Pre-Columbian North America

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Motivation

• Most important reason: understanding the human settlement in North America before the contact with Europeans is an important intellectual exercise in itself.

• But it is also key to analyze the political economy of Early America:

  1. Knowing how life was before the Europeans arrived helps us to appreciate the possibilities and limits imposed by geography and climate.

  2. Native Americans had already changed the environment.

  3. Existing settlement shaped the institutions that Europeans created. Example: Spaniards vs. English, organization of British colonies.

  4. Intersected with the dynamic of competition between English (British), French, Spanish, and Dutch. Particularly, French and Indian War.

  5. Later, vital role in the struggle between the British Crown and the British colonies.
Thayendanegea or Joseph Brant (1743-1807)
Human population of the Americas
First humans in the Americas

- Humans have inhabited North America since *at the very least* 14,800 ya (or BP; January 1st, 1950, Willard Libby and his students at the University of Chicago).

- The real date is more likely to be *at least* 16,000 ya.

- Some recent (but not conclusive) evidence from Mexico’s Chiquihuite cave suggests humans were present as early as 26,500 ya and likely human footprints in White Sands National Park from 21,000 to 23,000 ya.
  - Correct dating?
  - Ancestors of modern-day Native Americans or a different “ghost” population?
  - More general point: selection bias in excavations.
  - A few decades ago, researchers believed in much later arrivals.
Willard Libby, 1908-1980
Sources of evidence

• How do we know?

1. Archeological:
   • Carbon-14 dating (measures the amount of $^{14}\text{C}$ in organic material).
   • Optically stimulated luminescence (measures doses from ionizing radiation).

2. Genetic: “ancient DNA revolution” (bones, coprolites, ...).

3. Linguistics.

• However, there is much we do not know. For instance, lack of many human remains.

• Next decade can bring radical changes in our understanding of Pre-Columbian America as we get more newly sequenced ancient DNA samples and new other sources of evidence (ancient protein sequencing).
Archeological evidence
DNA evidence
thousand times more data, and in addition we have access to the rich lode of information contained in ancient DNA, which has become a more definitive source of information about past population movements than the traditional tools of archaeology and linguistics.

The first five ancient human genomes were published in 2010: a few archaic Neanderthal genomes, the archaic Denisova genome, and an approximately four-thousand-year-old individual from Greenland. The next few years saw the publication of genome-wide data from five additional humans, followed by a burst of data from thirty-eight individuals in 2014. But in 2015, whole-genome analysis of ancient DNA went into hyperdrive. Three papers added genome-wide datasets from another sixty-six, then one hundred, and then eighty-three samples. By August 2017, my laboratory alone had generated genome-wide data for more than three thousand ancient samples. We are now producing data so fast that the time lag between data production and publication is longer than the time it takes to double the data in the field.

Much of the technology for the genome-wide ancient DNA revolution was invented by Svante Pääbo and his colleagues at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, who developed it to study extremely old samples such as archaic Neanderthals and Denisovans. My contribution has been to scale up the methods to study large numbers of relatively more recent samples, albeit still many thousands of years old. The traditional length of an apprenticeship is seven years, and I began mine in 2007 when I started working with Pääbo on the Neanderthal and Denisova genome projects. In 2013, Pääbo helped me to establish my own ancient DNA laboratory—the first in the United States focused on studying whole-genome ancient human DNA. My partner in this effort has been Nadin Rohland, who did her own seven-year...
The Age of Modern Humans

-3,200,000 ya
"Lucy," an upright Australopithecus
(Awash Valley, Ethiopia)

-1,800,000 ya
Fossils of Homo
outside Africa
(Omanis, Georgia)

770,000–550,000 ya
Genetic estimate
of population
separation between
Neanderthals and
modern humans

7,000,000–5,000,000 ya
Final split from ancestors
of chimpanzees

700,000 years ago

330,000–300,000 ya
Oldest fossils with features shared
with anatomically modern humans
(Jebel Irhoud, Morocco)

300,000–250,000 ya
Middle Stone Age /
Middle Paleolithic
Transition

300,000 ya
Present

-160,000 ya
"Mitochondrial Eve"
Date of the most recent shared
ancestor of all present-day humans
along the entirely maternal line

350,000–250,000 ya
Later Stone Age /
Upper Paleolithic
Transition

70,000–50,000 ya
Later Stone Age /
Upper Paleolithic
Transition

350,000 years ago – present

The Age of Modern Humans

-320,000 ya
Date of the most recent shared
ancestor of all present-day humans
anywhere on chromosomes 1–22
(See Figure 5)

350,000 years ago – present

PERIOD OF DETAIL
Summary of DNA evidence

• The ancestors of modern-day Native Americans split from Siberians and East Asians around 25,000 ya, perhaps when they crossed Beringia.

• In some moment, humans separated into two groups: “Southern Native Americans” (a.k.a. Ancestral A lineage) and “Northern Native Americans” (a.k.a. Ancestral B lineage).

• Most likely, there were at least four pulses of migration and several population replacements.

• Special genetic markers in Amazonian Native Americans.

• Next-to-no evidence supporting the Solutrean hypothesis and none that humans evolved independently in the Americas.
Who We Are and How We Got Here

In Search of Native American Ancestors

There were at least two migrations that left a human legacy as far as South America (left) and at least two whose impact was limited to northern North America (right).

1. Split from closest Eurasians ~23,000 ya

2. Source of Population Y Timing of entry unknown

Genetic Evidence of at Least Four Prehistoric Migrations to America

Migration out of Asia forms the Paleo-Eskimo lineage. ~5,000 ya

A final wave from Asia contributes to the Neo-Eskimos and displaces the Paleo-Eskimos. ~1,000 ya

Figure 19

Approximate ice extent and ancient shorelines shown at ~13,000 ya

Paleo-Eskimos contribute some of the ancestry of Na-Dene speakers.

Coastal route
Open by ~16,000 ya

Ice-free corridor route
Open by ~14,000 ya

First Americans
Population Y
Both

~5,000 ya

~8,500 ya

~13,000 ya

~16,000 ya

~23,000 ya

~1,000 ya

~3,000 ya

~5,000 ya

~7,000 ya

~10,000 ya

~12,600 ya

~14,200 ya

~25,000 ya

~15,000–10,000 years ago

10,000–1,000 years ago

~5,000 ya

~8,500 ya

~13,000 ya

~16,000 ya

~23,000 ya

~1,000 ya

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~15,000–10,000 years ago

10,000–1,000 years ago
Linguistic evidence
• Around 296 spoken languages north of Mexico.

1. Subtle issue: What is a language? Or, more importantly, what are two separate languages? Pluricentric languages; language vs. dialect; dialect continuum.


3. Let’s look at the sentence: “Our Father who art in heaven, hallowed be thy name.” (Why do we like to pick a well-settled text such as a prayer?).

<table>
<thead>
<tr>
<th>Latin</th>
<th>Galician</th>
<th>Portuguese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pater noster qui es in caelis: sanctificetur nomen tuum</td>
<td>Nosso Pai que estás no ceo santificado sexa o teu nome</td>
<td>Nosso Pai que estás no Céu santificado seja o Teu nome</td>
</tr>
</tbody>
</table>

4. Often filled with contentious political aspects. Example: Serbo-Croatian.
• Languages in North America belonged to 29 families with 27 isolates.

• Diversity was particularly rich in California and Southeast.

• Compare with the Indo-European family.

• Linguistic diversity suggests early (and likely repeated) settlement.
How do we know?

- We can apply glottochronology to language evolution: Morris Swadesh.

- Swadesh list of 100 and 215 core terms ("one," "two," "three," "mother," "father," "and," "if," ...).
  1. Core terms are highly resistant to change (are "one" and "uno" a change?).
  2. Example: More than 50% of English vocabulary comes from French (Norman invasion of 1066), Latin, and Greek (technical language). However, 96% of English 215 core terms are Germanic (Anglo-Saxon invaders).

- Historical evidence for languages with well-documented records: 14% change per 1,000 years in the 100 terms list and 19% in the 215 list.

- Examples:
  1. Italian and French have 23% unrelated words in the 215 list: that suggests they separated around 1,200 ya (about right).
  2. Spanish and Portuguese: 15%, suggest they separated around 750 ya (again, about right).

- More sophisticated equations (Sankoff and Embleton).
North America on the eve of contact
Let us now focus on North America before the Europeans’ arrival (Post-Classical stage).

We are skipping a rich history of change and evolution (Clovis, Archaic, Formative, Woodland, and Classical stage).

Around 5 million Native Americans north of Mexico in 1492, although estimates are subject to huge uncertainty bands.

Also, some evidence that the population was falling already before European’s arrival:

1. DNA.

2. Archeological evidence suggests several cultures were in decline (Cahokia, Hohokam, ...).

Ecological stress? Climate change?
• Human presence had deeply shaped the environment of North America:
  1. Megafauna extinction.
  2. Annual fires.

• A prominent example: coastal California.
We need to make a brief detour on Mesoamerica. Why?

It is the area north of the Isthmus of Panama with the most sophisticated agricultural polities.

Key development: Adoption of maize (*Zea mays* ssp. *mays* L.) after its domestication around 9,000 ya in the Balsas river region (modern day states of Guerrero and Michoacán, in west-central Mexico).

Derived from teosinte, a grass plant with sweet kernels.

High genetic flexibility allows for fast adaption.

Maize is one of the most successful human crops (third world producer of calories after wheat and rice).

Also, important source for alcohol (maize beer, bourbon).
From teosinte to maize
Figure 1.1. Schematic drawing showing the shape of a modern hybrid maize plant (left) with two ears growing off the primary stalk, compared with a teosinte plant (right), which typically has many stalks or lateral branches and can have twenty or more small ears, or spikes. (Redrawn by Michael Blake after Beadle 1980:114. See also Lauter and Doebley 2002:335, figure 1.)

Figure 1.2. The earliest directly dated maize cobs, recovered by Kent Flannery during his excavations at Guilá Naquitz Cave in the Oaxaca Valley in the 1960s. Scale bar box = 1 centimeter. (Photograph courtesy of Bruce Benz)
map 8.1. The chronological sequence of maize dispersal based on the genetic analysis presented in figure 8.2 (Matsuoka et al. 2002). The darker arrows represent the earliest spread both northward and southward. Subsequent movements are indicated by progressively lighter arrows. (By Michael Blake and Nick Waber)
The age distribution of archaeological sites with both directly and indirectly dated maize macro- and microremains. The 1000-year-interval age distributions are based on the oldest date at a site. All sites located within a 50-kilometer radius of the oldest dated site in a region are excluded. (Created by Michael Blake and Nick Waber using sources referenced in Ancient Maize Map, http://en.ancientmaize.com/)
A comprehensive survey
• Adoption and diffusion of maize leads to a deep political-economic transformation of the area.

• Aztec Empire (a.k.a. the Triple Alliance) is perhaps the most famous outcome.

• But there are many previous structures: Olmecs, Toltec, ... 

• An impressive site: Teotihuacán with the Avenue of the Dead and the Pyramid of the Moon (although we know surprisingly little about the inhabitants of Teotihuacán!).

• All of these sites show the deep relation of the local peoples with maize.
Teotihuacán
The Olmec Maize God

"The top of the deity's head usually has a V-shaped cleft from which emerges an ear of maize. There are several distinct representations of the Maize God, each of which can depict several stages of the growth of the plant. Some show the maize emerging from a dot below the cleft, thought to represent the seed or kernel. Others show the ear rising out of the cleft. Frequently the ear is shown surrounded by leaves, thought to represent the husk, while others show the exposed ear with bands around it, likely representing the kernels on the cob.

Joralemon initially hypothesized that other similar representations of deities, which lacked this particular set of characteristics, were distinct gods. Taube's analysis shows, however, that as many as four of the separate deities can now be considered to be representations of different stages, or aspects, of the growth cycle of maize: from planting the seed to sprouting, growing, maturing, and ripening. The Maize God sculpture from Teopantecuanitlán is a vivid example of this, with several different aspects of the maize growth cycle represented in one image (figure 9.10).

Versions of the Maize God continue to be represented in later periods and extend beyond the Olmec heartland to many other regions of Mesoamerica. The evolution of the forms of deities from Olmec antecedents was noted by Covarrubias in the 1950s and picked up on by many other scholars. It is fascinating to see the visual and symbolic connections between the earliest Olmec representations of the Maize God and later versions portrayed in Classic period Zapotec and Maya cultures, and even subsequent Postclassic Mexican cultures.
Political economy structures II: North America

- Intermediate level of transition to agriculture.

- Two main examples of sophisticated political economy structures in current-day U.S.:
  1. Mississippian culture.
  2. Ancestral Pueblo in the Southwest.

- “Complex” hunter-gatherers groups of the Pacific Coast, Great Plain, and Northeast with some degree of cultivation (not always centered around maize such as the Adena culture; early examples of tobacco; Chumash’s fishing).

- Ecological stress in some areas combined with more sustainable situations in others.

- Also, societies were dynamic and changing over time, with some groups growing and some groups shrinking. Think about Cherokee’s expansion in the 17th century.
The Mississippian culture, I

- Starts around 800 CE:
  1. Bow and arrow (0 CE, slow diffusion).
  2. Maize cultivation.

- Settlements around platform mounds.

- Beyond maize, cultivation of marsh elder, goosefoot, sunflowers, and gourds.

- Widespread trade networks: copper, pottery, ...
Monks Mound
The Mississippian culture, II

- Sophisticated societies:
  1. Chieftains and social hierarchies.
  2. Settlement hierarchies.
  3. Craft specialization.
  4. Monumental architecture (with human sacrifices).


- Other examples: Moundville (AL), Etowah (GA), and Spiro (OK).

- Rich iconography, ceremonies, and mythology: Southeastern Ceremonial Complex.

- Despite serious decline, still highly sophisticated when De Soto arrives (1539-1543 CE).
The Southwest Culture

- Two periods (Basketmakers, 1500 BCE-750 CE and Pueblo, 750 CE-) and multiple subgroups.

- Two arrivals of maize (2100 BCE and 100 BCE). Only second arrival stucked.

- Arrival of squash and beans. Together with maize, they form the “three sisters”:
  1. Maize provides calories.
  2. Beans fix nitrogen.
  3. Squash’s shade keeps humidity.

- Highly cooperative societies with sophisticated apartment buildings and irrigation systems.

- For example, you can still see some of the canals built by the Hohokam in Phoenix today.

- Trade networks with the rest of North America.
• Area of original English settlement:
  1. New England and Mid-Atlantic mainly controlled by Algin (Algonquian-Ritwan) and Iroquoian nations.
  2. South: Siouan and Muskogean nations, with some presence of Algin and Iroquoian nations.

• Mississippian culture is somewhat more inland.

• Recall that Georgia, Florida, and North Carolina were “late” early colonies.
Algic nations
Siouan nations
Muskogean nations
Iroquois vs. Algonquian

- Iroquois Confederacy (Haudenosaunee) of five nations (Mohawk, Oneida, Onondaga, Cayuga, and Seneca) formed between 1440-1660 CE.
  
  1. Probably created after migration of several groups from the south. When?
  2. Appreciated by European settlers as a sophisticated political structure: “Great League of Peace.”
  3. Very successful militarily.

- Iroquois Confederacy in constant conflict with Algonquian:
  
  1. Control of the Saint Lawrence River.
  2. Expansion into Ohio country and fur access.

- Usually, Iroquois allied with Dutch and British, Algonquian with French.

- Beaver Wars (1609-1701).
The economy, 1

- The Southeast had moved more toward agriculture, Northeast and Mid-Atlantic, in general, less.

- Range of cultivation vs. domestication.

- For example, maize already consumed in the subarctic boreal forest in Canada 500 CE. Systematic cultivation? Occasional cultivation? Trade? Gifts?

- Likely that the frontier of systematic maize cultivation was around the current Canada-U.S. frontier.

- We do not want to think about hunter-gathering vs. agriculture as sharp divisions. Even today, most farmers do some hunter-gathering (hunting, fishing, ...).
The economy, II

- Main contrast:
  - Algonquians: seasonal economy with mobile villages.
  - Iroquois: maize only started to be cultivated regularly around 1000 CE. Change in settlements, pottery, and gender roles (matrilinear).

- Nevertheless, by 1607, it is likely that Native Americas in the East Coast had been already deeply influenced by the arrivals of Europeans in other parts of the Americas.

- Mechanisms: diseases, trade, new animals, dislocations, ....

- Clearest example: Epidemic among Native Americans, New England, 1616-1619, right on the eve of the arrival of English settlers has decimated the Wampanoag.
Longhouses
John White’s painting of Algonquian in North Carolina
Early contacts
As mentioned before, Solutrean hypothesis about the origins of the Clovis culture by Dennis Stanford and Bruce Bradley is minority among archaeologists.

We know, however, that Norsemen had settled in L’Anse aux Meadows (Newfoundland) around 1000 CE.

Perhaps some localized interaction by Atlantic fishermen (who did not realize they might have encountered a new continent).

The effects of climate change were probably considerable.

Contacts through Alaska? Venetian glass beads before 1492?

Other histories of early contacts are fanciful.
The Vikings’ Voyage to the New World

- c. 874: The Norse colonize Iceland.
- c. 960s: Erik the Red’s father is banished from Norway to Iceland.
- c. 986: Erik the Red, banished from Iceland, colonizes Greenland.
- c. 1000: Vikings reach Newfoundland and possibly points further south.
Reconstructed Temperature

Temperature Anomaly (°C)

Medieval Warm Period

Little Ice Age

2016
Some additional references