Soci111 – Human Societies
Module 10 – Horticultural Societies

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Outline

Main Themes

Emergence of Horticultural Societies

Metallurgy & Advanced Horticultural Societies

Characteristics of Horticultural Societies

Horticultural Expansions & World Languages

Reconstruction of Proto-Indo-European (PIE)

Emergence of Horticulture in the New World
Main Themes

- causes of the first switch from hunting & gathering to horticulture (plant cultivation) ca 8,000 BC
- causes of the invention of metallurgy as a consequence of the shift to horticulture
- 5 distinctive characteristics of horticultural societies, their interrelationships, and origin in horticultural technology
- effect of adoption of horticultural technology on vast populations expansions (demic expansions) causing intensive intersocietal selection, including
  - Bantu expansion
  - Austronesian expansion
  - perhaps Indo-European expansion?
- emergence of horticulture in the New World as a test of ecological-evolutionary theory
Emergence of Horticultural Societies
Horticultural Technology

- *horticulture* from Latin *hortus* = “garden”
- a.k.a. *swidden* or *slash-and-burn* farming
- = husbandry & plant cultivation with hoe & digging-stick (no plow)
- emerges ca 8,000 BC (10,000 BP)
Emergence of Horticultural Societies

Causes of Emergence of Horticultural Societies

- horticultural societies emerge about 8,000 BC first in Near East (="Middle East")
- older view: humans *chose to* adopt a better subsistence technology
- modern view: humans *were forced* to switch to horticulture, because
  - depletion of big game animals caused by progress in hunting technology
  - global warming (end of last ice age) making plant cultivation possible
Emergence of Horticultural Societies

One Clue to Causes of Emergence of Horticulture: Disappearance of North American Mammals

- pattern of disappearance of North American mammals
- between 14kya and 6kya
- due to human activities?

Figure 10.32. The pattern of disappearance from North America of representative groups of mammals between 14,000 and 6000 years ago. The Wisconsin glaciation ended in North America about 10,000 years ago, but extinctions have continued into the current interglacial period.
Emergence of Horticultural Societies

Causes of Shift from H&G to Horticulture

![Diagram showing the causes of the shift from hunting and gathering to horticulture.](image)

**FIGURE 6.1** Model of the causes of the shift from hunting and gathering to horticulture.
Emergence of Horticultural Societies
Independent Centers of Early Domestication of Plants & Animals

Fig. 1. Archaeological map of agricultural homelands and spreads of Neolithic/Formative cultures, with approximate radiocarbon dates.
Emergence of Horticultural Societies
Three Centers of Early Horticulture: Principal Domesticated Species

Figure 12.20. Three geographical centers are generally recognized as the major sites of the origin and spread to distant regions of domesticated plants and animals. Many of the important agricultural species indigenous to each region are listed.
Emergence of Horticultural Societies

Early Horticultural Societies in Near East

FIGURE 6.2 Early horticultural societies in southwest Asia. The “fertile crescent” is outlined, and its extensions into Turkey is indicated by the dashed lines.
Invention of metallurgy

- first copper, and later bronze
- marks transition from *simple* to *advanced* horticultural societies
- ultimately caused by adoption of horticulture
- following long chain of causes and effects
- as direct consequence of use of kilns
Metallurgy & Advanced Horticultural Societies

Causes of the Invention of Metallurgy

- more permanent settlements
- → beginning of pottery
- how to make a clay pot without a wheel?
- just the way you thought!
- make a snake, etc...
Metallurgy & Advanced Horticultural Societies
How Invention of Metallurgy Was Ultimately Caused by Shift from H&G to Horticulture

**FIGURE 6.4** Model of the chain of causes leading from the adoption of horticulture to the widespread use of copper in the manufacture of tools, weapons, and other artifacts.
Emergence of Horticultural Societies
Review Questions

▶ Q – What are the causes of the emergence of horticultural societies? Is increasing human intelligence one of them?

▶ Q – How reasonable is it to argue that the more sedentary lifestyle associated with horticultural technology is an indirect cause of the invention of metallurgy?
Horticultural technology primary cause of some of the common characteristics of horticultural societies. These include

▶ cultivation primarily a female responsibility
▶ high incidence of matrilineality
▶ high incidence of warfare
▶ high incidence of ancestor worship
▶ high incidence of slavery

These characteristics are causally interrelated (next slide)
Characteristics of Horticultural Societies

How Characteristics of Horticultural Societies Are Interrelated

- Horticultural technology
  - Cultivation by women
    - Warfare frequent
      - Slavery
      - Central role of clan-based kinship
  - Matrilineality
    - Ancestor worship
Cultivation is more often a female responsibility in horticultural societies than in agrarian societies.

**Table: Division of Labor Between the Sexes by Type of Society**

<table>
<thead>
<tr>
<th>Type of society:</th>
<th>Cultivation primarily a female responsibility</th>
<th>Both sexes share equally</th>
<th>Cultivation primarily a male responsibility</th>
<th>Total</th>
<th>N of societies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horticultural</td>
<td>39</td>
<td>33</td>
<td>28</td>
<td>100</td>
<td>389</td>
</tr>
<tr>
<td>Agrarian</td>
<td>8</td>
<td>33</td>
<td>59</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
Characteristics of Horticultural Societies
Matrilineality: Comparative Evidence I

Table: Percentage of Societies Matrilineal, by Type of Society

<table>
<thead>
<tr>
<th>Type of society:</th>
<th>Matrilineal (%)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>H&amp;G</td>
<td>7</td>
<td>TBA</td>
</tr>
<tr>
<td>Simple Hort.</td>
<td>24</td>
<td>TBA</td>
</tr>
<tr>
<td>Advanced Hort.</td>
<td>12</td>
<td>TBA</td>
</tr>
<tr>
<td>Agrarian</td>
<td>4</td>
<td>TBA</td>
</tr>
</tbody>
</table>

- *matrilineality* = tracing of descent through the maternal line (not the same as *matriarchy*)
- although generally rare, matrilineality more common among horticultural societies
Characteristics of Horticultural Societies
Matrilineality: Comparative Evidence II

Among simple horticultural societies likelihood of matrilineality declines as % subsistence from hunting & herding increases

Table: Matrilineality by % Subsistence from Hunting & Herding (Simple Horticultural Societies)

<table>
<thead>
<tr>
<th>Subsistence from hunting &amp; herding (%)</th>
<th>Matrilineal (%)</th>
<th>N societies</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 or more</td>
<td>14</td>
<td>29</td>
</tr>
<tr>
<td>16 to 25</td>
<td>24</td>
<td>54</td>
</tr>
<tr>
<td>15 or less</td>
<td>30</td>
<td>60</td>
</tr>
</tbody>
</table>
Characteristics of Horticultural Societies
Frequency of Warfare: Comparative Evidence

Warfare is more frequent in horticultural than in h&g societies

**Table: Incidence of Warfare by Type of Society**

<table>
<thead>
<tr>
<th>Type of society:</th>
<th>Warfare perpetual (%)</th>
<th>Warfare common (%)</th>
<th>Warfare rare or absent (%)</th>
<th>N of societies</th>
</tr>
</thead>
<tbody>
<tr>
<td>H &amp; G</td>
<td>0</td>
<td>27</td>
<td>73</td>
<td>22</td>
</tr>
<tr>
<td>Simple horticultural</td>
<td>5</td>
<td>55</td>
<td>41</td>
<td>22</td>
</tr>
<tr>
<td>Advanced horticultural</td>
<td>34</td>
<td>48</td>
<td>17</td>
<td>29</td>
</tr>
</tbody>
</table>
Characteristics of Horticultural Societies

Ancestor Worship: Comparative Evidence

FIGURE 6.3 Incidence of ancestor worship, by societal type.
Characteristics of Horticultural Societies

Slavery: Comparative Evidence

**FIGURE 6.5** Percentage of societies with slavery, by type of society.

Source: Appendix pages 419–421.
Characteristics of Horticultural Societies

Review Questions

▶ Q – What is the division of labor between the sexes with respect to plant cultivation in horticultural societies?

▶ Q – Which of the following items of culture are more likely to be present in a horticultural society than in a hunting & gathering society, or vice-versa?
  ▶ children trained to be independent and self-reliant
  ▶ ancestor worship
  ▶ art and religion
  ▶ warfare
  ▶ ceremonial cannibalism
  ▶ sharing
  ▶ slavery
  ▶ private ownership of land
  ▶ it is profitable to conquer other societies
  ▶ animism
  ▶ games of strategy
Table: Median Population Density, by Type of Society

<table>
<thead>
<tr>
<th>Type of society:</th>
<th>Persons per square mile</th>
<th>N societies</th>
</tr>
</thead>
<tbody>
<tr>
<td>H&amp;G</td>
<td>0.6</td>
<td>27</td>
</tr>
<tr>
<td>Simple Hort.</td>
<td>13.8</td>
<td>35</td>
</tr>
<tr>
<td>Advanced Hort.</td>
<td>42.7</td>
<td>38</td>
</tr>
<tr>
<td>Agrarian</td>
<td>100.0+</td>
<td>27</td>
</tr>
</tbody>
</table>

- horticultural technology permits much higher population density than H&G
- emergence of horticulture (farming) triggers a demic expansion
- horticultural technology spreads as wave of advance (next slide)
Horticultural Expansions & World Languages
Wave of Advance Model (Ammerman & Cavalli-Sforza)

Fig. 2.7.3 The model of demic diffusion called the wave of advance. Abscissa, space (assumed unidimensional for simplicity); ordinate, local population density. The various curves indicate different times at regular intervals. Arrows indicate the passage of time. (After Ammerman and Cavalli-Sforza 1984, p. 69, fig. 5.2.)
Horticultural Expansions & World Languages
Wave of Advance Model: Spread of Neolithic Horticulture in Europe I

![Map showing radiocarbon dates for the spread of farming economy to Europe. The map indicates the earliest sites of farming settlements, as determined by radiocarbon analysis for results published up to 1965. Dates are in uncalibrated radiocarbon years (after J. C. D. Clark).](image-url)
Horticultural Expansions & World Languages
Wave of Advance Model: Spread of Neolithic Horticulture in Europe II

**FIGURE 7.1** The early diffusion of plant cultivation into Europe.
Exciting recent scientific development is hypothesis that old demic (population) expansions due to adoption of farming have caused distribution of languages observed today; expansions can also be seen in distribution of genes.

Three well-studied instances

1. Bantu expansion in Africa
2. Austronesian expansion in Pacific
3. Indo-European expansions in Europe and Asia (controversial)
Horticultural Expansions & World Languages
Bantu Expansion in Africa

- Bantu “homeland” near Cameroon-Nigeria border
- emergence of horticulture (& later iron metallurgy) triggers demic expansion
- from ca 3,000 BC to 500 AD
- reconstructed from genetic, linguistic, anthropological & archaeological clues
- origin of contemporary distribution of languages in Africa
Horticultural Expansions & World Languages

Bantu Expansion in Africa: Distribution of Language Families

Figure 19.2. Language families of Africa.
Horticultural Expansions & World Languages

Bantu Expansion in Africa: Ancient & Modern Distribution of San People

Fig. 3.2.2 Area probably occupied by Khoisanids (Bushmen) in Africa around 10 kya at the end of the seventeenth century, and now. This illustration is a modification of figure 5.1 in Nurse et al. (1985), which is a modification of a figure in Tobias (1964).
Horticultural Expansions & World Languages

Bantu Expansion in Africa: Major Movements

Fig. 3.2.4 Major iron-smelting centers in sub-Saharan Africa and Bantu expansions (information from Phillipson 1980; Denbow 1989). Some important archaeological areas are circled.
Horticultural Expansions & World Languages
Austronesian Expansion in Pacific

- Austronesian-speaking people from South China coast & Taiwan
- expand 3,500 BC to 1,3000 AD
- east all the way to Easter Island
- west all the way to Madagascar near African coast
Horticultural Expansions & World Languages

Austronesian Expansion in Pacific: Distribution of Austronesian Languages

Figure 17.1. The Austronesian language family consists of four subfamilies, three of them confined to Taiwan and one (Malayo-Polynesian) widespread. The latter subfamily in turn consists of two sub-subfamilies, Western Malayo-Polynesian (= W M-P) and Central-Eastern Malayo-Polynesian (= C-E M-P). The latter sub-subfamily in turn consists of four sub-sub-subfamilies, the very widespread Oceanic one to the east and three others to the west in a much smaller area comprising Halmahera, nearby islands of eastern Indonesia, and the west end of New Guinea.
Figure 17.2. The paths of the Austronesian expansion, with approximate dates when each region was reached. 4a = Borneo, 4b = Celebes, 4c = Timor (around 2500 B.C.). 5a = Halmahera (around 1600 B.C.). 5b = Java, 5c = Sumatra (around 2000 B.C.). 6a = Bismarck Archipelago (around 1600 B.C.). 6b = Malay Peninsula, 6c = Vietnam (around 1000 B.C.). 7 = Solomon Archipelago (around 1600 B.C.). 8 = Santa Cruz, 9c = Tonga, 9d = New Caledonia (around 1200 B.C.). 10b = Society Islands, 10c = Cook Islands, 11a = Tuamotu Archipelago (around A.D. 1).
Horticultural Expansions & World Languages

Indo-European Expansions in Europe & Asia

- Indo-European family of languages expanded either
  - around 6,500 BC from homeland in Anatolia together with horticultural technology (Neolithic)
  - OR around 3,500 BC from homeland between Black Sea & Caspian Sea (in modern Ukraine) together with domesticated horses, oxen-drawn carts & plow
- scholars disagree over which took place (but second hypothesis favored)
- discovery of Indo-European family of languages and reconstruction of ancestral proro-Indoeuropean is a major episode of intellectual history
# Reconstruction of Proto-Indo-European (PIE)

Indo-European vs. non-Indo-European Words

<table>
<thead>
<tr>
<th>Indo-European Languages</th>
<th>English</th>
<th>two</th>
<th>three</th>
<th>mother</th>
<th>brother</th>
<th>sister</th>
</tr>
</thead>
<tbody>
<tr>
<td>German</td>
<td>ein</td>
<td>zwei</td>
<td>drei</td>
<td>Mutter</td>
<td>Bruder</td>
<td>Schwester</td>
</tr>
<tr>
<td>French</td>
<td>un</td>
<td>deux</td>
<td>trois</td>
<td>mère</td>
<td>frère</td>
<td>soeur</td>
</tr>
<tr>
<td>Latin</td>
<td>unus</td>
<td>duo</td>
<td>tres</td>
<td>mater</td>
<td>frater</td>
<td>soror</td>
</tr>
<tr>
<td>Russian</td>
<td>odin</td>
<td>dva</td>
<td>tri</td>
<td>mat’</td>
<td>brat</td>
<td>sestra</td>
</tr>
<tr>
<td>Old Irish</td>
<td>oen</td>
<td>do</td>
<td>tri</td>
<td>mathir</td>
<td>brathir</td>
<td>siur</td>
</tr>
<tr>
<td>Tocharian</td>
<td>sas</td>
<td>wu</td>
<td>trey</td>
<td>macer</td>
<td>procer</td>
<td>ser</td>
</tr>
<tr>
<td>Lithuanian</td>
<td>vienas</td>
<td>du</td>
<td>trys</td>
<td>motina</td>
<td>brolis</td>
<td>seser</td>
</tr>
<tr>
<td>Sanskrit</td>
<td>eka</td>
<td>duva</td>
<td>trayas</td>
<td>mater</td>
<td>bhratar</td>
<td>svasar</td>
</tr>
<tr>
<td>PIE*</td>
<td>oynos</td>
<td>dwo</td>
<td>treyes</td>
<td>mater</td>
<td>bhrater</td>
<td>suesor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Indo-European Languages</th>
<th>Finnish</th>
<th>kaksi</th>
<th>kolme</th>
<th>äiti</th>
<th>veli</th>
<th>sisar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>yksí</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foré*</td>
<td>ka</td>
<td>tara</td>
<td>kakaga</td>
<td>nano</td>
<td>naganto</td>
<td>nanona</td>
</tr>
</tbody>
</table>

*PIE stands for Proto-Indo-European, the reconstructed mother tongue of the first Indo-Europeans. Foré is a language of the New Guinea Highlands. Note that most words are very similar among the Indo-European languages and totally different among the non-Indo-European languages.
### Reconstruction of Proto-Indo-European (PIE)

Conjugations of “to bear” Compared

<table>
<thead>
<tr>
<th>English</th>
<th>Sanskrit</th>
<th>Greek (Doric)</th>
<th>Latin</th>
<th>Old High German</th>
<th>Old Slavonic</th>
</tr>
</thead>
<tbody>
<tr>
<td>I bear</td>
<td>bharami</td>
<td>phero</td>
<td>fero</td>
<td>biru</td>
<td>bera</td>
</tr>
<tr>
<td>(thou bearest)</td>
<td>bharasi</td>
<td>phereis</td>
<td>fers</td>
<td>biris</td>
<td>berasi</td>
</tr>
<tr>
<td>he bears</td>
<td>bharati</td>
<td>pherei</td>
<td>fert</td>
<td>birit</td>
<td>beretu</td>
</tr>
<tr>
<td>we bear</td>
<td>bharamas</td>
<td>pheromes</td>
<td>ferimus</td>
<td>berames</td>
<td>beremu</td>
</tr>
<tr>
<td>you bear</td>
<td>bharata</td>
<td>pherete</td>
<td>fertis</td>
<td>beret</td>
<td>berete</td>
</tr>
<tr>
<td>they bear</td>
<td>bharanti</td>
<td>pheronti</td>
<td>ferunt</td>
<td>berant</td>
<td>beratu</td>
</tr>
</tbody>
</table>

Table 1  Comparisons of the verb ‘to bear’
Reconstruction of Proto-Indo-European (PIE)
Sir William Jones (1746–1794)

- born Westminster, father mathematician
- linguistic prodigy learns Greek, Latin, Persian, Arabic, Chinese early
- 1764 graduates U. College, Oxford
- tutors Earl Spencer (ancestor of Princess Diana)
- reputed orientalist by 22
- 1783 becomes Chief Justice of India
in 1786 Sir William Jones observes similarities between Greek, Latin, Sanskrit, “Gothick” (Germanic) and Celtic in both individual words & syntax postulates common origin for these languages spoken over vast area of Europe & Asia this is called the *Indo-European hypothesis*
“The Sanscrit language, whatever be its antiquity, is of a wonderful structure; more perfect than the Greek, more copious than the Latin, and more exquisitely refined than either, yet bearing to both of them a stronger affinity, both in the roots of verbs and the forms of grammar, than could possibly have been produced by accident; so strong indeed, that no philologer could examine them all three, without believing them to have sprung from some common source, which, perhaps, no longer exists.”

- common source later termed proto-Indo-European
Reconstruction of Proto-Indo-European (PIE)
Languages of Europe & Western Asia Around 1492

Figure 7. Language map of Europe and western Asia around 1492, just before the European discovery of the New World.
Reconstruction of Proto-Indo-European (PIE)
The Indo-European Family of Languages
Reconstruction of Proto-Indo-European (PIE)
Hypothetical Spread from PIE Homeland in Ponto-Caspian Steppe

Figure 10. This map shows how surviving Indo-European languages might have spread. The inferred homeland where Proto-Indo-European (PIE), the mother tongue, was spoken lay in the Russian steppes north of the Black Sea and east of the Dnieper River.
Figure 8. In many modern Indo-European languages, as well as in some ancient ones that we know from preserved writings, the words meaning “sheep” are quite similar. These words must have been derived from an ancestral form that is inferred to have been “owis” and that was used in Proto-Indo-European (PIE), the unwritten mother tongue.
Reconstruction of Proto-Indo-European (PIE)

Spread of PIE *perd*

Figure 9. Just as in the case of words for “sheep,” the words that mean “to fart loudly” are similar among many written Indo-European languages. This suggests an ancestral form inferred to have been “perd” and used in Proto-Indo-European (PIE), the unwritten mother tongue.
Reconstruction of Proto-Indo-European (PIE)
Reconstruction of PIE

- linguists realize correspondences among IE languages are regular
- suggesting systematic sound changes from ancestral to daughter languages
- allowing reconstruction of ancestral language, termed proto-Indo-European
- over next 200 years historical linguists (mostly Danish, German, and French) use comparative method to analyze correspondences among IE languages
- and reconstruct original sounds of PIE
- by 1870 main outline of reconstruction in place
- reconstruction of PIE is triumph of 19th c linguistics
Reconstruction of Proto-Indo-European (PIE)
Reconstruction of PIE – Comparative Method (Handout from Craig Melchert)

Introduction to Language
Handout 6

The Comparative Method: “Grimm’s Law” and “Verner’s Law”

Sample Data:

<table>
<thead>
<tr>
<th>Sanskrit</th>
<th>Greek</th>
<th>Latin</th>
<th>Gothic</th>
<th>Correspondences</th>
</tr>
</thead>
<tbody>
<tr>
<td>pitā</td>
<td>patēr</td>
<td>pater</td>
<td>fadar</td>
<td>‘father’</td>
</tr>
<tr>
<td>trāyas</td>
<td>treis</td>
<td>trēs</td>
<td>freis</td>
<td>‘three’</td>
</tr>
<tr>
<td>śatām</td>
<td>(he)katōn</td>
<td>centum</td>
<td>hund</td>
<td>‘hundred’</td>
</tr>
<tr>
<td>dāsā</td>
<td>déka</td>
<td>decem</td>
<td>taimun</td>
<td>‘ten’</td>
</tr>
<tr>
<td>yugām</td>
<td>zugón</td>
<td>iugum</td>
<td>juk</td>
<td>‘yoke’</td>
</tr>
<tr>
<td>bhrātā</td>
<td>phrātēr</td>
<td>frater</td>
<td>brōtar</td>
<td>‘brother’</td>
</tr>
<tr>
<td>dhā-</td>
<td>-thē-</td>
<td>-dere</td>
<td>‘put, do’</td>
<td></td>
</tr>
<tr>
<td>stighnōti</td>
<td>steikhō</td>
<td>steigan</td>
<td>‘go (up)’</td>
<td></td>
</tr>
</tbody>
</table>

Proto-Indo-European Stops:

\[
*p\quad *t\quad *k
\]
\[
*b\quad *d\quad *g
\]

“Grimm’s Law”:

PIE voiceless stops > Germanic voiceless fricatives: (p, t, k > f, θ, h).
PIE voiced stops > Germanic voiceless stops: (b, d, g, > p, t, k).
PIE “voiced aspirated” stops > Germanic voiced stops: (b̩, d̩, g̩ > b, d, g).

Exception: PIE voiceless stops remain voiceless stops after another consonant (e.g. sp, st, sk > sp, st, sk).

“Verner’s Law”:

After an unaccented vowel, Germanic voiceless fricatives became voiced stops, then Germanic fixed accent on the first syllable: *faθār > *faθār > fādar. This includes *s already inherited from PIE: *wosēyo- ‘to put on’ > Gmc. *wasīya > *wazīya- > OldEnglish werian ‘to wear’.
A PROTO-INDO-EUROPEAN FABLE

OWIS EKWOOSQUE

Gwrreei owis, quesyo wlnaan ne eest, ekwoons espeket, oinom ghe gwrrrum woghom weghontm, oinomque megam bhorom, oinomque ghmmem ooku bherontm.

Owis nu ekwomos ewewquet: “Keer aghnutoi moi ekwoons agontm nerm widntei.”

Ekwoos tu ewewquont: “Kludhi, owei, keer ghe aghnutoi nsmei widntmos: neer, potis, owioom r wlnnaam sebhi gwhermom westrom qurnneuti. Neghi owioom wlnnaa esti.”

Tod kekluwooos owis agrom ebhuget.

THE SHEEP AND (THE) HORSES

On (a) hill, (a) sheep that had no wool saw horses, one (of them) pulling (a) heavy wagon, one carrying (a) big load, and one carrying (a) man quickly.

(The) sheep said to (the) horses: “My heart pains me, seeing (a) man driving horses.”

(The) horses said: “Listen, sheep, our hearts pain us when we see (this): (a) man, the master, makes (the) wool of (the) sheep into (a) warm garment for himself. And (the) sheep has no wool.”

Having heard this, (the) sheep fled into (the) plain.
Horticultural Expansions & World Languages
Enigma of Indo-European Origins: Anatolian vs. Kurgan Hypotheses

- **Anatolian Hypothesis** (Colin Renfrew in *Archaeology & Language*):
  - PIE homeland in Anatolia
  - IE languages expanded with Neolithic horticulture starting ca 6,000 BC
  - plausible because other horticultural expansions well documented
  - but much too early given IE knew the wheel & domesticated horses (from reconstructed lexicon)

- **Kurgan hypothesis** (Marija Gimbutas):
  - mainstream hypothesis
  - PIE homeland in Pontic-Caspian steppe (Ukraine)
  - expansion ca 3,500 BC
  - helped by horses & wagons & plow
Fig. 3. Language families of the New World and their suggested expansions. Maps based on information in (69) and other sources. Numbered examples discussed in text are 2 (Arawakan, Cariban, and Tupian), 4 (Uto-Aztecan), 5 (Cito-Manguean and Mayan). Other possible examples mentioned only briefly: C (Iroquoian and Siouan, with muse after 500 A.D.), D (Chibchan), and E (Quechuan and Aymaran).
Emergence of Horticulture in the New World
Emergence of Horticulture in the New World as a Natural Experiment

- first human settlements in New World 13ky BP (perhaps as early as 50kya)
- through Beringia, land bridge between Siberia & Alaska
- after last glaciation land bridge submerged
- → New World cut off from the Old World
- “natural experiment”: horticulture cannot have diffused from Old World
- independent emergence of horticulture in New World suggests
  - similar environmental circumstances + similar technologies → similar outcomes
Horticultural Societies
Review Questions

- Q – According to Colin Renfrew, what mechanism is ultimately responsible for the spread of Indo-European languages in Europe?
- Q – What does the independent emergence of horticulture in the New World suggest for ecological-evolutionary theory?