Introduction

Maps in Science and Society
Professor Keith C. Clarke
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History of the Class

• First taught at UCSB by Waldo Tobler, using materials from George Kish at Michigan

• Paper presented in 1993

History of Cartography As Taught at UCSB

History of Cartography Conference, Chicago, June 1993

Waldo Tobler

As background to my course at the University of California, Santa Barbara, I should inform you that my training is in geographical cartography, and my specialties are the subjects of map projections, mathematical and computer cartography, and analytical geographical modeling. I teach courses in all of these areas. My language competence is limited to western tongues.

During a ten week quarter I present twenty-five lectures in a once-a-year course called “History of Cartography”. While at the University of Michigan I had the good fortune to audit the comparable course offered by the late Professor George Kish, and I use some slides from his
Geog 126

- Awarded a Fulbright Distinguished Chair in 2007 at the University of Trieste, Italy
- Used part of the time to build the class
- Chose to change chronology organization to development of mapping science and technology around 6 themes with labs
- Have taught the class since 2008 in alternate years
Mapping technology today
Maps in Science and Society

• This class is designed to show how technical and scientific development in cartography produced a series of instruments, practitioners, and ultimately maps that illustrate the strive for cartographic knowledge, accuracy and lucidity.

• In lectures, we will explore history by theme, tracing how developments in methods and ideas went hand in hand.

• In labs, we will build an experience through the analysis, replication and use of historical maps and mapping instruments.
Assessment

• There will be six laboratory assignments that will make practical the ideas introduced in lecture (each worth 10% of the grade)
• Also a brief paper, discussing a map or mapping method of particular interest to the student encountered during the course.
  The paper should be no longer than five pages, including references and illustrations, suitable for use as a Wiki entry. Worth 30%
• The papers will be reduced to powerpoint presentations: each with no more than four slides and lasting five minutes. This will take the place of the final (10%)
Maps in Science and Society

• TOPIC 1: Geographical Positioning and Maps
• TOPIC 2: Thematic cartography
• TOPIC 3: Exploration and the Expansion of Nation States
• TOPIC 4: Perceptions of Foreign Lands
• TOPIC 5: Toponymy
• TOPIC 6: Maps and Visualization
Resources

- Lectures
- Videos
- Laboratory exercises
- Web site and links
- Gauchospace
- Discussions
- References
Human Origins

The Migration of Anatomically Modern Humans

Evidence from fossils, ancient artifacts, and genetic analyses continues to tell a compelling story.

The route from Africa to modern human species is complex and has various hypotheses to explain the migration. Here are some key points:

- **Northern Route**: This route involves a northward migration through the Middle East and into Europe. It is supported by genetic evidence showing a greater genetic contribution from Denisovans in Eastern Asia.
- **Southern Route**: This route involves a southward migration along the coast of Africa and into Asia. Genetic evidence suggests that this route played a significant role in the migration of modern humans.
- **Combined Route**: Some individuals may have migrated via both routes, indicating a more complex movement pattern.

Key dates and events:

- **550,000 years ago**: Homo erectus is the first known hominin to migrate out of Africa.
- **120,000 years ago**: The first modern humans are found in Europe.
- **40,000 years ago**: The cave art at Lascaux in France is created by modern humans.
- **5,000 years ago**: Modern humans first arrive in America.

Each of these routes and events has contributed to the diversity of human populations and the genetic makeup of modern humans today.

Further reading:

1. *Genomic Evidence for the Early Peopling of the Americas* by Brian P. Goldsworthy and co-authors.
2. *The Evolutionary History of Modern Humans* by M. K. Henn and co-authors.
Figure 3. Genetic matrilineal distances between 55 modern Western Eurasian populations (Table S6) and Neolithic LBK samples. Mapped genetic distances are illustrated between 55 modern Western Eurasian populations and the total of 42 Neolithic LBK samples (A) or the single graveyard of Derenburg (B). Black dots denote the location of modern-day populations used in the analysis. The coloring indicates the degree of similarity of the modern local population(s) with the Neolithic sample set: short distances (greatest similarity) are marked by dark green and long distances (greatest dissimilarity) by orange, with fainter colors in between the extremes. Note that green intervals are scaled by genetic distance values of 0.02, with increasingly larger intervals towards the “orange” end of the scale.
My conjecture

• By 15000BP humans are everywhere
• Was this exploration possible without maps?
• Extensive ancient knowledge of world
• Then for millennia, people remained in place (with some exceptions)
• Age of Discovery and Exploration during the renaissance: Maps critical
• Era of mass emigration spreads humanity a second time: Colonization and maps
• Contemporary period: Ubiquitous mapping and navigation
Earliest evidence
9,000 years before writing:

A team of Spanish archaeologists have matched marks on polished sandstone made 14,000 years ago in Navarre, northern Spain to the landscape in which it was found and claim to have the earliest known map, which appears to be a prehistoric hunting map. The map has depictions of reindeer, a stag and some ibex, plus the shapes of mountains, and the course of a river.
Abauntz Cave, Navarra, Spain
Some questions to ponder

• If maps existed 65K years ago, what did they look like? What functions did they perform?
• Do maps today still serve the same functions?
• How has scientific progress changed map accuracy and function?
• Why do so few truly ancient maps survive?