

GEOG 220

“The Human Environment: Place, Space and Identity”

September 9 2019

The evolution of human geography: Part 1

Alan Nash

You should read:

- The textbook for this course is Human Geography Places and Regions in Global Context (Pearson, Toronto 2016) by Paul Knox, Sallie Marston, Michael Imort. 5th Canadian edition

Usually, the pages in the textbook chapters for each class are indicated in these Moodle notes. In addition, I will always tell you specific pages to read for a class.

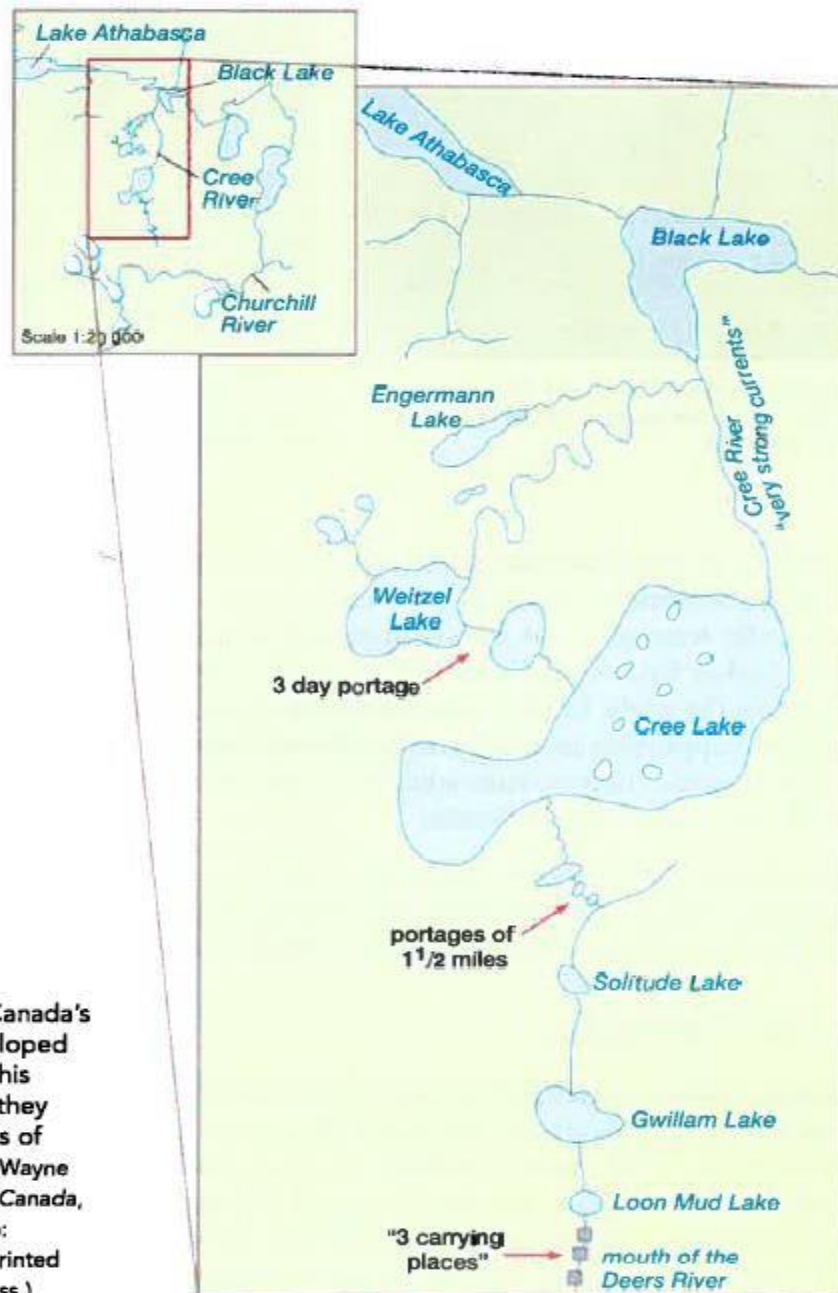
- But, for this class, sit back -- there is nothing in the book on the history of geography so I am going to add this for you.
- {If you want to read ahead, read Chapter 1, especially pages 8-17 "The Basic Tools and Methods of Human Geographers" and focus in your reading on maps.)

The beginnings:

- Many geography textbooks tell us that “geography” began with the Ancient Greeks
- BUT if we define geography as
 - (1) an interest in knowing where we are, and
 - (2) an interest describing the characteristics of our world, and
 - (3) a knowledge of who/what lies beyond our own world –
 - then almost all early peoples – and not only Europeans -- were “geographers”. Lets consider some examples

Example 1: Geographical knowledge of Canada's Aboriginal peoples

- Example: Map drawn in 1810 by a member of the Chipewyan people (for Hudson's Bay employees) --- *see the next slide for illustration*
 - Important to emphasize that geographic skills were shared by all (male and female),
 - and that it is obvious that early peoples (even nomadic) would have to have a good sense of their surroundings (environment) and the world around them in order to survive (see Hugh Brody, *The Other Side of Eden*, 2000)



This map was drawn in 1810 by a Chipewyan Indian named Cot aw ney yaz zah. It provides essential information on canoe travel between Churchill River and Lake Athabasca. The map exaggerates scale to clarify important features, such as portages. It also conveys information on route choice: the original map indicated that those travelling north should take the fast-flowing Cree River and those travelling south should travel via Weitzel Lake to avoid struggling against the river's fast currents. The map was drawn for Peter Fidler of the Hudson's Bay Company, who (like all fur traders) depended on the local knowledge of Aboriginal people.

Note: The outline of the map preserves that of the original. Place names, however, have been modernized to aid in interpretation, and annotations by Peter Fidler have been omitted.

Figure 1.12 Early Aboriginal maps Canada's Aboriginal peoples possessed a well-developed sense of their surroundings. Evidence of this knowledge is preserved in the maps that they drew to guide Europeans on their voyages of "discovery" into this country. (Source: D. Wayne Moodie, "Indian Maps," *The Historical Atlas of Canada, Volume 1: From the Beginning to 1800*. Toronto: University of Toronto Press, 1987, plate 59. Reprinted with permission of the University of Toronto Press.)

Example 2: The Inuit -- their navigation abilities

- John MacDonald, The Arctic Sky: Inuit Astronomy, Star Lore and Legend (Iqaluit: Inuit Research Institute; Toronto: Royal Ontario Museum, 2000)
- Snow drifts known as *uqalurait* align themselves according to the prevailing wind's direction – *see next slide*

Uqalurait: tongue-shaped directional snowdrifts

During a blizzard the snowfall is usually soft. A type of snow mound, *uluangnaq*, is formed. The [prevailing wind] then erodes this mound, thereby forming a *uqaluraq*—a drift with a tip that resembles a tongue (*uqaq*)—which is pointed and elevated from the ground. . . . *Uqalurait* are formed by the *Uangnaq* [the west-northwest wind] . . . the strongest of all winds, at least in our homelands.⁴



Figure 1.5 Inuit snowdrift navigation
The Inuit make use of many aspects of their world for navigation. One of the most dependable and frequently used is the orientation of snowdrifts. These types of snowdrifts are called *uqalurait*, after the elevated tongue-shaped form found at their windward extremity.

²John MacDonald, *The Arctic Sky: Inuit Astronomy, Star Lore and Legend*. Toronto: Royal Ontario Museum/Iqaluit: Nunavut Research Institute, 2000, ch. 6, p. 162.

³Ibid, p. 161.

⁴Ibid, p. 174.

- Remarking on the abilities of the Inuit woman Iligliuk, an early 19thC secretary to the British Admiralty said:
 - “To her alone is the merit due to the discovery of the extreme northern boundary of America”

Example 3: Polynesian star navigation

we will talk more about this in a later class



Star navigation: to Easter Island (Rapa Nui) (Pointe-à-Callière. Montreal 2010)



And now ..The Ancient Greeks

- Legend has it that the word ‘geography’ was first coined by Eratosthenes (273-193BC)
 - “ge” = the earth
 - “grapho”= to describe
 - Geology?”logos” = to discourse
 - Geophagy?
 - Geomancy?
 - Geodesy The Geodesic Dome?

BTW – the Greeks build on older Mesopotamian ideas



1. The earliest known world map: the Babylonian world map, from Sippar, southern Iraq, c. 700-500 BC.

- Source: Jerry Brotton, *A History of the World in Twelve Maps* (London: 2012; Penguin (2013), Plate 1.

Guardian Weekly (8 Sept 2017) Babylonian tablet is 3,700 year old trigonometry table



Scientists take fresh angle on Babylonian tablet's secrets

Maev Kennedy

At least 1,000 years before the Greek mathematician Pythagoras worked out that the square of the longest side of a right-angled triangle is always equal to the sum of the squares of the other two, an unknown Babylonian genius took a clay tablet and a reed pen and marked out not just the same theorem, but a series of trigonometry tables that scientists claim are more accurate than any available today.

The 3,700-year-old broken clay tablet survives in the collections of Columbia University, and scientists now believe they have cracked its secrets. The team from the University of New South

Wales in Sydney believe that the four columns and 15 rows of cuneiform - wedge-shaped indentations - represent the world's oldest working trigonometric table, which could have been used in calculating how to construct temples, palaces and pyramids.

Mathematicians have been arguing for most of a century about the interpretation of the tablet known as Plimpton 322, pictured, named after New York publisher George Plimpton. He bought it from Edgar Banks, a flamboyant amateur archaeologist said to have inspired the character of Indiana Jones.

Daniel Mansfield, of the university's school of mathematics and statistics, said: "The huge

mystery, until now, was its purpose - why the ancient scribes carried out the complex task of generating and sorting the numbers on the tablet. Our research reveals that Plimpton 322 describes the shapes of right-angle triangles using a novel kind of trigonometry based on ratios, not angles and circles. It is a fascinating mathematical work that demonstrates undoubted genius."

Mansfield's colleague Norman Wildberger said: "Plimpton 322 predates Hipparchus [the Greek astronomer regarded as the father of trigonometry] by more than 1,000 years. It opens up new possibilities not just for modern mathematics research, but also for mathematics education."

Ancient Greeks:

- TWO main *geographic* interests: topographic description and mathematical observations
 - 1. Topographical description
 - “*Topos*” == ? Topographic? (a type of map mentioned in chapter 1)
 - **Herodotus** (active between 450s and 420s BC), the author of *The Histories* in which he writes about the history of the Greeks’ conflict with the Persians and, in doing so, includes descriptions about the Mediterranean world)

An example from Herodotus

- “The Thracians [northern Greece] say that bees occupy the region beyond the Ister {Danube} and it is their presence that makes it impossible to travel through the land. But to me what they claim seems unlikely, since these creatures appear intolerant of frost. In fact, I think it is because of the cold that the regions under the constellation of the Bear are devoid of settled habitations.”
- [source: *The Landmark Herodotus: The Histories*, edited by Robert B. Strassler (New York: Pantheon Books 2007: page 370. Conc Lib D58 H4713 2007 Webster]

Some 400 years later, the Greek geographer Strabo (64 BC- 24 AD) continues this topographic tradition

- “Britain is triangular in shape ... Most of the island is flat and overgrown with forests, although many of its districts are hilly. It bears grain, cattle, gold, silver, and iron. These things, accordingly, are exported from the island, as also hides, and slaves, and dogs...The men of Britain are taller than the *Celti* ...I myself, in Rome, saw mere lads towering as much as half a foot above the tallest people in the city ... although well supplied with milk, [they] make no cheese; and they have no experience in gardening or other agricultural pursuits...their forests are their cities ... their weather is more rainy than snowy... [Strabo, *Geography*: Book 4 chapter 5, sections 1-2.]

Climate zones

- One of the results of this interest in regional description was the belief that the Earth is divided into 5 zones (frigid, temperate, hot, temperate, frigid) and only the temperate can support human life.
- *See illustration in next slide taken from David Woodward, "Reality, Symbolism, Time, and Space in Medieval Maps", Annals of the Association of American Geographers Vol 75 (4) 1985: pages 510-521*

Idea of zones, or *klimata* [“slopes”]

[Source Woodward 1985]

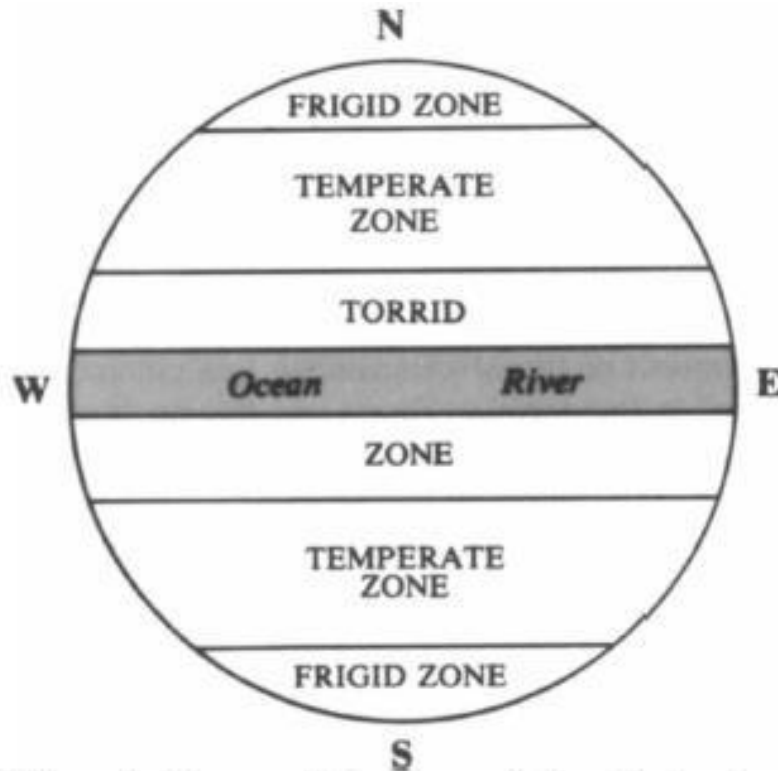


Figure 2. Category 2: Zonal map. Schematic drawing of the system of five climatic zones, derived from a model of the ancient Greek geographers.

Antikythera mechanism 80BC (National Museum Athens) “front view”



Ancient Greeks:

- 2. Mathematical and astronomical observations
 - Belief that the Earth is a sphere
 - Eratosthenes (273-192 BC)
 - calculates the circumference of the world as 40,000kms
 - Produces one of the earliest “maps” of the known world (to the Ancient Greeks, at least!)
 - Ptolemy (90-168AD)
 - Takes the ability to estimate latitude and longitude to calculate positions of places on a sphere of the size Eratosthenes calculated
 - Ptolemy’s “Atlas” of the known world is based on his calculations – which assume circular world of 360 degrees

Eratoshenes (273-192BC)

Question – what type of Map projection is this most closely related to????

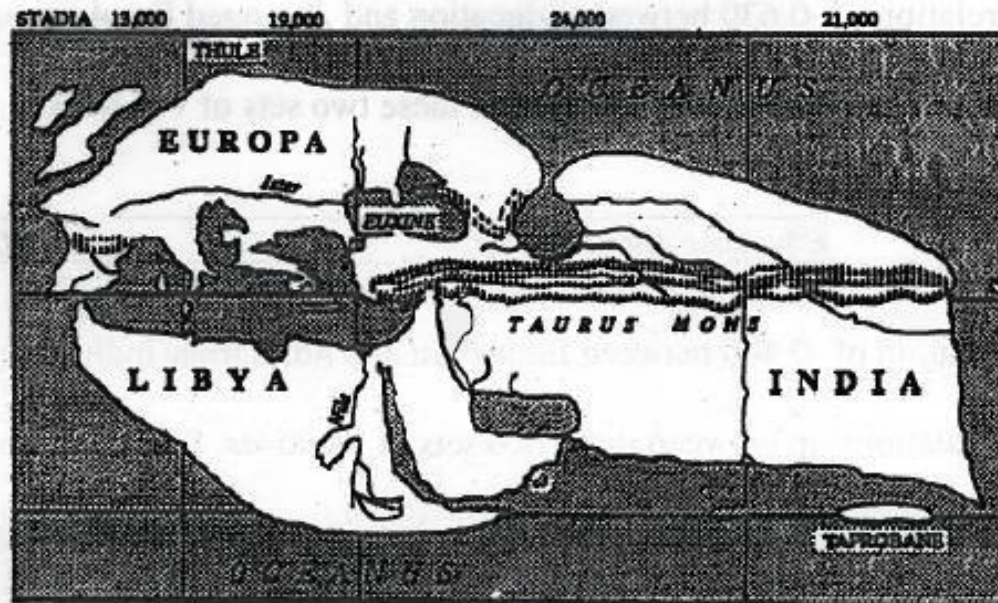
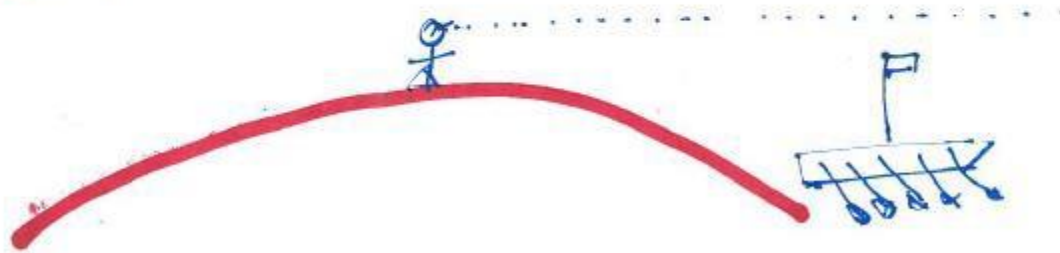


Figure 1.1 The world according to Eratoshenes. (273-192BC)

Greek belief earth was a sphere

HOW DID GREEKS 'KNOW' EARTH
WAS ROUND?

ONE WAY WAS HOW SHIPS DISAPPEARED
ON THE HORIZON



Eratosthenes and the earth's circumference

ERATOSTHENES (273-192 BC)
Calculates Earth's circumference as 40,000 kms
— How?

1. Assume Earth is a sphere
— But how big?
2. Conduct some observations

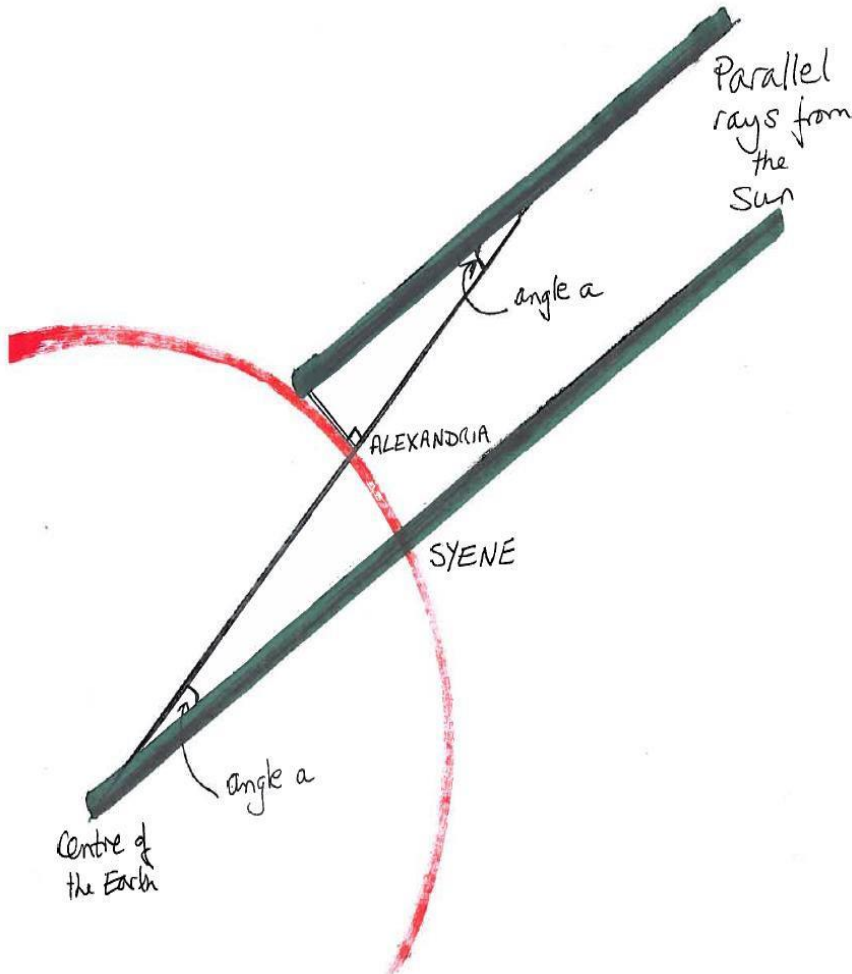


Sun casts a shadow

• Aswan

Sun is overhead
on longest day

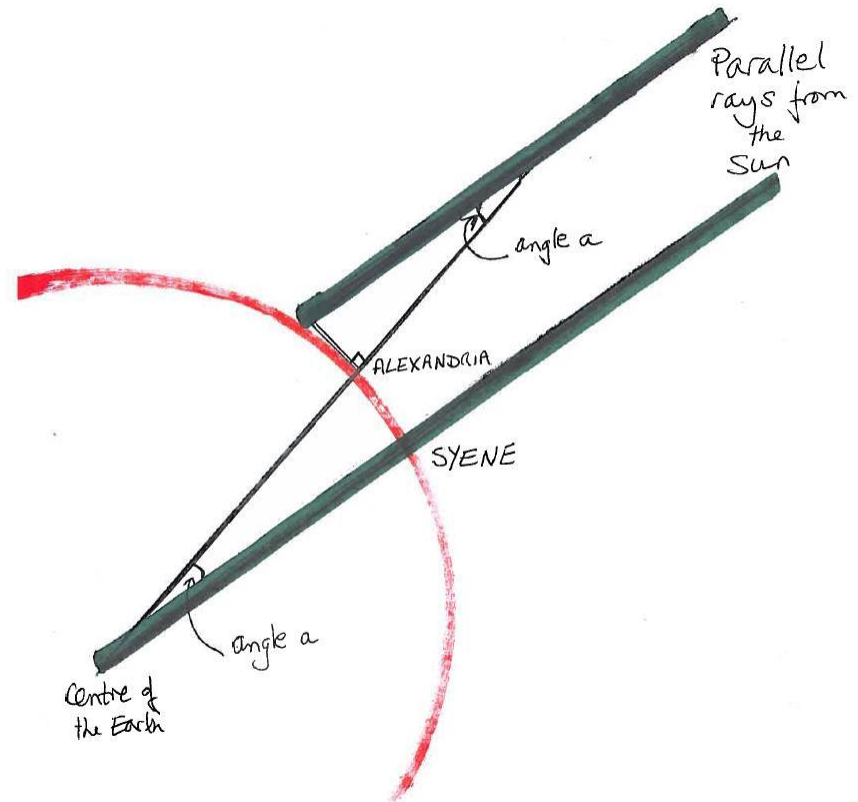
Eratosthenes and the earth's circumference



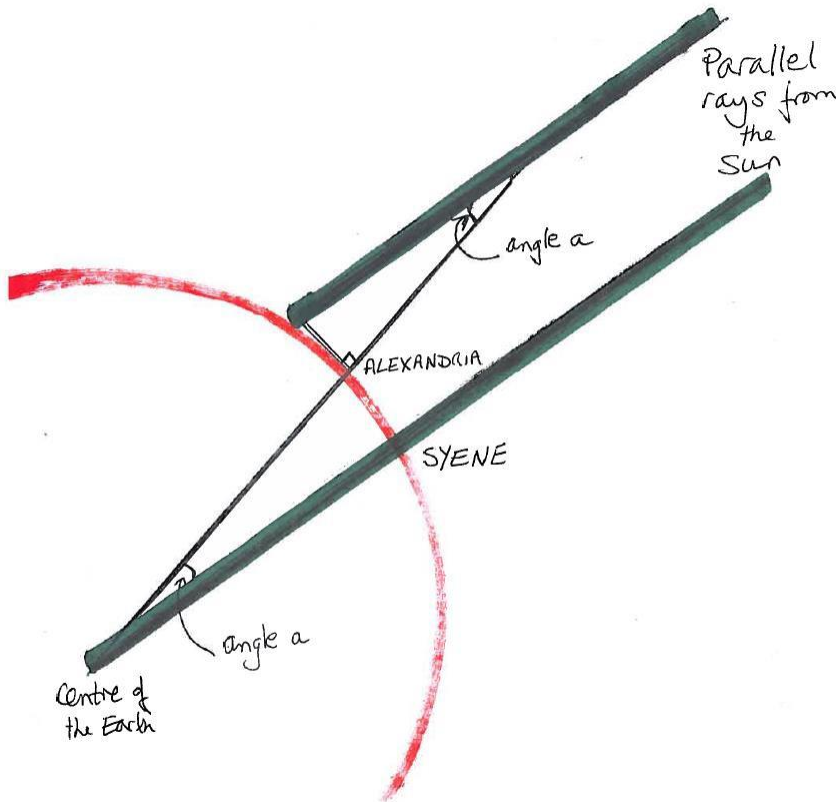
- Assume Alexandria and Syene {Aswan} on same longitude
- Assume Sun's rays are always parallel to Earth's surface
- Assume distance between them is 800kms (originally measured in *stades* - a Greek unit of measurement).

Eratosthenes and the earth's circumference

- During longest day of year, the sun is overhead at Syene but it casts a shadow past a *gnomon** at Aswan.
- By making a drawing of the right angled triangle formed by the *gnomon* and the shadow, estimate the angle “a”
- [* a *gnomon* can be a stick – think of a sundial and its central “pointer”]



Eratosthenes and the earth's circumference



- Angle “a” estimated at $1/50^{\text{th}}$ of a circle, or 7.2 degrees
- Now, if the distance between Alexandria to Syene also represents $1/50^{\text{th}}$ of a circle {which it does since angle “a” is the same in the larger triangle} , the Earth must be $[800\text{kms} \times 50] = 40,000 \text{ kms}$

Syene: the place “where the world was grasped”

- With these words, Pliny (in his *Natural History*) describes the importance of both Syene and Erastosthenes' achievement.

[Source: Duane W. Roller, *Erastosthenes' Geography* (Princeton: Princeton university Press, 2010, page 4).]

Conc Lib G 87 E6 2010

Eratosthenes and the earth's circumference

- Once you know the size of the Earth, you can begin to figure out where you are, and draw the first “world maps” {see slides below of Eratosthenes and Ptolemy's maps)
 - Latitude – could be crudely estimated by length of day
 - Longitude – crudely measured by travel distance (paces)
- but also to come to some understanding of what else is out there ...
 - Since you know the size of the earth, you can also figure out the size of that part of the world known to the Ancient Greeks [the “habitable realm” or *ecumene*] [*in Greek: oikoumenê*]
 - And you realize there is plenty of room for other realms – these might be uninhabitable (“torrid climate”) or full of barbarians that Greeks see as part of an uncivilized “Other” (see slide below “position of the 4 *oikoumenê*”)

Position of the 4 *oikoumenê*

Source: Daniela Dueck *Geography in Classical Antiquity* (Cambridge: Cambridge University Press, 2012, p. 78) Conc Lib G84 D 84 2012

Note: The Antipodes – where have you heard of that before?

78

Geography in Classical Antiquity

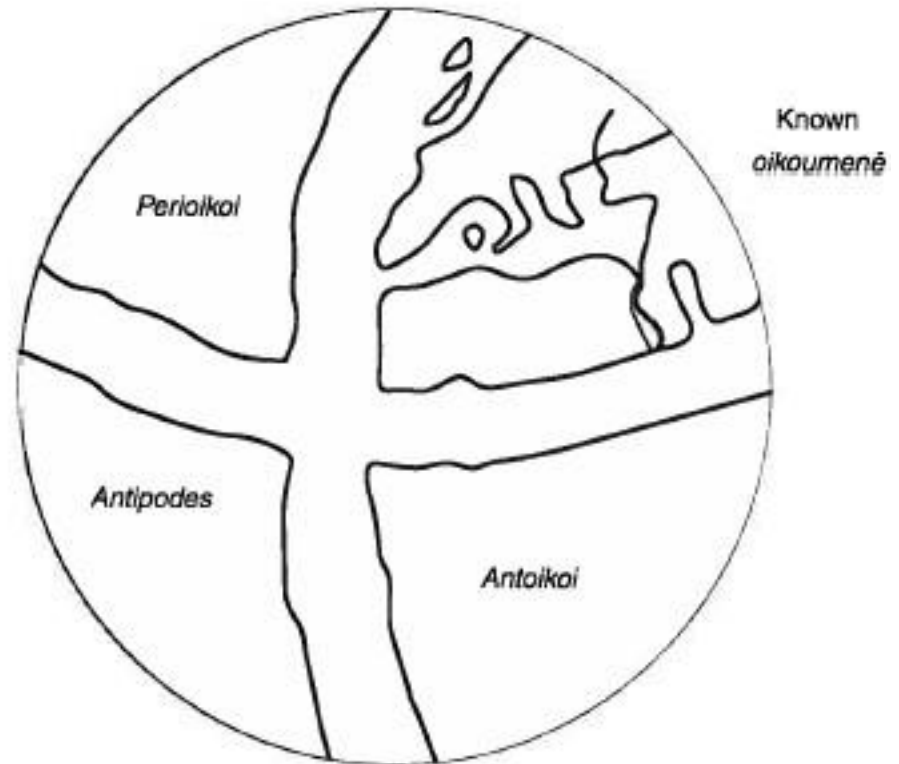


Figure 1: The position of the four *oikoumenai* on the globe according to Crates of Mallus.

Eratoshenes (273-192BC)

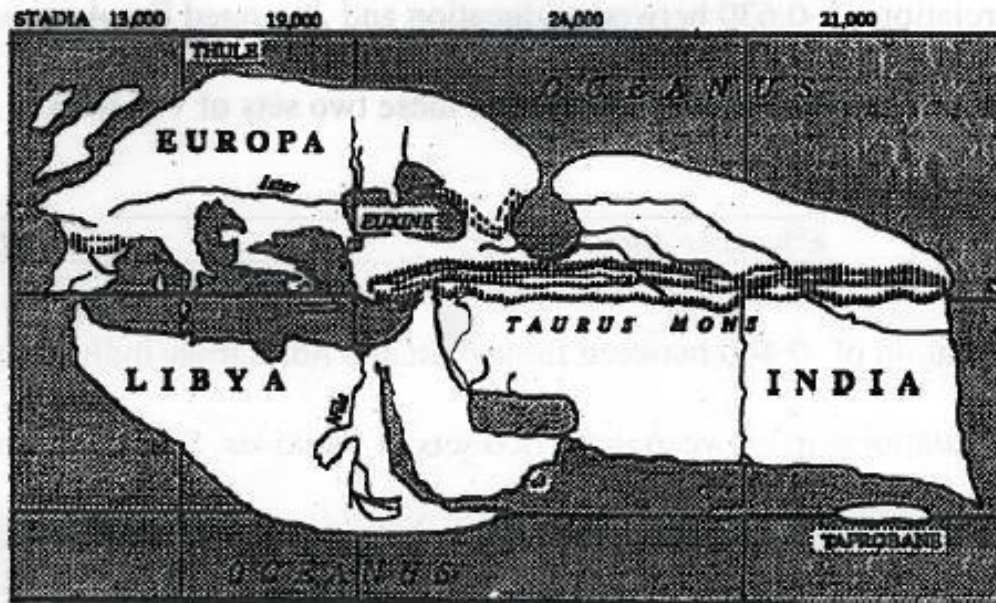


Figure 1.1 The world according to Eratoshenes. (273-192BC)

Ptolemy's "Atlas"

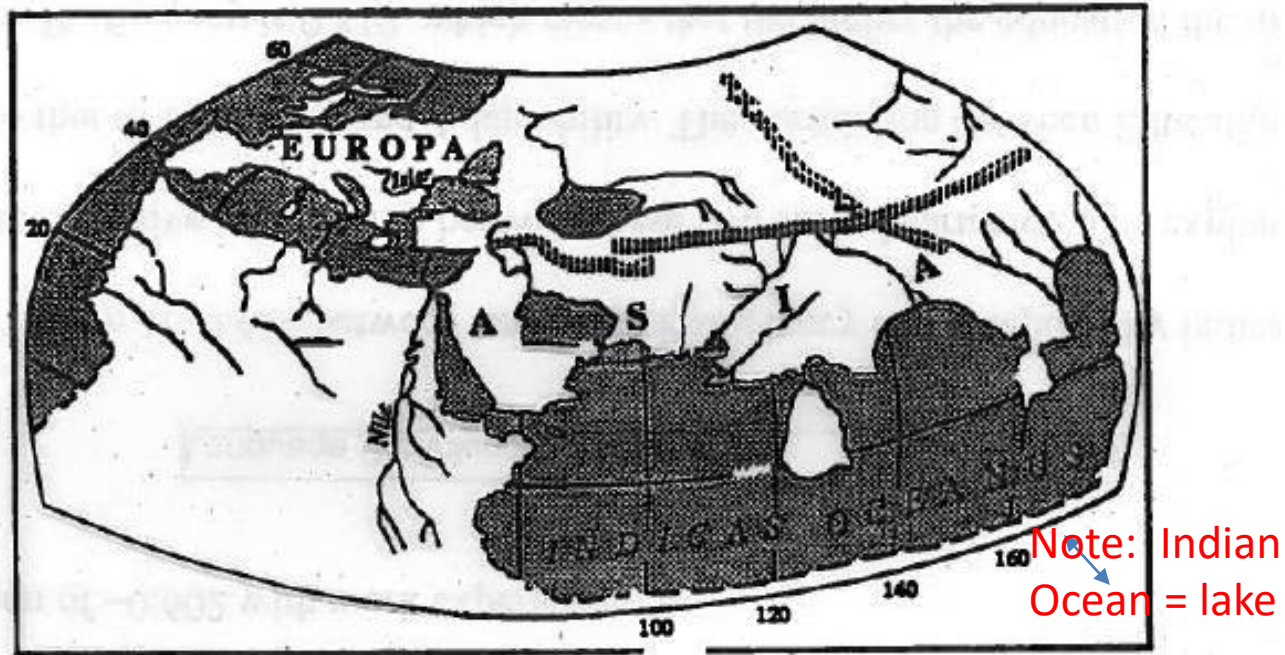
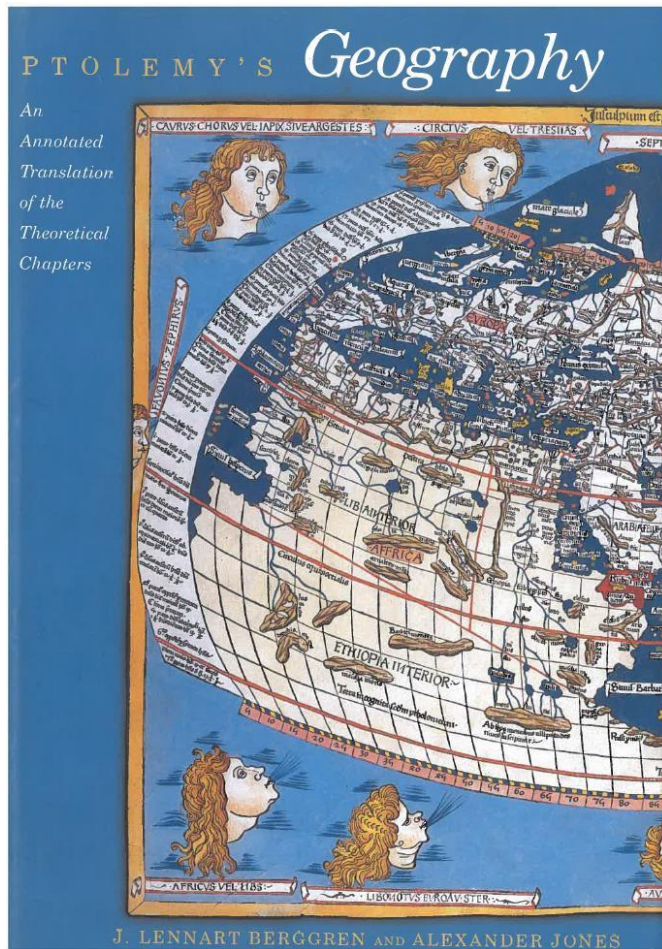


Figure 1.2 The world according to Ptolemy. (90 - 168 AD)

Ptolemy's Geography



- J. Lennart Berggren and Alexander Jones, *Ptolemy's Geography: An Annotated Translation of the Theoretical Chapters* (Princeton: Princeton University Press, 2000)



PLATE 6. Map of the world in Ptolemy's second projection (Ulm edition of 1482)

Ptolemy's "Atlas" was only a list of co-ordinates

His co-ordinates

[Continuation of the description of the coast]

After the R. Rhodanus on the sea, there is situated

Avatili [Anatili]:

Maritima colonia (city)	23½	43½
Then the mouths of the R. Caenus	23¾	43

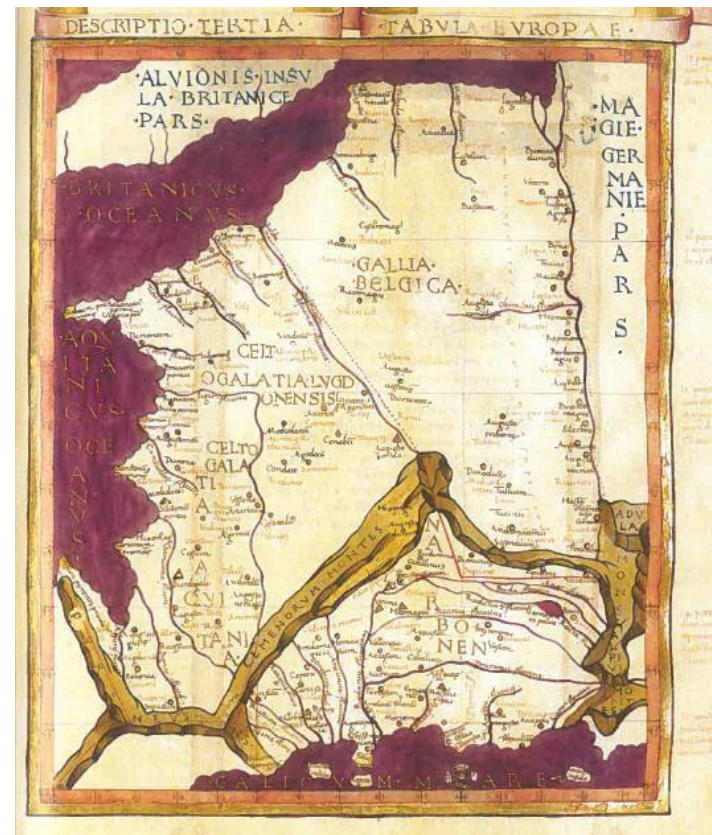
Comani [Commoni]:

•Massalia [Massilia, <i>Marseilles</i>] (Greek city)	24½	43½
Tauroentium	24¾	42⅝
And Cape Citharistes	25	42⅔
Olbia (city)	25½	42¾
And the mouths of the R. Argenteus [<i>Argens</i>]	25¾	42¾
And Forum Iulium colonia [Iulii colonia, <i>Fréjus</i>]	26½	42⅞

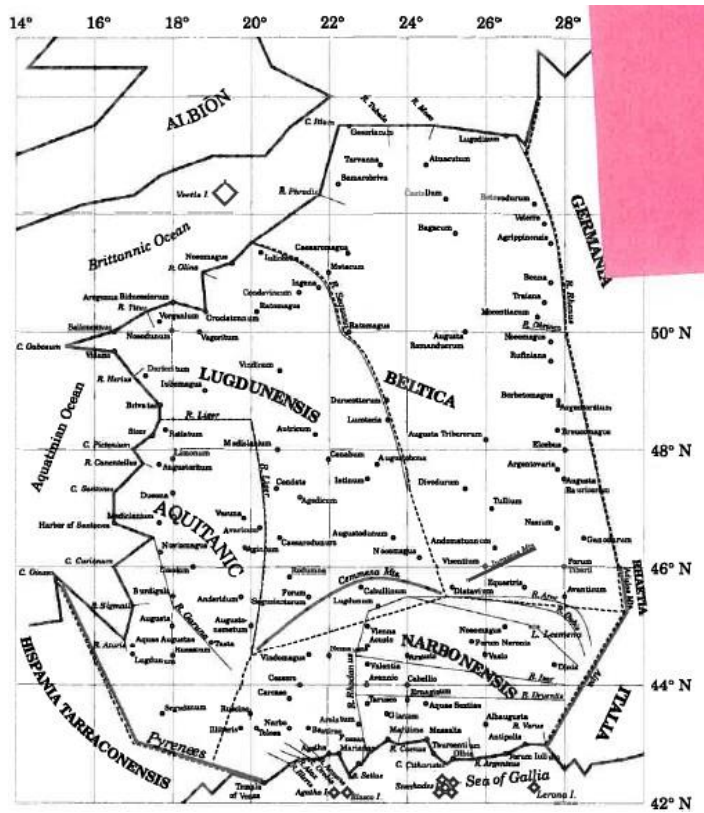
Decatii:

Antipolis [<i>Antibes</i>]	27	43
And the mouths of the R. Varus	27½	43

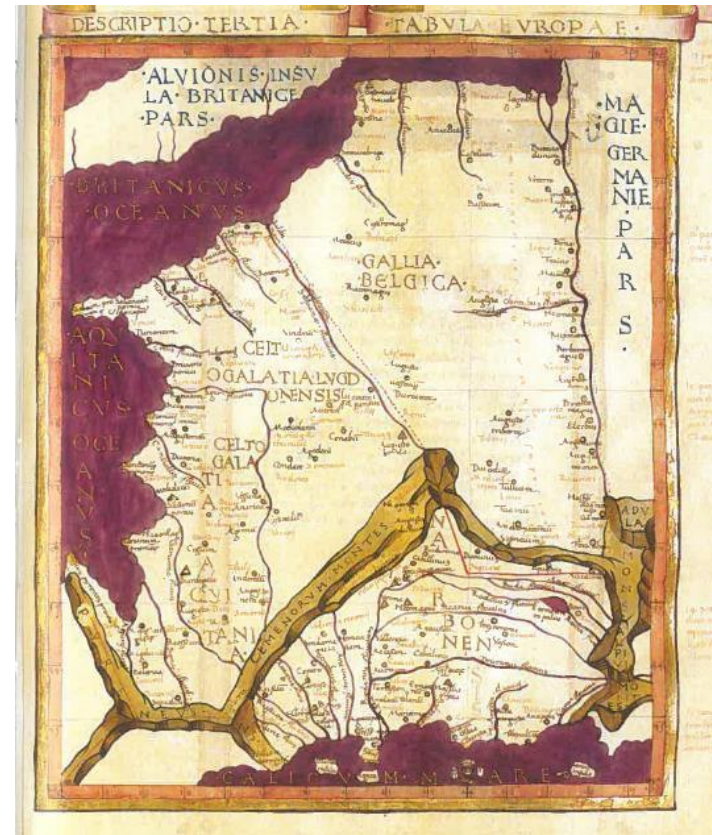
Later these were mapped



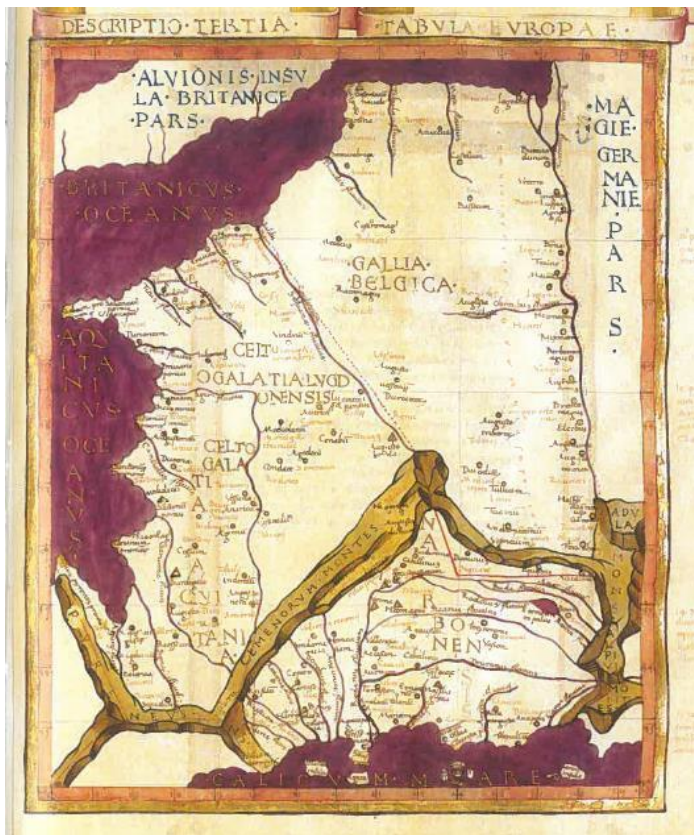
France – using Ptolemy’s co-ordinates



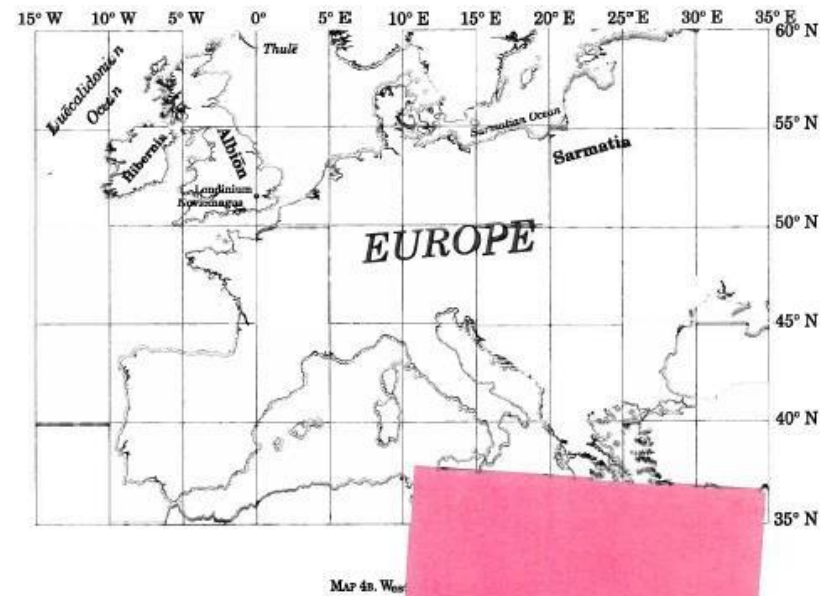
France



France -- Ptolemy

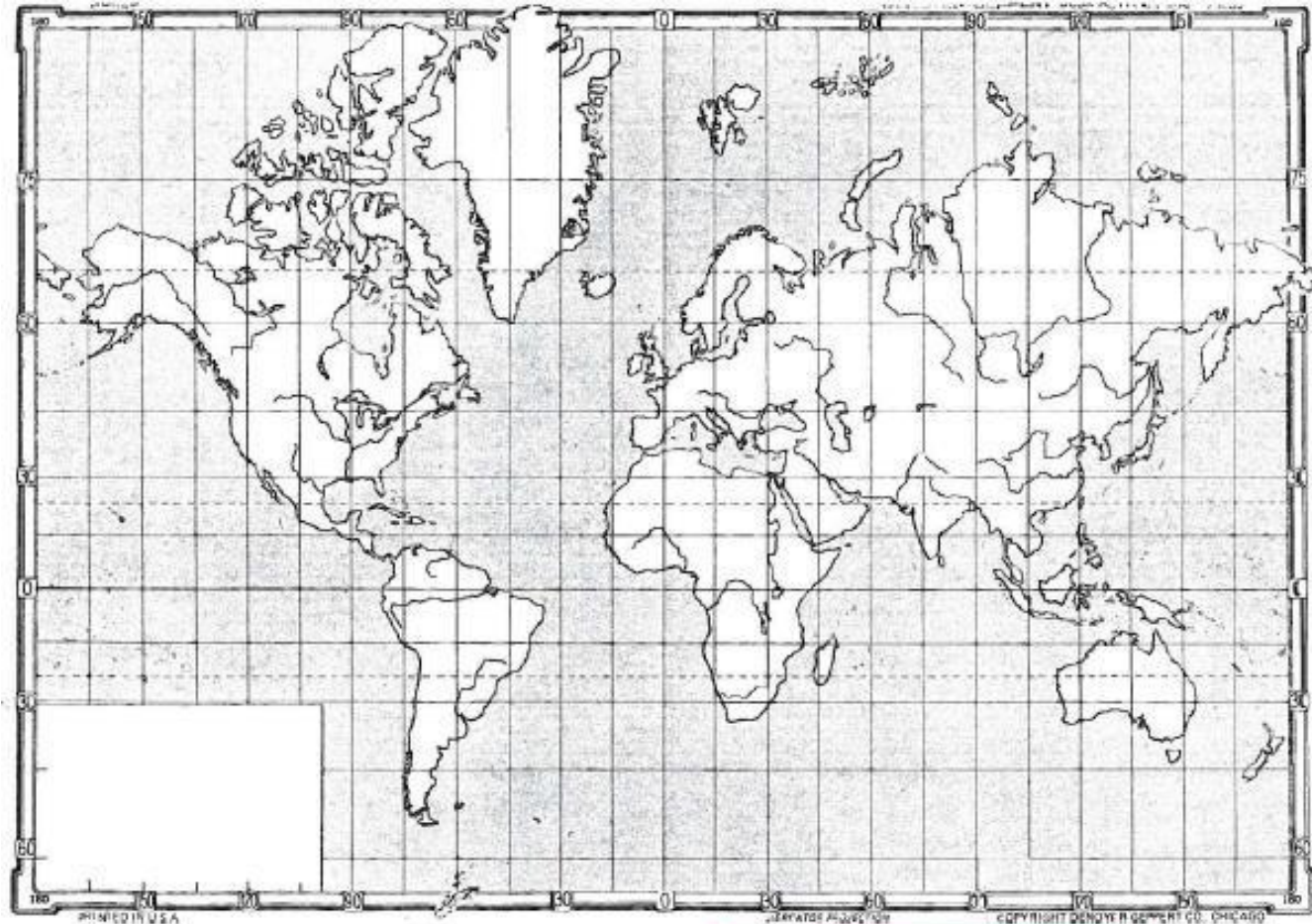


France – modern map



Intermission

- We have seen how Ptolemy was able to locate the places he knew onto a map of the world
- How well can you do?
- Let us try to locate some places on a blank map that uses the Mercator projection



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Can you mark these on your map?

- Cape Town
- Argentina
- North Korea
- Montreal
- Burma (Myanmar)
- Berlin
- Chicago
- Baffin Island
- The Equator
- The Amazon River
- New Orleans
- The Congo River
- Alexandria
- And one extra place you know you know!

Middle Ages

- **In Europe:**
 - Ancient Greek knowledge rejected in favour of medieval church's view of the world:
 - The T-O Map
 - Some even argue the earth is flat (but note - always a minority view)

The “T-O” map of Europe’s Middle Ages

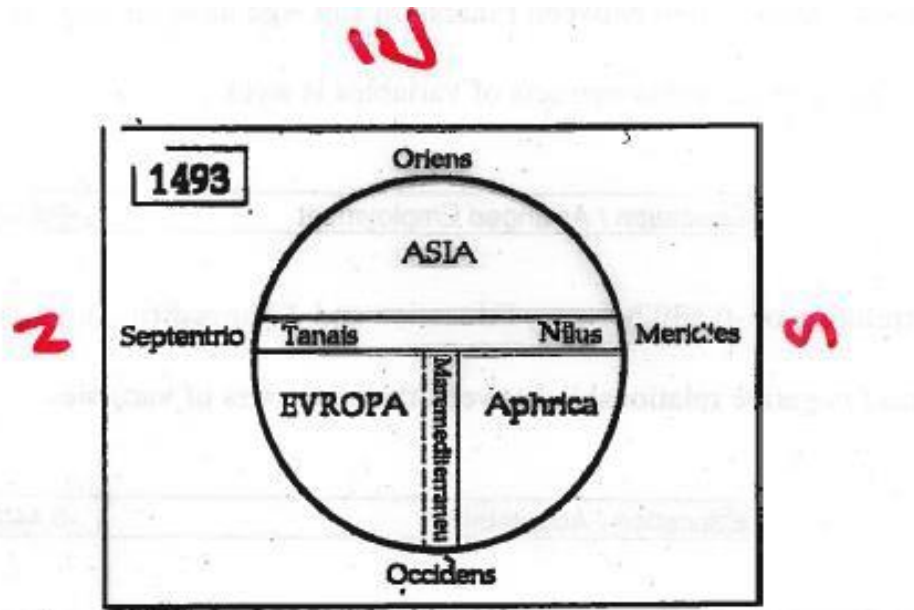


Figure 1.3 An example of a T-O map.

T-O maps

- Known as *Mappae mundi* [“maps of the world”]
- “The function of the *mappae mundi* was primarily to provide a visual narrative of Christian history cast in a geographical framework, not to communicate geographical or cosmological facts” David Woodward, “Reality, Symbolism, Time and Space in Medieval World Maps” *Annals of the Association of American Geographers* vol 75 no. 4 Dec 1985, pages 510-521

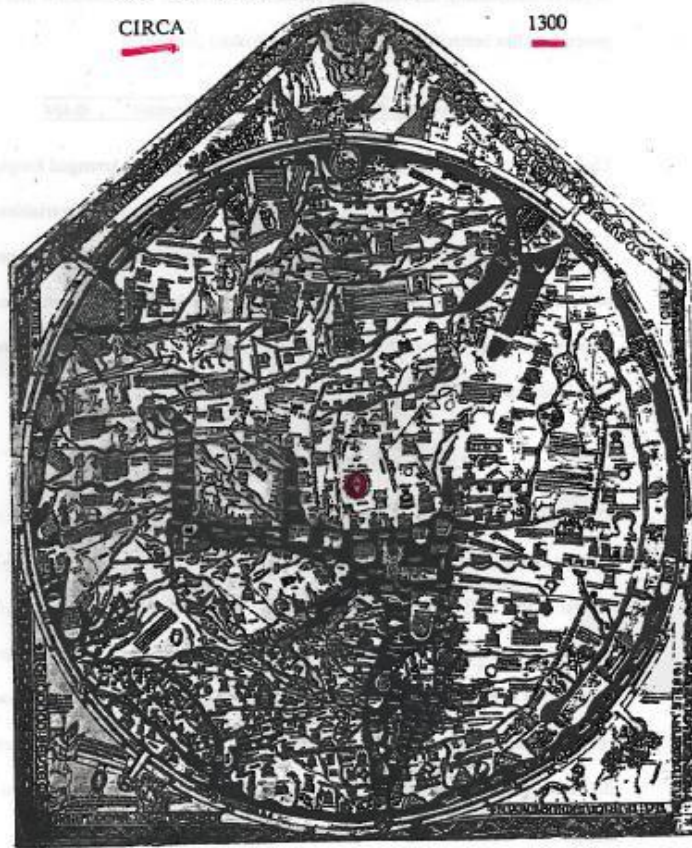
Example of T-O map - The Hereford Map

about 1283 AD

THE WORLD MAP IN HEREFORD CATHEDRAL

CIRCA

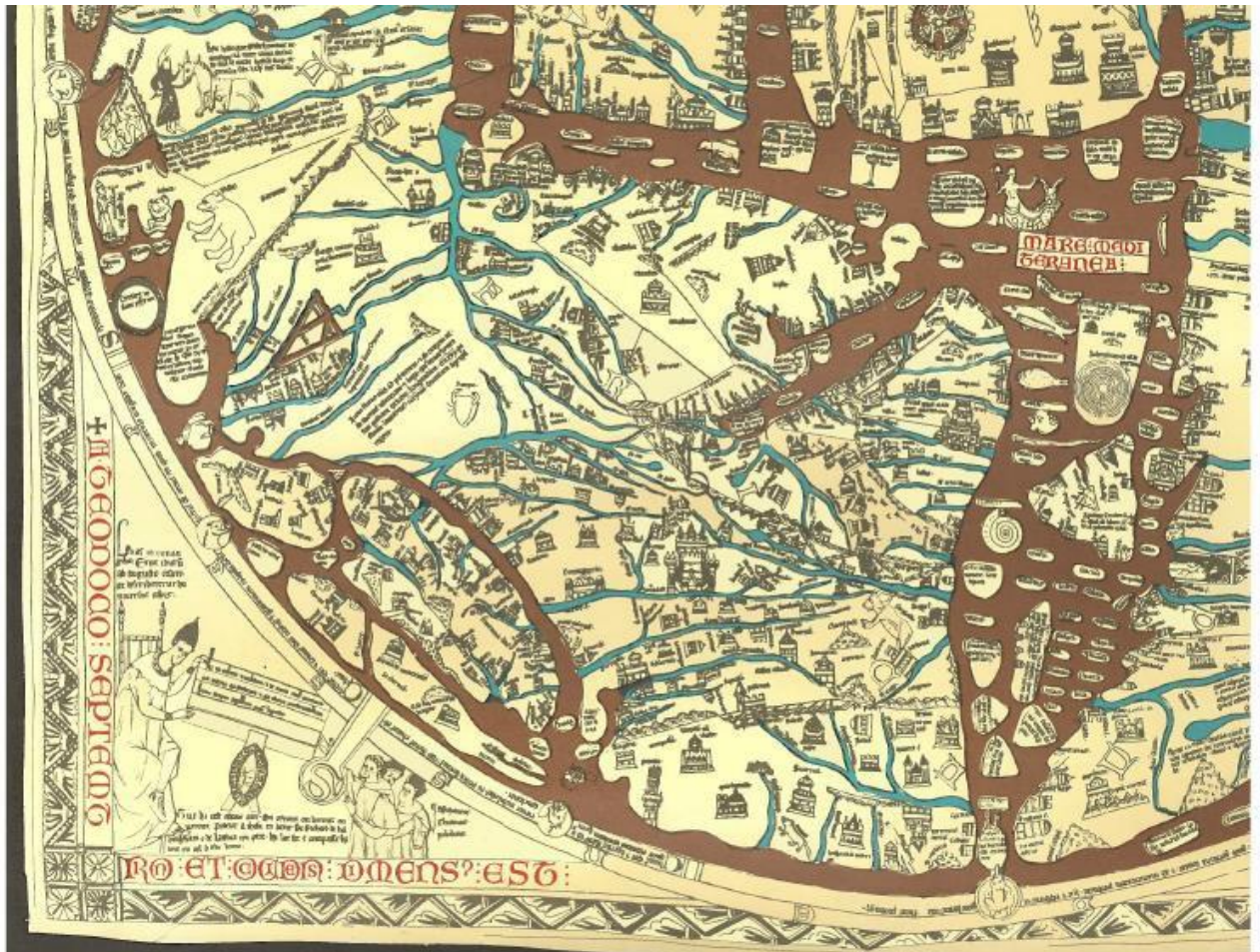
1300



Hereford Map - Europe



Hereford Map – detail of Europe



Recall - geographical accuracy not a goal of the *mappae mundi*

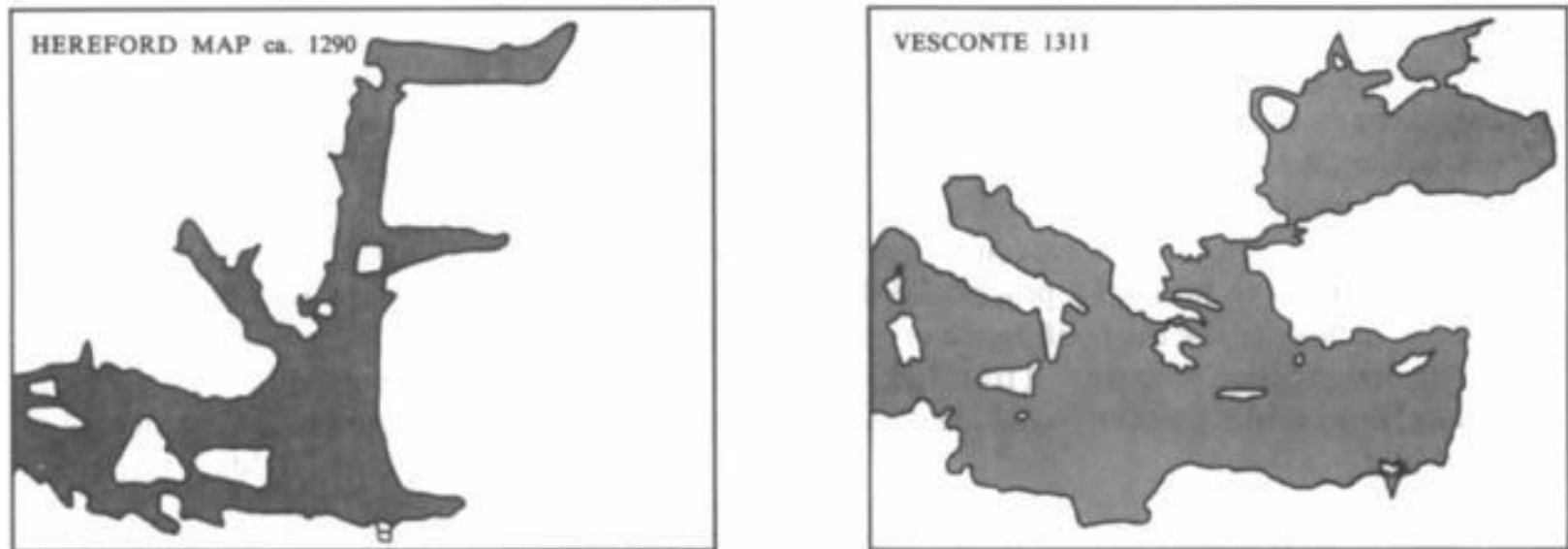


Figure 5. Diagram comparing the eastern part of the Mediterranean Sea as shown on the Hereford Map (c. 1290) (left) and a portolan chart by Pietro Vesconte dated 1311 (right).

Flat Earth idea – only found in work of Kosmas Indicopleustes [“Indian Voyager”]

- In his book *The Christian Topography* [c. 550 AD] argues for idea of flat earth
- BUT note – this was a minority view (Kosmas argued it because idea of a sphere implied perfection – or eternity – and he believed the Bible taught that the world would end)
- [Source: Maja Kominko, *The World of Kosmas: Illustrated Byzantine Codices of the ‘Christian Topography’* (Cambridge: Cambridge University Press, 2013)

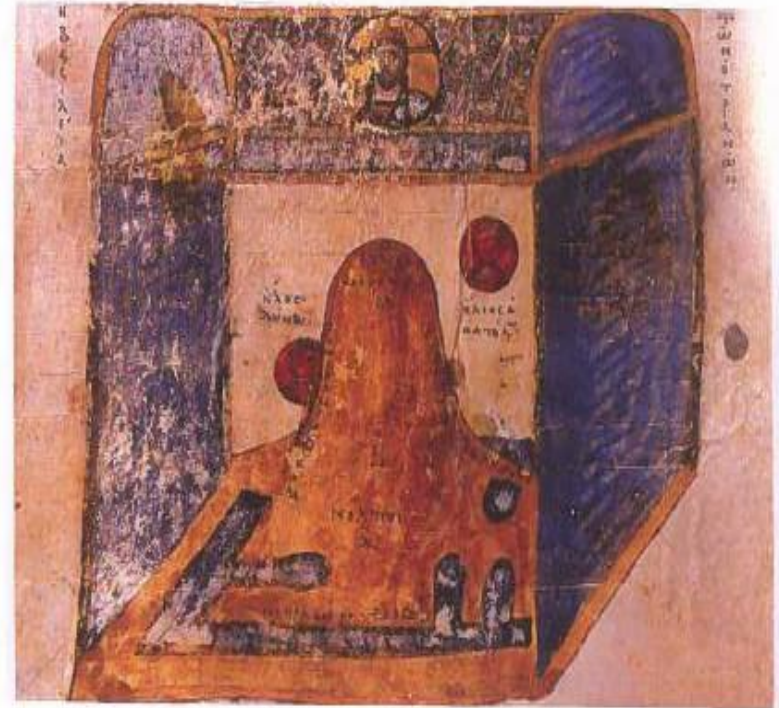
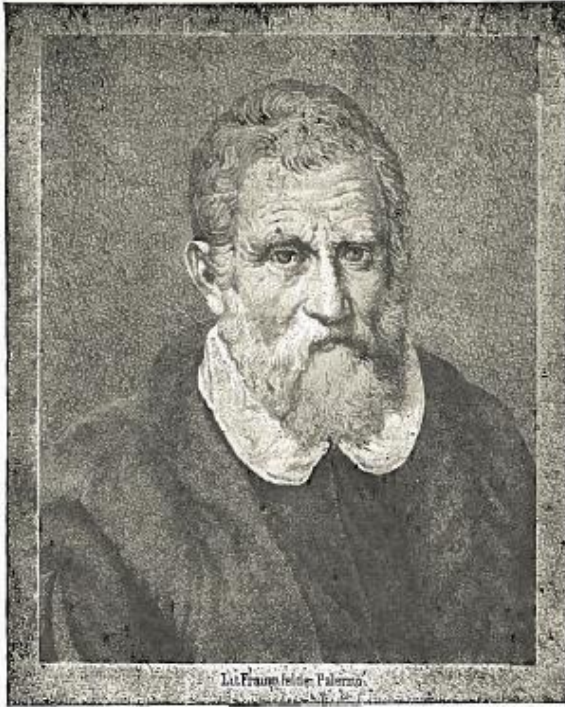


Plate 4 The universe, Sin. gr. 1186, fol. 69r

Although European geography falters, it is not completely static



"MARCUS POLVS VENETVS TOTIVS ORBIS ET INDIE
PEREGRATOR PRIMVS."

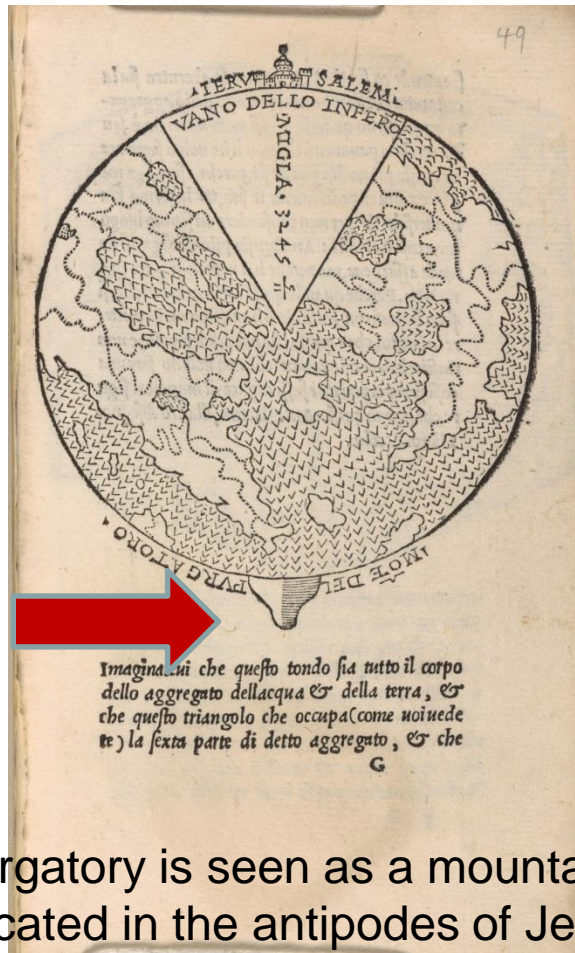
Copied by permission from a Painting bearing the above Inscription in the
hall ery of MONSIGNORE BADIA at Rome.

MARCO POLO.

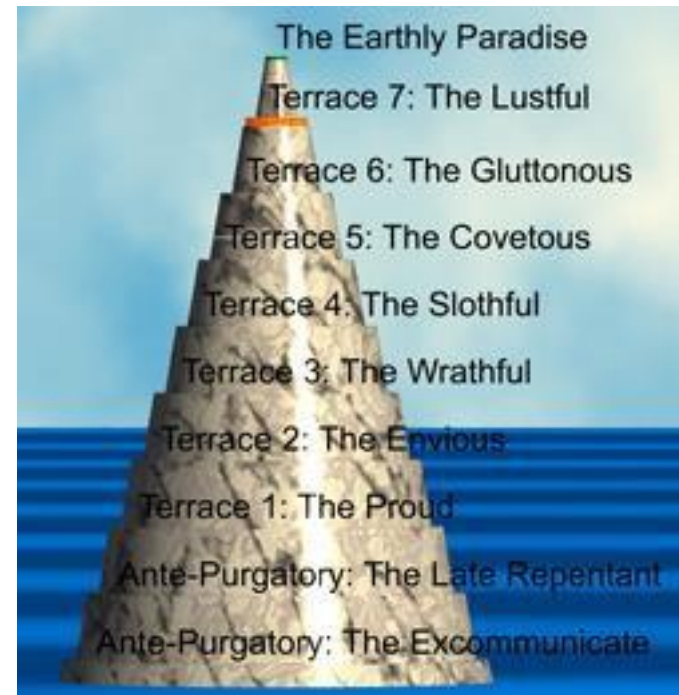
- Marco Polo (1254-1323)
- Venetian traveller who visits China (1271-1295)
- His book (dictated while in prison in Genoa) describes his many adventures.

Dante (1265-1321) *The Divine Comedy*

Hell



Purgatory



Purgatory is seen as a mountain
Located in the antipodes of Jerusalem

Elsewhere in Middle Ages, geography makes progress

A. In Arab world

- Developed a strong geographic tradition, built on the knowledge of the Ancient Greeks – which was preserved and built upon long after forgotten in W. Europe
- Examples: Al-Idrisi (1100-1165), Ibn Batuta (1304-1368)
- And only discovered in 2000 – the Book of Curiosities (c1050)

The Book Of Curiosities of the sciences and marvels for the eyes (written 1020-1050 in Cairo)

Source: Lost Maps of the Caliphs: Drawing the World in Eleventh-Century Cairo. Y. Rapoport and E. Savage Smith (Chicago 2018)

First to use a scale

We see how Ptolemaic knowledge is added to by Arabic work – they add the use of itineraries to the basic map



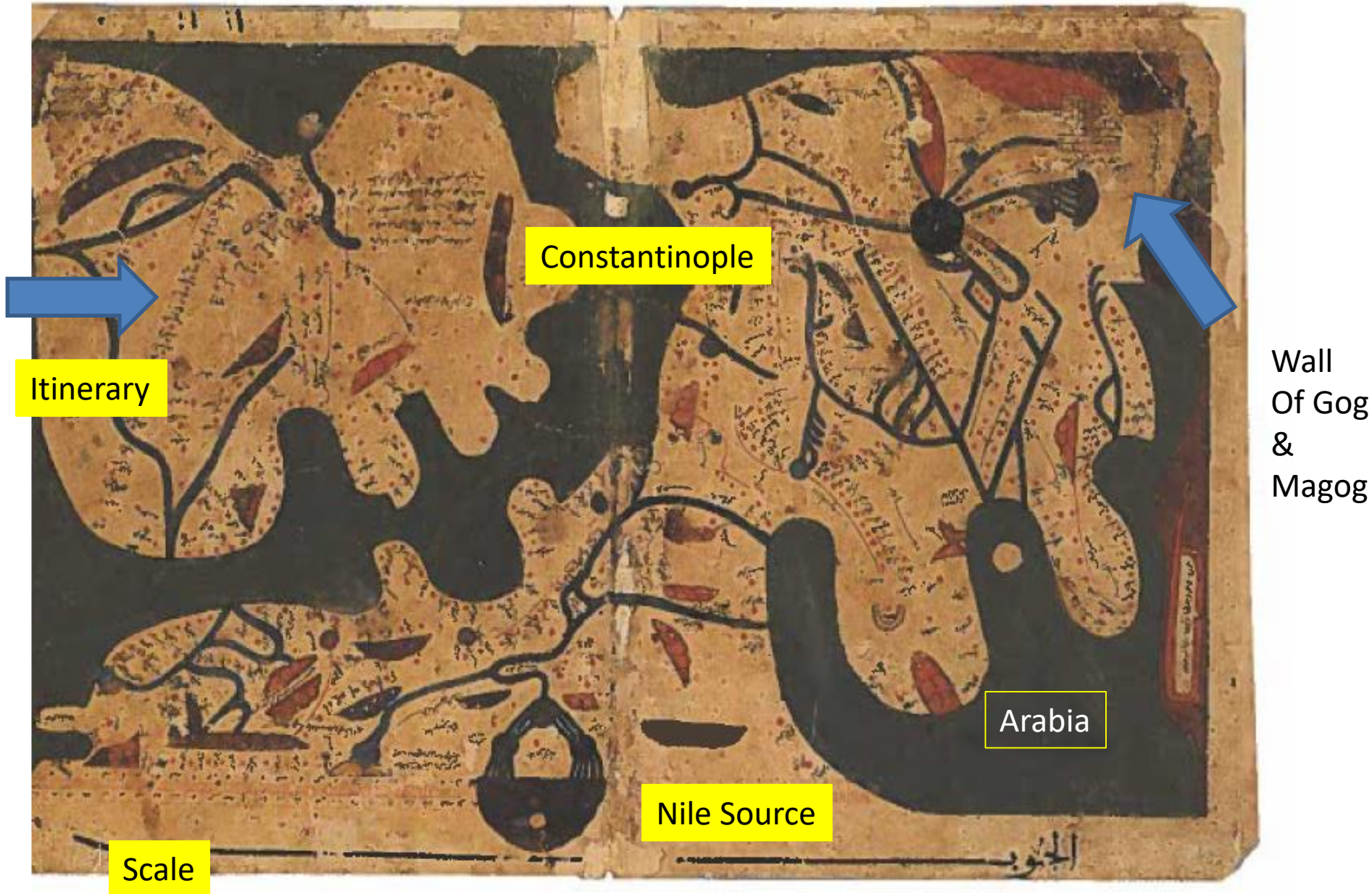
PLATE 1. The rectangular world map. Oxford, Bodleian Library, MS Arab. c. 90, fols. 23b-24a, copied ca. 1200. South is at the top.

Kitāb Gharā'ib al-funūn wa-mulaḥ al-'uyūn



PLATE 1. The rectangular world map. Oxford, Bodleian Library, MS Arab. c. 90, fols. 23b–24a, copied ca. 1200. South is at the top.

PLATE 1. The rectangular world map. Oxford, Bodleian Library, MS Arab. c. 90, fols. 23b-24a, copied ca. 1200. South is at the top.



Ibn Batuta (1304-1368)

- Ibn Batuta (1304-1368) visits China and Africa
- A nice book on this is *Travels with a Tangerine: A Journey in the Footnotes of Ibn Battutah*, by Tim Mackintosh-Smith (London: Murray, 2001). There is a good PBS TV documentary based on this trip. See also: *The Travels of Ibn Battutah*, edited by Tim Mackintosh-Smith (London: Picador, 2002)

Al-Idrisi (1100-1165)

- Born in Ceuta, Morocco
- Prepares world map for Roger II of Sicily (1097-1154)
 - Which was engraved on silver disc about 6 feet wide for his palace in Palermo, Italy
 - And describes it in a work he calls *Nuzhat al-mustaq fi'khtiraq al-afaq* {"The book of pleasant journeys to faraway lands"}, which contained a small world map and 70 individual ones. The text describes each region
 - He follows Ptolemy but adds information from Arab and Norman knowledge.

[see S. Maqbul Ahmad, "Cartography of al-Sharif al-Idrisi" in J. Harley and D. Woodward, *The History of Cartography. Vol 2 (1992) 156-174.*]

Palermo: Royal Palace



Palermo: Royal Palace interior



Palermo Cathedral

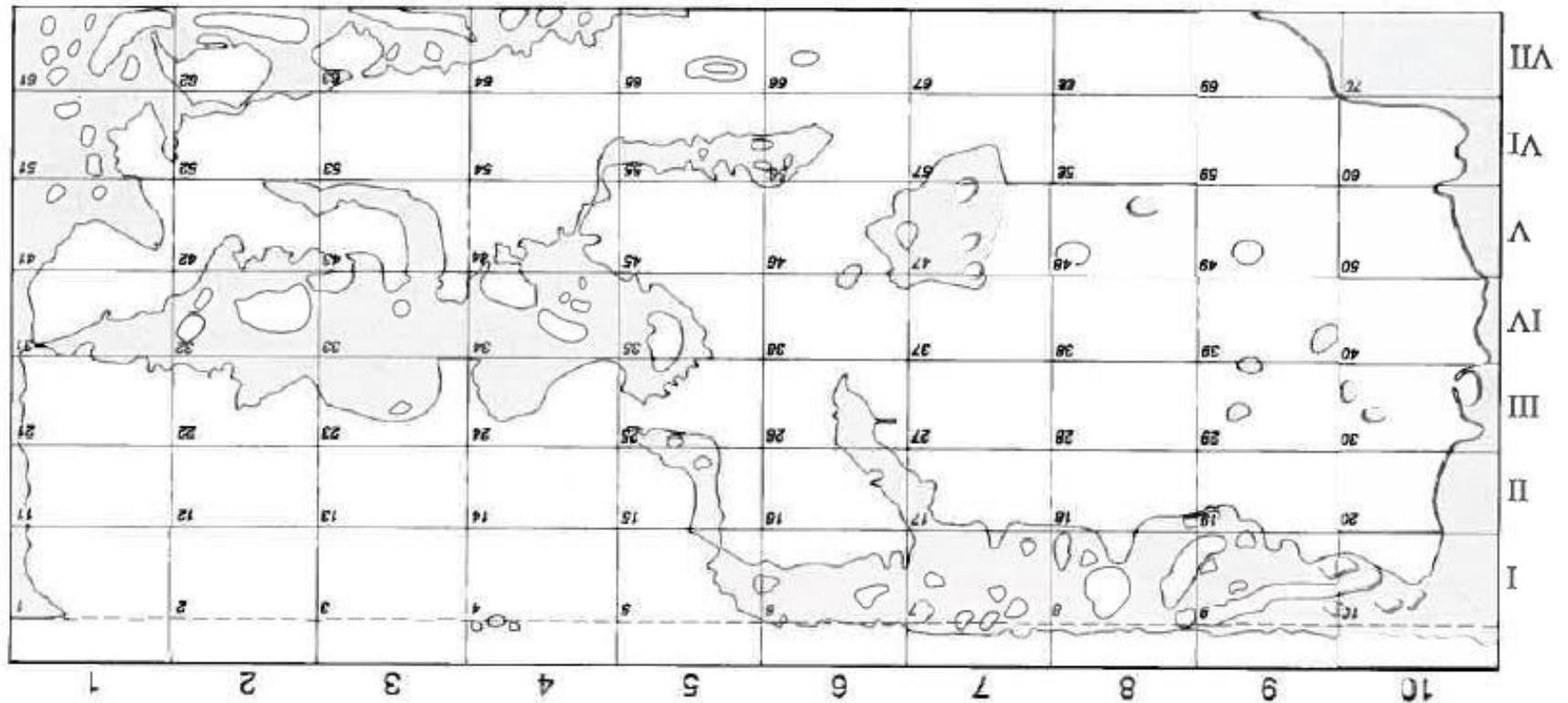


Al-Idrisi: world map

PLATE 11. AL-IDRISI'S WORLD MAP FROM THE OXFORD
POCOCKE MANUSCRIPT. Dated 1456 and copied by 'Ali ibn
Hasan al-Hafī al-Qasīm, this world map comes from a well-
preserved and complete manuscript.
Diameter of the original: ca. 23 cm. By permission of the Bod-
leian Library, Oxford (MS. Pococke 375, fols. 3v-4r).



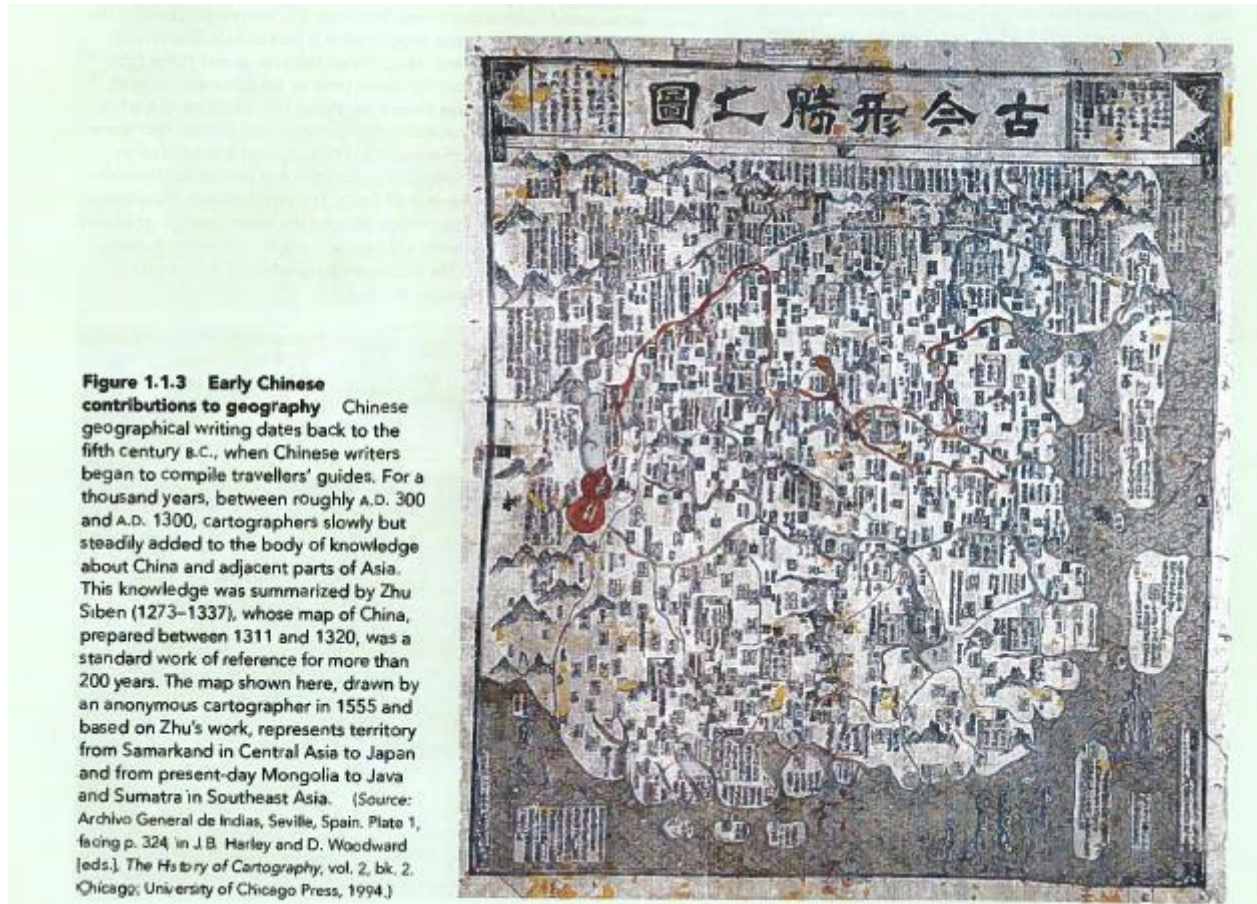
Al-Idrisi – his 70 small maps put together



Middle Ages

- B. In China
 - From 2nd century BC to 1500s AD China was most advanced geographically
 - Invention of the compass (first used in *Feng-shui*)
 - Zhu Siben's (1273-1377) map of China

Zhu Siben's (1273-1377) map of China



- Next class:
- We try to complete the story...at least we will look at Mercator's projection!