SECOND TERM: JANUARY TO APRIL 2013

XIIIa. Week no. 13: Lecture Topic no. 15: on 9 January 2013:

British Agriculture and Agrarian Changes, 1815 - 1914.

A . **Lecture no. 15 on British agriculture combined elements of both lectures 13, on the Transportation Revolutions, 14, on Free Trade and Foreign Trade**

1) **to examine the particular impact on Britain's agrarian economy:**

a) to see how both of these major factors (combined with the economics of the Gold Standard) forced Britain to obey the Law of Comparative Advantage:

b) so that Britain radically contracted its agriculture sector, especially for grains, in order, finally, to import almost 90% of its foodstuffs, by the eve of World War I,

c) thereby releasing resources and factors of production to be invested and engaged more effectively elsewhere in its export-oriented economy.

2) **We saw how the two transformations worked together:**

a) a radical reduction in the agricultural sector, overall;
b) and a shift within that sector away from grain towards the production of other arable products- especially perishable fruits and vegetables – but especially to livestock products.

3) I will argue at the end of the course that these developments together explain how Great Britain ended up with having by far the highest standard of living in Europe, up to World War I (though not as high as that in North America).

B. **The history of English/British Agriculture underwent four phases from 1792 to 1914:**

1. **1792 - 1815: the era of the French Revolutionary and Napoleonic Wars, marked by very high agricultural and especially grains prices, from a combination of:**

a) **dramatic population growth that outstripped Britain's capacity to feed herself,** so that Britain became forever more a net importer of grains and then of other foodstuffs

b) **war-time disruptions that severely limited grain imports**

c) **paper-money inflation,** during the era of the 'paper pound', when the currency was no longer backed by gold (1797-1821)

2. **1815 - 1846: The era of the Corn Laws, with sharply falling prices, once peace and imports were restored.**

a) **With falling prices, forcing marginal lands out of production,** both land owners and tenant farmers clamored for protection in the form of two new Corn Laws: of 1815 - 1828. They were discussed in the previous lecture on Free Trade (in late November).

b) **Despite some technological advances, with the completion of enclosures and the spread of the New Husbandry,** overall progress was hindered by the projectionist of the Corn Laws

c) **low agricultural wages also discouraged mechanization**

3. **1846 - 1873: the Era of Free Trade and 'High Farming'**

a) **Despite the repeal of the Corn Laws and then end of protective tariffs,** British agriculture experienced a surprisingly era of prosperity

b) **While grain prices fell, they continued the same trend of falling prices,** without a sharp change in prices

c) **falling grain prices, and thus cheaper bread, liberated consumer income to be spend on superior goods:** especially meat, dairy products, leather goods, perishable fruits and vegetables

d) **British agriculture also experienced significant gains from the development of railways during the 1840s to 1870s:** sharply reducing most agricultural costs and expanding urban markets, especially for livestock and non-grain arable crops

e) **This was also the period of extensive mechanization, using steam powered machinery,** so that British agriculture was over 50% mechanized by 1900 (vs. under 10% in France)

i) increased steam-powered mechanization was a response to a growing scarcity of labour (not the reverse): a growing scarcity caused by both railroad building and urban industrialization, which together drew more and more agricultural labour away from the countryside
ii) The spread of chemical fertilizers was an equally important advance related to mechanization

f) **The advent of chemical fertilizers**

i) That was related to steam-powered mechanization: because the horses and oxen so displaced no longer consumed so much fodder crops and thus did not produce as much manure
ii) furthermore, most fodder crops had been nitrogen-fixing legumes
iii) hence the need for nitrogen-based chemicals to replace these natural fertilizers
iv) but this topic will be left to the lectures on Germany, which gained world leadership in chemical and chemical agriculture

4. **1873 - 1914: the era of the 'Agricultural Depression', with sudden and sharply falling grain prices**

a) **the sudden, sharp fall in grains prices from the early 1870s to the late 1890s, by almost 45%:** was chiefly the result of the aforementioned combination of the dual transportation revolutions (world-wide railway building and steam shipping) and of Free Trade (with the Gold Standard – to prevent protection via currency manipulation – i.e., devaluations)

b) **Britain alone in this era remained completely faithful to Free Trade,** while most other countries restored protectionist tariffs to save their farming communities

c) **the result in Britain was a dramatic shift away from grain growing,** as indicated, to livestock raising

i) but overall a major contraction of the agricultural sector: from 25% to just 7% of the GNP by 1914
ii) part of the fall in grain prices was due to monetary deflation and thus the post-1896 recovery in grain prices was partly due to monetary inflation, to be discussed in later lectures

d) **the overall gains for Britain were the shift of resources (capital, labour, land):** from agriculture to be more productively employed in industry, commerce, and finance

e) **and these events also led to a sharp rise in British living standards, the most rapid in the 19th century:** and by far the highest living standards in Europe by 1914 (if lower than those in North America).

XIIIb. Week no. 13: Lecture Topic no. 16: on 9 January 2013:

Great Britain and the Revolution in Steel-Making, 1856 - 1914:

1. **Lecture no. 16 was devoted to the Revolution in Steel-Making,** which Britain initiated and in which the British held industrial leadership -- until the 1890s, when Germany and the US both surpassed Britain in steel-making, for reasons to be seen later.

2. **Steel is the ideal form of iron,** with the right amount of carbon (added to molten wrought iron) --
i) about 1.0% to 1.5% -- to ensure that it is the strongest form of iron, with the best resistance to stress: in contrast to both cast iron (2.5% - 4.0% carbon),
ii) which is very hard, but also brittle, and subject to shattering; and to purified wrought iron (about 0.1% carbon), which will bend under stress.

3. **As such, steel was the ideal and requisite metal for the so-called Second Industrial Revolution in mechanical power:** involving the steam turbine (for both ocean shipping, as seen earlier, and electrical generation), electrical power, and the internal combustion engine; and to that we will later add the new chemical industries.

4. **The initial major consumers of steel were the transportation industries (railways and stream shipping),** the military, large-scale construction, and the engineering and machine-tool industries. World industrialization after 1860, with the tripartite revolution in steel making, would have been impossible without cheap and high quality steel, previously a luxury metal.

5. **The three components of the Steel Revolution were:**

a) **the Bessemer Converter (1856):** for the mass production of low cost bulk steels.
i) Bessemer steel cost 75% more per ton than did wrought iron (Puddling and Rolling Processes),
ii) but steel rails lasted from 10 to 22 times longer than did wrought iron rails.

b) **the Siemens-Martin Open Hearth (1861-64):** with a much smaller scale, for the production of far higher quality, precision steels

c) **the Gilchrist-Thomas 'Basic Process':**
i) which allowed both types of furnaces to produce steel from phosphoric iron ores ('minette' ores), which otherwise fatally contaminated the metal.
ii) the chief beneficiary of this process was Germany with such large deposits of minette ores, especially in

Alsace-Lorraine (taken from France in 1871) and the Ruhr valley.

6. **Great Britain, as the pioneer**, dominated the first Age of Steel, until the 1890s

a) when both Germany and the US overtook Britain in bulk steel production
b) the reasons will be examined when we come to the lecture topics on German industry
c) but we will see that German pre-eminence was limited to Bessemer steel, so that Free Trade forced the British to seek out their comparative advantage: in Siemens-Martin Open Hearth steels (high quality)