

# Archaeology and Landscape Learning Next to the White House

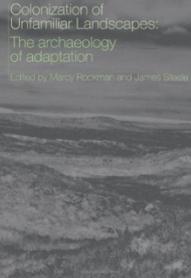


Marcy Rockman, Ph.D., RPA

*NABO Conference, Akureyri, Iceland, 12-13 July 2013*

# Scope

---



Colonization of Unfamiliar Landscapes:  
The archaeology of adaptation  
Edited by Marc Rockman and James Stoen

1. 10<sup>th</sup> anniversary of two major publications on landscape learning, which is quest of mine

2. Address relating archaeology to major policy issues (on climate change posed by the Council on Environmental Quality (which is across the street from the White House)

➤ Shameless promo: poster on archaeology and nuclear detonation



# Landscape Learning Process

---

**IS:** the means by which human groups gather, share, remember, and transmit to other generations information about the nature and distribution of natural resources.

**OCCURS:** in situations in which such human groups lack both direct knowledge about the natural resources of a region and access to sufficient previously acquired knowledge about those resources, and therefore must develop such knowledge anew.

**RELEVANT:** in any situation in which there is a contrast between an originating and a current environment.

**ASKS:** can the process of environmental familiarization be seen in the archaeological record? If so, how does it compare across time, space, and culture?

# LLP: Types of Environmental Knowledge



**Locational knowledge:** spatial and physical characteristics of specific resources

- likely quickest and easiest to gather
- archaeological signature: detectable use of a raw material, use of resource location



**Limitational knowledge:** boundaries, costs, and cycles of resources and environmental characteristics

- gathered in a time frame  $\geq$  variation/cyclicity in the resource
- archaeological signature: repeated use of raw material at small no. sites; built features at localized resources



**Social knowledge:** attribution of names, meanings, and practices to natural features; storage of locational and limitational knowledge in forms transmitted to succeeding generations

- timeframe uncertain
- archaeological signature: reuse of given resource over extended time; use may have particular topographic or quality characteristics

### III. Development and Dispersal of the Model

Formation of identity through journeys [Hidatsa/Mandan] (Zedeno et al. 2005)

Mesolithic colonization (Bergman et al. 2004)

Colonization by modern humans (Pavlov et al. 2004)

Success/failure in 3 late glacial cultures (Riede 2007)

Contact hunter-gatherers vs. first farmers (Radanovic 2006)

Development of a ritual landscape (Rockman 2007)

Pleniglacial occupation and aridity (Verpoorte 2003)

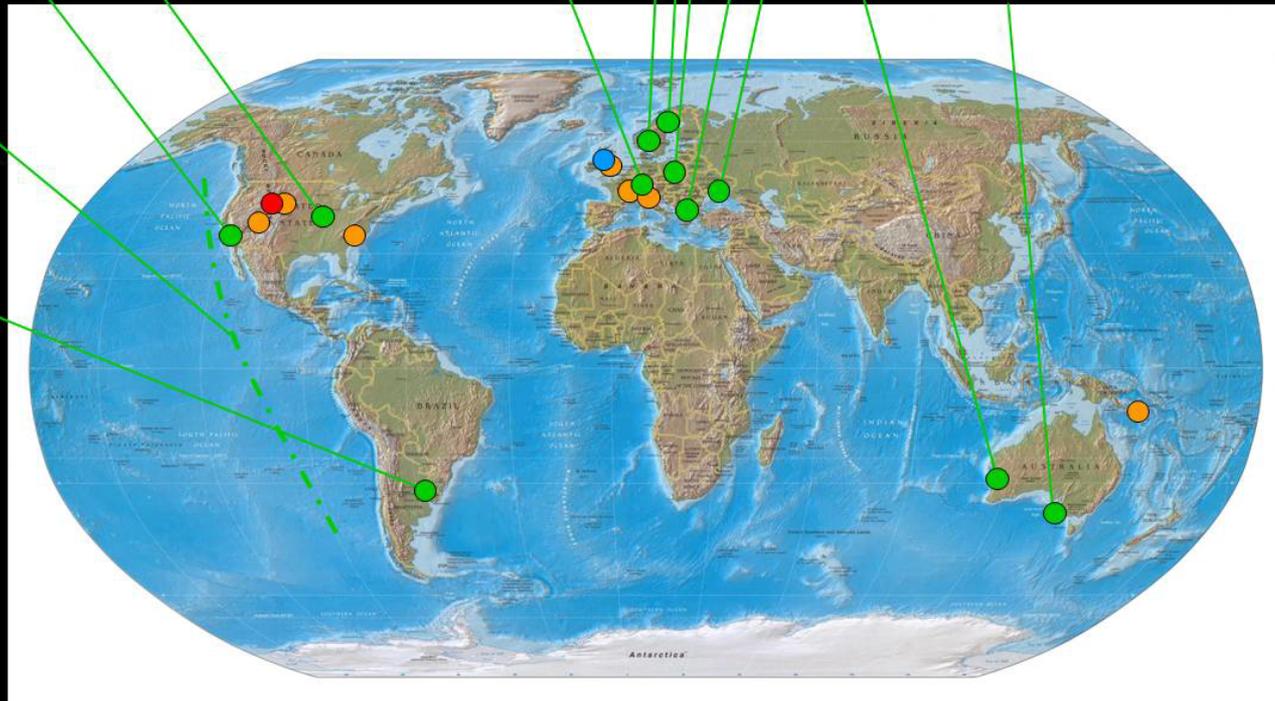
Neanderthal land use in Crimea (A. Burke 2006)

Historical land improvement policy (S. Burke 2007)

Maritime Cultural Landscape (Smith 2006)

Paleoindian peopling of the Americas (Meltzer 2004)

Hunter-gatherers and faunal population fluctuations (Rindel and Belardi 2006)

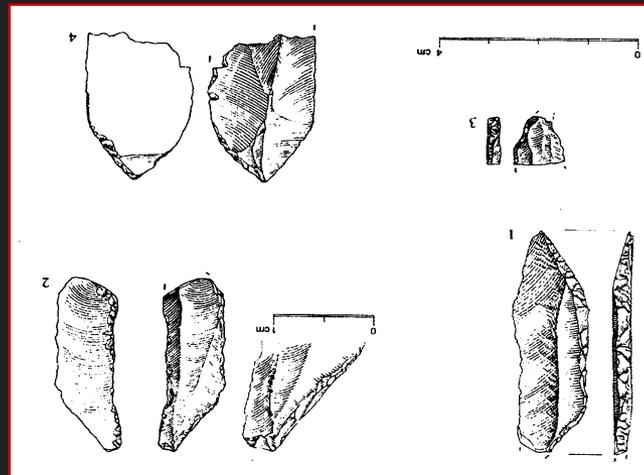


- Initial model developed to address resource use in an 1860s Gold Rush camp in the American West, 1998
- Rockman dissertation study of locational knowledge of flint in the late glacial recolonization of Britain, 2003
- Case studies in *Colonization of Unfamiliar Landscapes: The Archaeology of Adaptation*, 2003
- Recent studies that draw from one or more works in *Colonization*, 2003-2008

# LLP: Findings & Directions to Date

## Locational Knowledge:

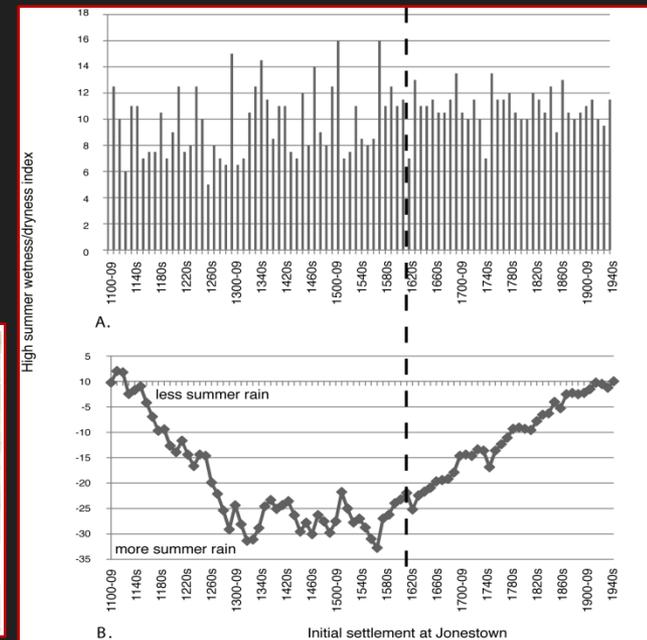
- Ex: late glacial recolonization of Britain via ICP-MS + GIS of flint deposits
- Colonizer's blueprint: geological and topographical predictions less applicable to temperate rainy regions than anticipated
- Following water difficult, seasonality may have been important
- Apparent emphasis on flint areas similar to originating Paris Basin= importance of prior expectations
- IS possible to break learning process into series of testable hypotheses



# LLP: Findings & Directions to Date

## Limitational Knowledge:

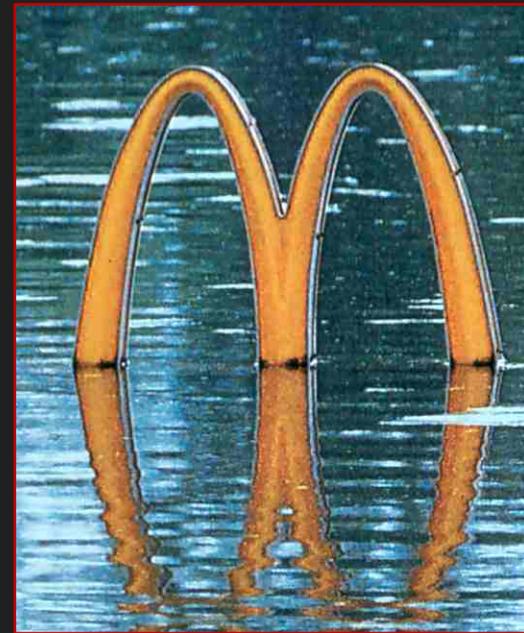
- Little Ice Age climate experience & expectations of Jamestown colonists
- NABO examples of prior expectations re: Norway-Iceland-Greenland
- Cumulative deviation technique via Dugmore—how change changed
- Concept of holon via Terry Hopkinson – multiple variables produce single identifiable signal: human behavior can be a holon re: adaptation
- Visible change in terms of applied practices happened faster than social recognition of the different environment
- Documentary evidence of commitment to idea of climatic predictability
- Concept of prime driver also useful : in this case—climate and environment, particularly disasters, are not prime drivers- economics are



# LLP: Findings & Directions to Date

## Social knowledge:

- Next big piece
- Focus: will be social memory of disasters  
(poster promo: social memory of disasters in action!)





THE WHITE HOUSE COUNCIL ON ENVIRONMENTAL QUALITY

*Progress Report of the Interagency  
Climate Change Adaptation Task  
Force: Recommended Actions in  
Support of a National Climate  
Change Adaptation Strategy*

October 5, 2010



- Expand research on relevant social and behavioral sciences to improve understanding of human responses to change.
- Identify the social and ecological tipping points and thresholds (beyond which change is sudden and potentially irreversible) to help guide decisions regarding intervention and planning

**Expand research:**

- Science re: human barometer, shifting baselines
- Processes of transmission of information
- Climate narratives- how we understand and process change

**Identify tipping points:**

- Science re: human barometers
- Processes of transmission of information

# Expand Research & Identify Tipping Points: Human Barometer, Shifting Baselines

Human barometer is relationship of archaeo/anthro data to paleoenvironmental data

- Decisions and thresholds useful re: resilience
- Ex. Medieval Warm Period (A.D. 900-1300)
  - California Chumash reorganized/traded
  - Anasazi left Chaco Canyon

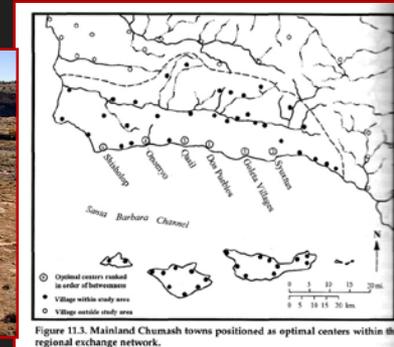


Figure 11.3. Mainland Chumash towns positioned as optimal centers within the regional exchange network.

## Shifting baselines

- Site/landscape data provide context for natural resource capacity
- Landscape data leads to scope of previous human management of environment
- **What does “natural” really mean?**



# Expand Research & Identify Tipping Points: Transmission of Information

---

- Adaptation is Outcome of Evolution
- Being adapted or “fit” in evolutionary terms = capacity to thrive & reproduce
- Biological evolution works on traits passed genetically between generations (vertically)
  - Characteristics on which biological evolution works are inherent to the individual
  - Environment in which biological evolution works is the physical environment
- Culture not held in genes, but in ideas, beliefs, and practices taken on by individuals and shared within a group
- Culture passes vertically from parents to children *and* horizontally between peers and from children to adults
  - Because the components of culture can be passed in multiple directions and are not inherent to an individual, they are separate entities from individuals
  - The collection of ideas, beliefs, and practices held by a given group is the “environment” in which fitness of a given idea, belief, or practice is tested

**Therefore:** evolution works on the components of culture distinct from its workings on the biological fitness of individuals and groups, which means...

# Cultural Adaptation $\neq$ Biological Adaptation

---

- An idea, belief, or practice can be adapted to the social setting in which it occurs, but does not necessarily confer biological fitness on the individuals or groups that hold it
  - Ex. pursuit of a Ph.D. : social fitness? biological fitness?
- Incumbent on individuals or groups to evaluate an idea, belief, or practice to confirm that it confers either social fitness, biological fitness, or both
- True that ideas re: adaptation need to suit the local culture (An idea that takes off in a given social setting does not necessarily mean it is suited to the local physical or natural environment )

# Adaptation and Information Transmission: Built for Speed, Not Comfort

---

- Two ways to get an idea, belief, or practice:
  - Individual learning: decision based on personal experience
  - Imitation: decision based on observations of others
- In any given group, there is some ratio of individual learners and imitators for any given facet of behavior
  - Higher proportion of individual learners: tracks the real environment fairly closely, but useful innovations may not spread very fast or remain isolated
  - Higher proportion of imitators: ideas, beliefs, or practices can spread rapidly through population, but may be less effective at tracking the real environment
- Imitation is not random, but has transmission biases:
  - Frequency bias = most common idea, belief, practice around
  - Prestige bias = using an idea, belief, practice held by someone with high status

# Transmission and Adaptation over Long Term

---

- Via imitation processes, ideas, beliefs, and practices that confer fitness in some notable way and put a practicing population at a relative adaptive peak can spread and be taken up by multiple populations
- Once practicing population is quite large, social context likely to favor ideas, beliefs, and practices that promote group cohesion—this is what allows the whole to stay at the adaptive peak
- If group cohesion is favored in a large population, frequency biases and prestige biases for imitators are likely to be powerful
- Given the size of the population, transmission of ideas, beliefs, and practices from individual learners may be impeded through inertia and the strong imitative forces
- If the balance of imitative biases becomes too strong, the group as a whole may lose track of its real environments

**If a group loses track of its environments, stress is likely!** The length of time between development of the strong imitative forces relative to learners and indications of stress depends on the gap between environmental characteristics and the environmental perceptions held within the group

# In Plain English...

---

- Because an idea, practice, or belief is widespread or has been practiced for an extended period of time does not mean it is or is still an appropriate idea, practice, or belief with respect to biological fitness for the environment in which it occurs
- A widely spread idea in a big population can be hard to change

(above points developed from multiple works by A. Prentiss, I. Kuijt, P. Richerson, and R. Boyd. Key point – big theory based on data)

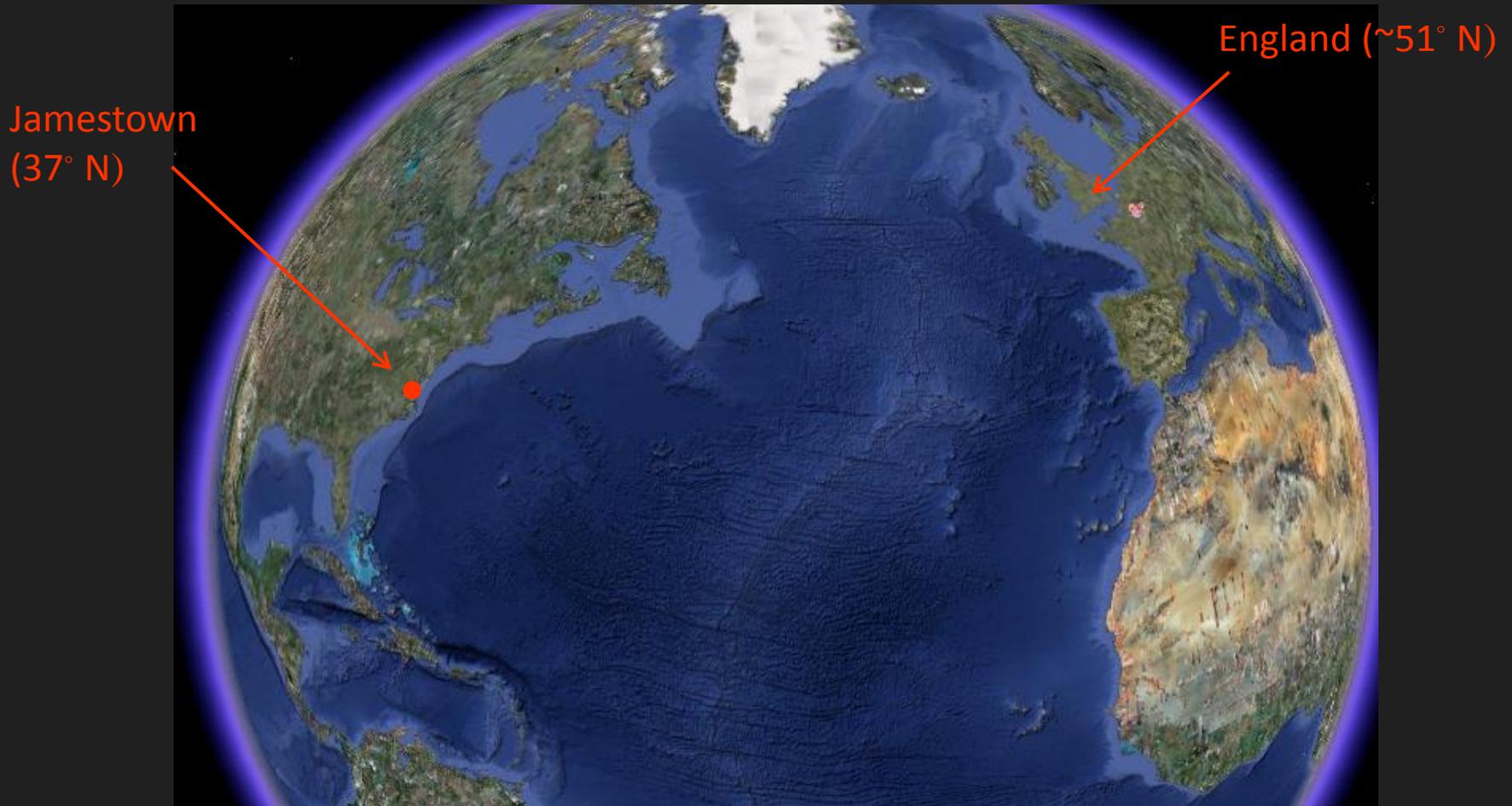
# Expand Research: Climate Stories and How We Understand Ourselves

## Ex. Jamestown Colony

- Established 1607
- Project of the Virginia Company
- Located on edge of Spanish New World possessions
- Commercial and military objectives from the start



# Colonial Expectations of Climate: Consistent by Latitude



# Jamestown Chronology

- 1609 – 1610: Starving Time
  - Unhealthy location
  - Little Ice Age drought
- By 1617: tobacco cash crop
- 1618-1680s: initial plantation system with imported plants/animals
- 1680s-1750s: development Chesapeake Bay agricultural economy and settlement pattern



# Jamestown Climate Chronology

---

- LIA drought not recognized as such for ca. 10 yrs.
- To 1630s, published reports vary between individual learning and expectations from climate model
- 1630s-1650s publications note:
  - Some parts of New World more desirable than others, and
  - Interior of continent should be more favorable; but

*“Colonists firmly believed that the climate of America, under the impact of settlement by Europeans with their agricultural technology, would become healthier, warmer, and more temperate ( Kupperman 1982: 1287 ).”*

**Fundamental Question:**

**Has this model been updated? Are we doing so now?**

Thank you.



[marcyrockman@hotmail.com](mailto:marcyrockman@hotmail.com)

EXTRAS

# Adaptation is Outcome of Evolution

- Being adapted or “fit” in evolutionary terms = capacity to thrive & reproduce
- Biological evolution works on traits passed genetically between generations (vertically)
  - Characteristics on which biological evolution works are inherent to the individual
  - Environment in which biological evolution works is the physical environment
- Culture not held in genes, but in ideas, beliefs, and practices taken on by individuals and shared within a group
- Culture passes vertically from parents to children *and* horizontally between peers and from children to adults
  - Because the components of culture can be passed in multiple directions and are not inherent to an individual, they are separate entities from individuals
  - The collection of ideas, beliefs, and practices held by a given group is the “environment” in which fitness of a given idea, belief, or practice is tested

**Therefore:** evolution works on the components of culture distinct from its workings on the biological fitness of individuals and groups, which means...

# Cultural Adaptation ≠ Biological Adaptation

- An idea, belief, or practice can be adapted to the social setting in which it occurs, but does not necessarily confer biological fitness on the individuals or groups that hold it
  - Ex. pursuit of a Ph.D. : social fitness? biological fitness?
- Incumbent on individuals or groups to evaluate an idea, belief, or practice to confirm that it confers either social fitness, biological fitness, or both
- True that ideas re: adaptation need to suit the local culture (An idea that takes off in a given social setting does not necessarily mean it is suited to the local physical or natural environment )

# Adaptation and Information Transmission: Built for Speed, Not Comfort

- Two ways to get an idea, belief, or practice:
  - Individual learning: decision based on personal experience
  - Imitation: decision based on observations of others
- In any given group, there is some ratio of individual learners and imitators for any given facet of behavior
  - Higher proportion of individual learners: tracks the real environment fairly closely, but useful innovations may not spread very fast or remain isolated
  - Higher proportion of imitators: ideas, beliefs, or practices can spread rapidly through population, but may be less effective at tracking the real environment
- Imitation is not random, but has transmission biases:
  - Frequency bias = most common idea, belief, practice around
  - Prestige bias = using an idea, belief, practice held by someone with high status

# Information Transmission and Adaptation over the Long Term

- Via imitation processes, ideas, beliefs, and practices that confer fitness in some notable way and put a practicing population at a relative adaptive peak can spread and be taken up by multiple populations
- Once practicing population is quite large, social context likely to favor ideas, beliefs, and practices that promote group cohesion—this is what allows the whole to stay at the adaptive peak
- If group cohesion is favored in a large population, frequency biases and prestige biases for imitators are likely to be powerful
- Given the size of the population, transmission of ideas, beliefs, and practices from individual learners may be impeded through inertia and the strong imitative forces
- If the balance of imitative biases becomes too strong, the group as a whole may lose track of its real environments

**If a group loses track of its environments, stress is likely!** The length of time between development of the strong imitative forces relative to learners and indications of stress depends on the gap between environmental characteristics and the environmental perceptions held within the group