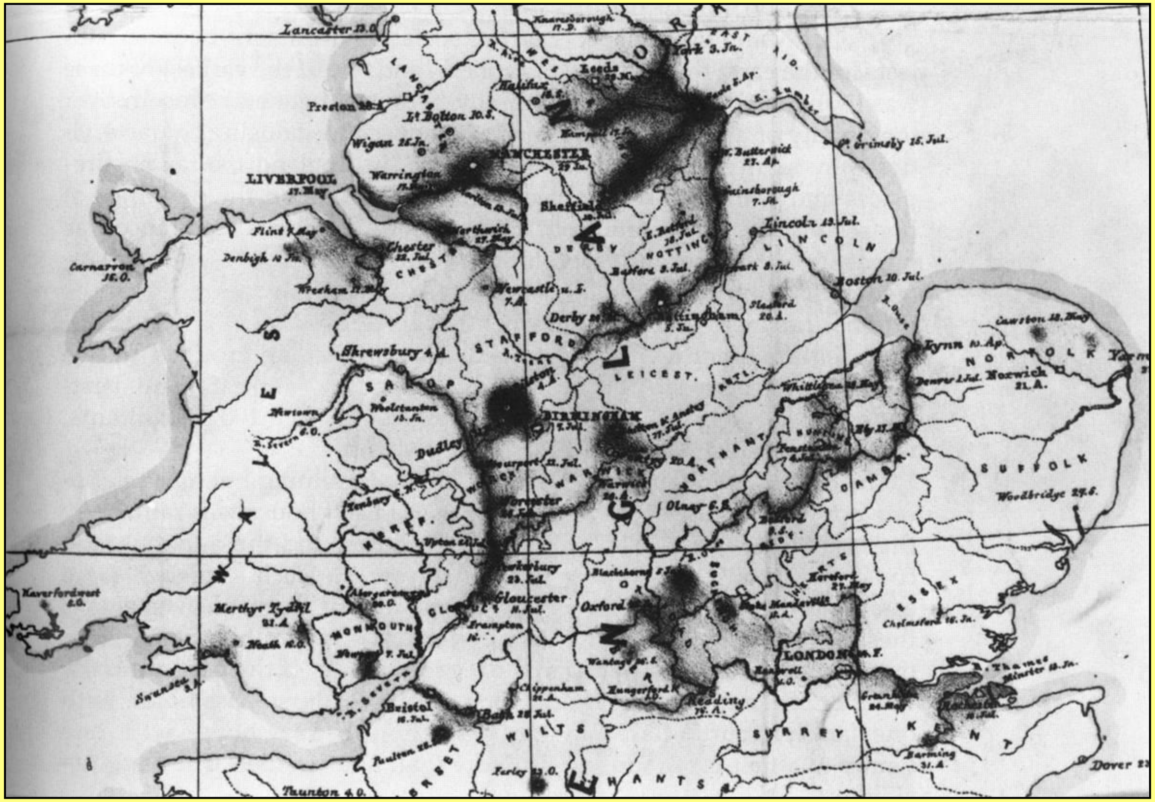
EARLY THEMATIC MAPS

- d'Angeville's Population Map (1836)
  - An early choropleth
  - Tone-value relationship is reversed



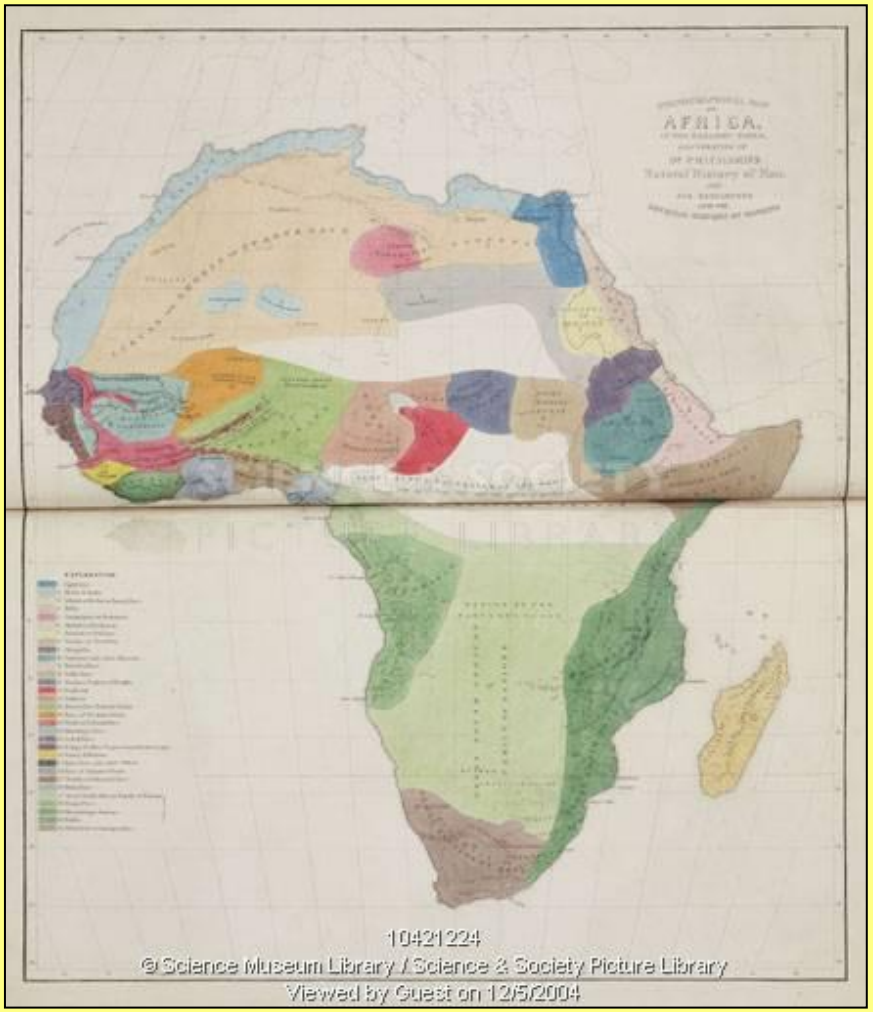
EARLY THEMATIC MAPS

- Petermann’s Cholera Map (1848)
  - An early density surface illustrating concentrations of cholera cases



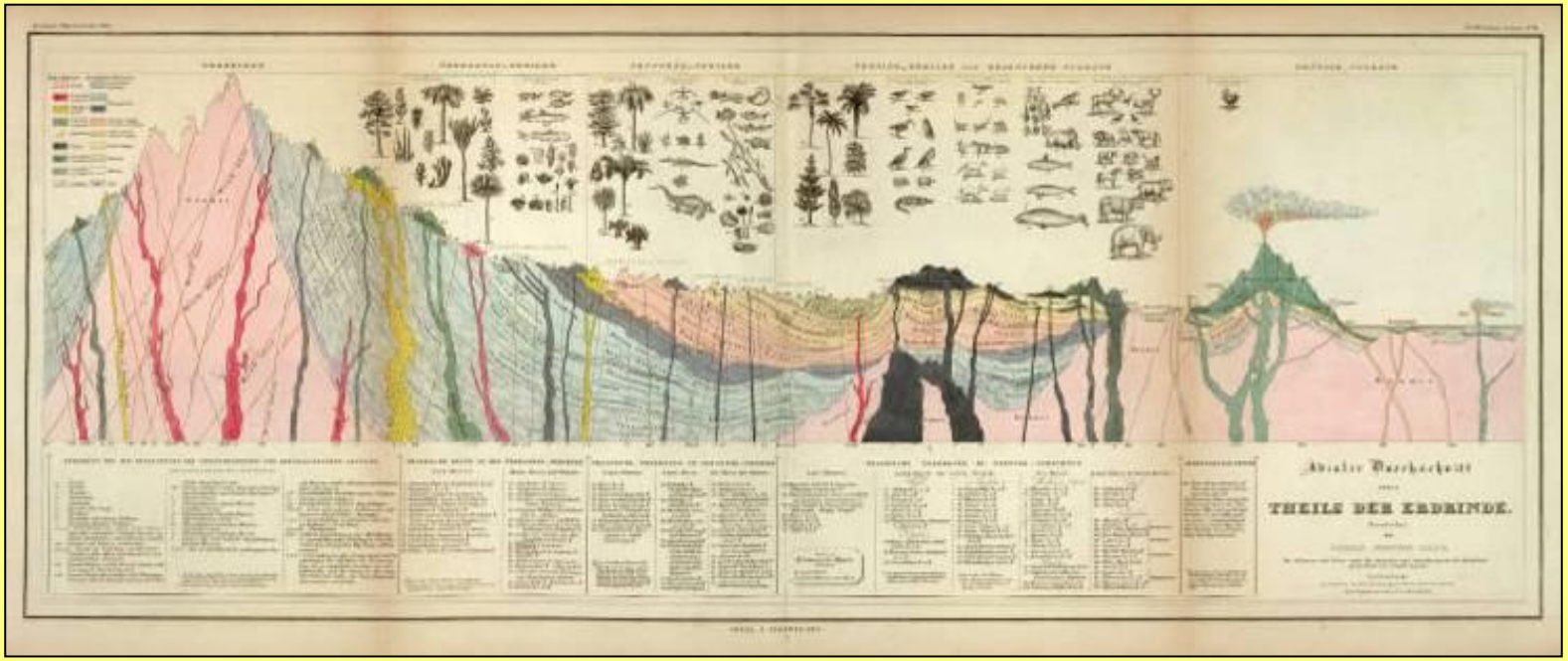
EARLY THEMATIC MAPS

- Pritchard's Ethnographic Map (1843)
  - A qualitative map illustrating the spatial distribution of ethnic groups
  - A chorochromatic map ("place-color")



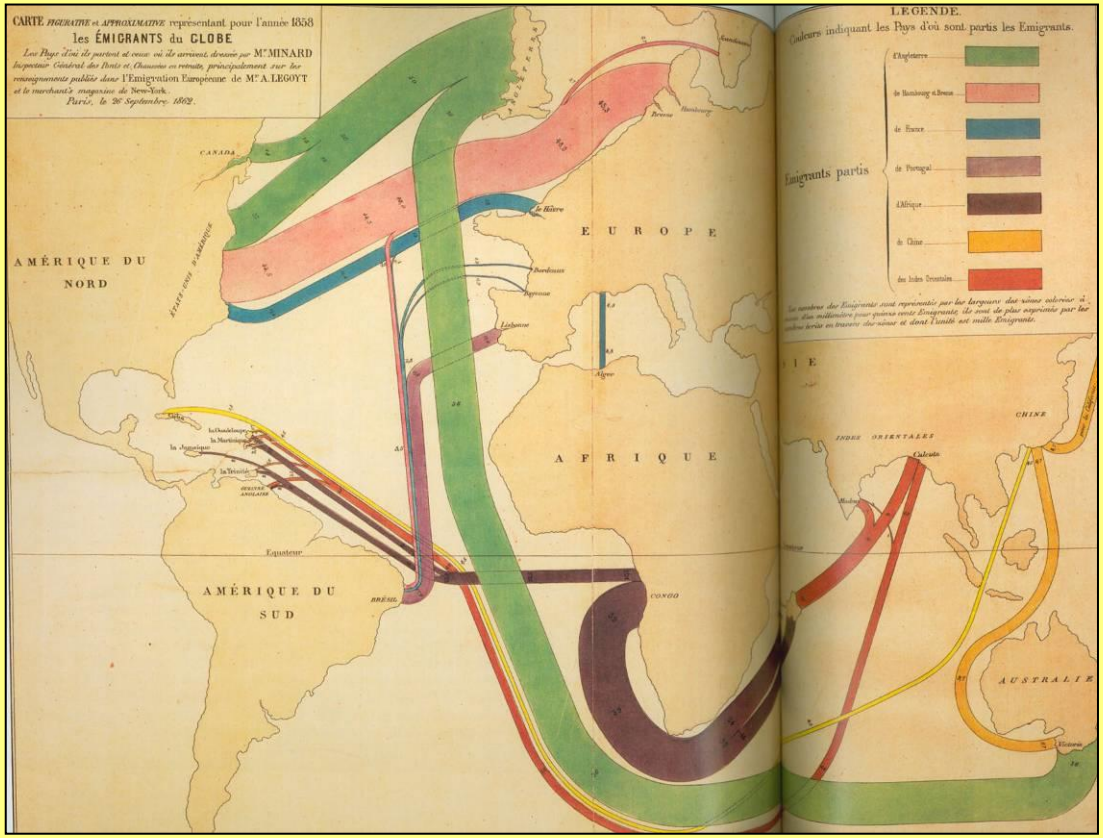
EARLY THEMATIC MAPS

- Berghaus' "Ideal" Geologic Cross-Section (1838)
  - From one of the most extensive and detailed early thematic atlases



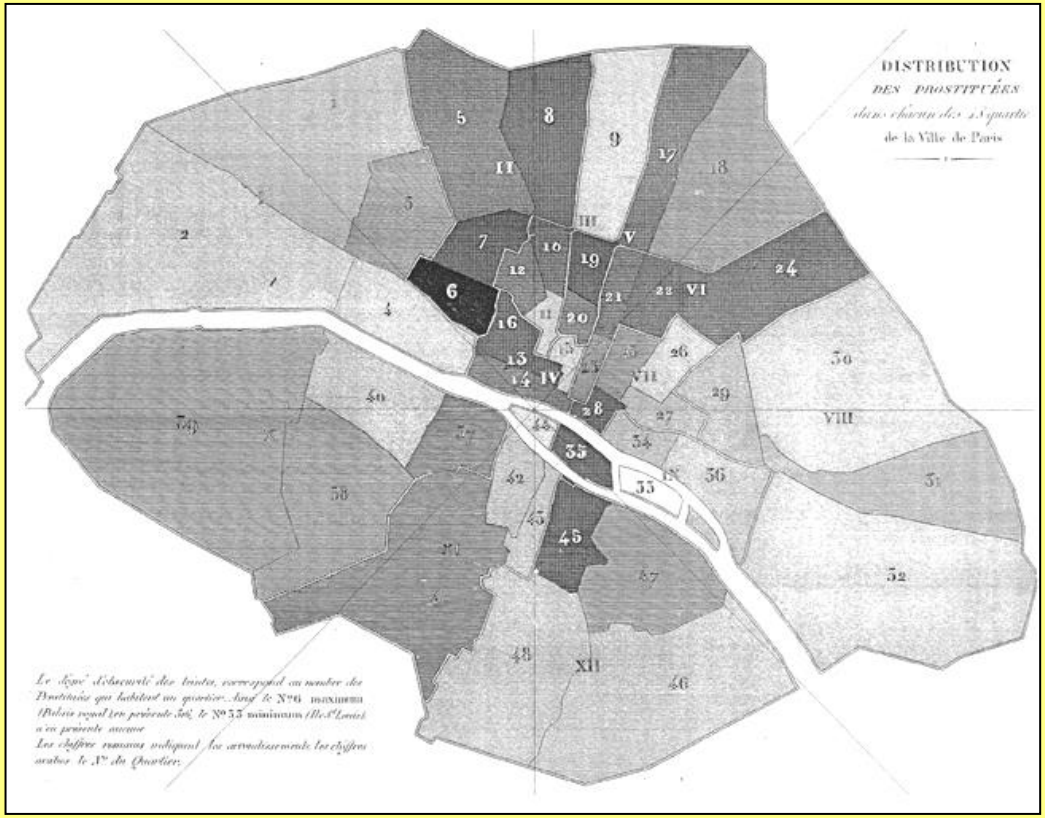
EARLY THEMATIC MAPS

- Minard's Emigration Flow Map (1862)
  - Four attributes: magnitude, location, direction, and nationalities/racial groups



EARLY THEMATIC MAPS

- Duchatelet's Prostitute Map (1836)
  - A choropleth map illustrating concentrations of prostitutes in Paris



HISTORY of CARTOGRAPHY