Lecture 3
Neolithic Revolution and the Discovery of Agriculture
Dating the Past

The Great Technological Discoveries of Pre-history

- The discovery of tools
- The discovery and control of fire
- The invention of agriculture
- The invention of the wheel

Reconstruction of Paleolithic landscape
Source: Syria
Earliest tools were made from flaked flint. Later, certain tools began to be shaped from hard stone that was polished with an even harder stone, like emery, could take 4–8 weeks. These tools had to be fitted into a shank made of antler before they could be fixed to a handle. 

In Syria, flax was the first fiber to be spun (into linen), predating the use of sheep’s wool.
The first houses in prehistoric Syria were round; later houses became rectangular, with rounded corners.

By 6000 BCE, near Palmyra, three-part rectangular houses were constructed with plaster floors and equipped with food store houses and hearths for cooking.
Why Did Agriculture Develop?  
- Nomadism  
- Population Pressure  
- Domestication for religious reasons  

Agriculture and Social Surplus: Conventional Theory  

Agriculture and Conflict  
- Abel & Cain (Nomad vs. Farmer)  
- Hunters vs. Cultivators  
- Territoriality warfare  
- Ranchers vs. Farmers

Domestication  

Domestication Process (change from wild plant to crop)  
- Cultivation (management)  
- Selection (differential reproduction)  

Cultigens:  
- Crops unknown in the wild  
- Some wild plants are still gathered:  
  - Blueberry (*Vaccinium* spp.)  
  - Brazil nut (*Bertholletia excelsa*)  
  - Chickle (*Achras zapota*)  
  - Indian rice (*Zizania aquatica*)  
  - Rubber (*Hevea brasiliensis*)  
  - Sugar maple (*Acer saccharum*)
History of Horticulture: Lecture 3

Changes from Wild Species to Domesticated Crop

1. **Gigas characteristics:** Cultivated plants appear larger, more robust, larger thicker leaves, flesher roots, larger flowers, fruits, and seeds.
   a. Polyploidy (Examples: strawberry is an octoploid, bread wheat is a hexaploid)
   b. Possibility of internal changes in the chromosomes which are often larger and thicker in cultivated plants
   c. Mutation

2. **Reduction in fertility**
   a. Decrease in fertility though reduction in seed number, increase in seed size
   b. Loss of fertility, particularly true for crops in which economic portion is not the seed
      Many seedless crops (banana, orange)
      Thus, crops are dependent on humans for survival

3. **Loss of survival characters**
   Shattering ability in grains
   Potato tubers borne close to plant in domestic types, spread in wild types
   Thin vs. thick shells in nuts

Wild and domesticated forms of einkorn wheat
Wild forms need to disperse seeds effectively and evolved easily shattered ears with brittle rachises and thin, arrow-shaped spikelets designed to penetrate surface litter and imbed in ground cracks
In domesticated form, plumper spikelets have lost some key structures necessary for self-implantation, seed dispersal, and success in the soil

Source: Smith 1995, p.73.
4. Loss of bitter and toxic substances
   - Hydrocyanic acid in cassava
   - Tannins in apples
   - Bitter principles (cucurbitacin) in cucurbits
   - Bitterness in lettuce

5. Loss of protective, defensive structures
   - Spines (citrus, apples, locust)
   - Prickly fruits and seeds (cactus)

6. Loss of delayed germination
   - Loss of dormancy separates weeds from many annual crop plants
   - Typically ornamentals (closer to wild plants) have seed

7. Early and simultaneous ripening
   - This change is occurring in tomato

8. Change in life span
   - Seed crops—shortened
   - Vegetative crops—lengthened

9. Changes in organ shape and size
   - Roots—carrots, parsnip, beets
   - Flowers—doubleness
   - Buds—cauliflower
   - Fruits—increasing apple fruit size
10. Increase in self pollination
   Cultivated types are often highly self pollinated
   Self-pollination is rarer in wild species