Lecture #10: The Machine in the Garden: Agricultural Revolutions

Suggested Readings:
Johann Heinrich von Thunen, *Von Thünen's Isolated State* (1826, translated 1966)
David Potter, *People of Plenty: Economic Abundance and the American Character* (1954)
H. J. Habakkuk, *American and British Technology in the Nineteenth Century* (1962)
William Cronon, *Nature's Metropolis: Chicago and the Great West* (1991)

Outline:
I. Secular Trends in Agriculture
Note general trends from 1800 on: population growth; cities grow more rapidly than country, urban surpasses rural in 1920; rising mechanization in ag and industry; replacement of solar energy with fossil energy; increasing soil intensity (fertilizer); increasing capital intensity, labor efficiency (100 bushels of wheat took 373 person-hours in 1800, 108 in 1900; 9 in 1970). Can we abstract these trends?
II. Von Thünen's Der Isolierte Staat and the Proliferating Market
proliferation of market relationships central to emerging economy and environmental change
Heinrich von Thünen's *The Isolated State* (1826) as useful way of abstracting geographical consequences of the market as interface between city and country.
Imagine city in midst of featureless agricultural plain: how far goods will travel to city depends on their price, cost of transport, and value of land on which they're produced
key insight: different goods/productive regions will array selves around city in rings
inner ring: perishable, high value goods (dairy, orchard, vegetables) produced with *intensive* agriculture on lands with high rents, direct response to urban demand
1859 census: vegetables & milk adjacent to cities, fruit, butter & cheese farther out, hay & hops urban too (hay for horses for transport, and hops for beer)
next ring: *extensive* agriculture, especially of grain crops, on lands of lower value
grains capable of paying longer journey to market, especially wheat; corn highly desirable as frontier subsistence crop, but had to convert to pork or whiskey for urban demand
corn concentrated in Ohio & Miss. valleys in 1859; so too did porkpacking & whiskey manufacture; wheat followed as soon as land ready
lumbering also an extensive activity in this ring: white pine from Maine, then MI, WI, MN
third ring: livestock raising, animals graze land of low value; (lumbering extensive too)
outer ring: hunting, trapping, trading. Furs & skins of high value relative to weight and bulk, can still pay transport costs, with no land rents at all. Beyond: wilderness?
general implications: market hierarchy expressed geographically, and transport innovation (along with actual resource distribution) will change spatial expression of rings
so NYC in 1820 surrounded by market gardens, grain ag farther out; opening of Erie brings cheap western grain east, drives New Eng & NY farmers to intensive ag or bankruptcy, as did rising rents in vicinity of cities
Frederick Jackson Turner's westward moving frontier can be seen as moving von Thunen rings, with intensive ag around cities, extensive grain in Midwest, livestock on Great Plains
southern tobacco & cotton shift west for soil exhaustion, but strong urban links too: high yield from English and northeastern markets meant capital and labor-intensive agriculture, with labor capitalized in form of slaves, non-capitalist social relations as foundation for most commercial (hence capitalist?) of American crops
III. Relative Factor Costs: People of Plenty, People of Waste
Potter's *People of Plenty* said Turner right not about free land but resource abundance.
H. J. Habakkuk cast abundance in terms of classic factors of production (land, labor, capital) to argue that British-U.S. factor shares accounted for differing technologies
in Britain, land dear and skilled labor cheap; in U.S. land cheap and unskilled labor dear
hence: American employers had strong incentive to buy labor-serving machinery, source of technological innovation and diffusion (cf. rapid spread of John Deere's plow and Cyrus McCormick's reaper in mid-19th)
U.S. faith in technology becomes foundation of commitment to "progress" & "improvement"
increasingly involved replacing human energy with non-human energy: solar to fossil
also increased inputs of fertilizer from imported Peruvian guano: growth begins c. 1850
also: conserve labor rather than resources. "waste" of resources economically sensible
Americans assume goods to be used up & replaced, not kept: more innovation, but more waste
central dialectic of U.S. env hist between scarcity and abundance, plenty and waste