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ECONOMICS 303Y1

The Economic History of Modern Europe to 1914

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Lecture Topic No. 28:

VI. RUSSIA: THE BEGINNINGS OF INDUSTRIALIZATION TO 1914

E. Russia: the Uneven Foundations of Modern Industrialization

E. RUSSIA: THE UNEVEN FOUNDATIONS OF MODERN INDUSTRIALIZATION

from the 1880s to World War I (1914):

1. The Main Phases of Russian Economic Development

a) **the dynamics of the 1880s:** the vital transition era

i) **generally regarded as period of ‘take-off’ – to use W.W. Rostow’s terminology – into modern industrialization,** especially from the mid-1880s.¹

ii) **and especially then,** with the establishment or completion of the major railway lines railroads in Ukraine and the Caucasus regions.

b) **1885-1900:** fairly rapid industrialization, especially in Ukraine and the Caucasus regions.

c) **1900-1906:** severe industrial depression, culminating in the disastrous Russo-Japanese War and the abortive Revolution of 1905.

d) **1906-1914:** rapid recovery and economic boom, with more intensive industrialization, fuelled by foreign investment, and dominated by the investment banks, as already seen.

2. The Role of the Government in Russian Industrialization:

a) **In Russia, the government played a much stronger role in promoting industrialization (especially for military reasons) than anywhere else in Europe:**

i) **thus state direction of the economy after the Russian Revolution of 1917:** was no new departure;

ii) **On the other hand, we must note and remember,** that despite the strong role of the state there were still almost no direct state industrial enterprises in Tsarist Russia, apart from railroads;

iii) **government ownership and/or management of railroads:** was fairly commonplace in 19th- century continental Europe.

b) **We have already seen the role of the Russian state government in:**

i) **railroad development:**

(1) as just mentioned, and as we saw before, the state was very active in both promoting and then in building and operating railroads

(2) It took over the Great Russian Railroad in 1882;

(3) and later built the Trans Siberian Railway, from 1891 to 1900.

ii) **agriculture:** controversial agrarian reforms from the emancipation of the serfs in 1861.

(1) Gerschenkron argued that the so-called agrarian land reforms had largely negative results

(2) But more recent research, especially by Paul Gregory, has put forth the following counter-arguments: as

¹ W. W. (Walt Whitman) Rostow, *The stages of economic growth : a non-communist manifesto*, 3rd edn. (Cambridge: Cambridge University Press, 1990).

previously noted:

- that examples of declining productivity (if that can indeed be at all proved) in communal-agrarian areas of Russia itself were more than offset by new growth areas,
- especially on the periphery of the Russian Empire (i.e., the non-Russian regions, which were very large and expansive regions)
- and especially in non-peasant, non-communal agriculture: i.e., in estate agriculture and privately owned and operated farms

(3) Certainly in Ukraine, as well as in non-Russian parts of the Empire, agrarian changes promoted growth of large-scale efficient estates

- which produced large-scale grain exports,
- which then provided Russia with much of the necessary foreign exchange to buy foreign machinery.

(4) Heavy taxation of the peasantry, in the form of 'Hunger Exports' (Gerschenkron) to finance industrialization, and to support the gold standard policy? – a matter still under debate.

iii) **Gosbank and banking institutions:**

(1) the government's use of the banking system to promote domestic and foreign investments.

(2) Especially the gold ruble policy to attract a far larger volume of foreign investment, after 1867: Probably the government's most important role.

(3) As noted in the previous lecture, a chief criticism is that this policy required excessively high levels of taxation and interest rates to borrow and acquire the gold necessary to back the ruble.

c) **Russian government taxation:** was it excessive? See the table on the screen.

i) **Per Capita taxes almost doubled between 1885 and 1913 as the accompanying table 1 shows:**

(1) but these are in nominal money terms and

(2) thus do not take account of the considerable inflation in this period..

ii) **As the table also shows, however, taxes as a percentage of national income did not change during this period,** and actually fell as a percentage of gross industrial output.

iii) **Trebilcock also suggests that a lower rate of taxation might have had no effect on either domestic demand or domestic investment:** that the lower classes, if taxed less lightly, were not so likely to have spent that extra income on domestic industrial goods, or increased savings.

Table 1: Russian Per Capita Taxation, in Rubles, 1885 - 1913

Year	Excise Taxes Per Capita in Rubles	Total Per Capita Taxes in Rubles	Taxes as Percentage of Net National Income	Taxes as Percentage of Gross Industrial Output
1885	2.43	6.41	12.8%	51.3%
1890	2.83	7.12		46.2%
1895	3.29	8.15		
1900	4.10	8.83	13.2%	27.3%
1905	5.59	9.53		29.2%
1910	6.69	11.79		34.4%
1913	7.34	11.43	12.9%	25.5%

Source: Arcadius Kahan, 'Government Policies and the Industrialization of Russia', *The Journal of Economic History*, 27:4 (December 1967), extracted from tables 1-3, pp. 462-63.

d) **Government Tariff Policy:** last major state policy not yet examined.

i) **Free Trade and Protection:**

(1) In the 1860s and 1870s, Russia had joined other European countries in the general extension of free trade in the 1860s and 1870s;

(2) but, as elsewhere, Russia also returned to protectionism in the 1880s.

ii) **The Mendeleyev Tariff of 1891:** known as the 'monster tariff', represents, for many historians, the epitome of Russian industrial protectionism.

(1) Many tariffs were so high that they virtually excluded foreign industrial goods so taxed.

(2) Gregory, however, contends that tariffs were imposed instead for purely fiscal purposes;

(3) but how much revenue could they produce if foreign goods were excluded?

iii) **Aims of Russian protectionism (if the tariffs are viewed as protectionist):**

(1) to encourage foreign investments, in form of direct investments: thus if foreign firms could not sell their products in the Russian domestic market, because of high tariffs, they could jump the tariff barrier by establishing branch firms and subsidiaries.

(2) to protect and promote the development of industrial cartels, in turn designed to promote the growth of scale economies.

(3) in general, to promote the development of import substitution industries.

iv) **The industrial boom of the 1890s was undoubtedly greatly fostered by this tariff policy:** especially in the metallurgical industries.

3. **The Main Features of Russian Industrialization**

a) **The traditional iron industry in Russia:**

i) **From the 17th to early 19th centuries**, as we saw before, in analysing the origins of the British Industrial Revolution, Russia was then one of the world's leading producers of iron, with an industry based largely in the Urals.

ii) **This iron industry was based on the old traditional wood and water technology:** enjoying abundant supplies of cheap wood and water, and also cheap labour, in the Urals.

iii) **But by the early 19th century, this traditional iron industry became uncompetitive:**

(1) at least, according to traditional views, it became uncompetitive, because:

- its wood & water based technology was higher cost than foreign iron produced by the new British coke and steam based technology
- all the more uncompetitive, because of its very high transportation costs in delivering iron from the Urals to major urban markets, so far distant
- nor similarly, could it cheaply transport coking coal to its Urals iron sites.

(2) This view, however, has recently been challenged by the British economic historian Ian Blanchard, in the *Economic History Review*, as cited below, who contends that: ²

- the combination of high grade iron ores, abundant water-power, and abundant, low cost supplies of charcoal (i.e., from forests) allowed the old industry to remain competitive
- that its quality of steel production (using wood-charcoal in place of coke, in the Bessemer converters and open-hearths) allowed it to retain an important market share
- but quantitative statistics permitting comparisons are not readily available

iv) **Yet clearly the Urals iron industry did come to be superseded by a far more important one:** chiefly in the Ukraine, but also in the Moscow region

b) **The Modern Coal, Iron, and Steel Industry:**

i) **Developed instead in the southern Ukraine, from the 1880s:**

² Ian Blanchard, 'Russian Railway Construction and the Urals Charcoal Iron and Steel Industry, 1851-1914', *The Economic History Review*, 2nd ser., 53:1 (February 2000), 107-26.

(1) first, in 1873: the discovery of immensely rich coal deposits at Lugansk in the Donets (or Donbass) region: developed by British businessmen, especially the New Russia Company, established by the Hughes firm.

(2) 1882: discovery of equally rich iron deposits at Krivoi Rog (to the west of the Dniepr River, and north of the Crimean peninsula).

(3) Subsequently, in the 1880s, the discovery of even vaster if somewhat inferior quality iron ore deposits in Crimea itself,

- in the Kerch peninsula, bordering on the Sea of Azov
- with about ten times the reserves of Krivoi-Rog.
- See the map on the screen

(4) 1886: construction of the Ekaterinoslav or St. Catherine's Railway to link up the coal deposits of Lugansk with the iron of Krivoi Rog, via Ekaterinoslav itself on the Dniepr.

ii) **The Mendeleyev tariff of 1891:** as stressed, was also a key factor in promoting direct investment in these metallurgical industries.

iii) **1891 - 1900: period of industrial boom that produced a gigantic coal, iron, and steel complex in what might be called the Russian Ruhr:**

(1) a complex running from Krivoi Rog in the west to Kharkov then along the Donets and Don River basin to Rostov on the Black Sea, and then to the Crimean peninsula;

(2) this region rapidly outdistanced the Urals, Moscow, and Warsaw regions as the chief producers of iron, coal, and then steel.

iv) **By 1910, this Ukrainian industrial complex was accounting for:**

- 87% of Russia's total coal production,
- 74% of total pig iron,
- and 64% of total steel,
- making Russia the world's 4th leading producer of iron and steel.

v) **High quality iron ores from Krivoi Rog in Ukraine a very major asset:**

(1) because the production of one tonne of good quality pig iron required only 1.7 tonnes of ore

(2) compared to an average of 2.5 tonnes of ore per tonne of pig iron, in western Europe

(3) But the more recently discovered iron ores of the Kerch peninsula were less high quality;

- thus ca. 1900 the Briansk Company using Krivoi Rog iron ores produced on average 260 tonnes of pig iron per day
- But the Kerch Metallurgical Company, using local ores, produced only 175 tonnes of pig iron per day

■ Yet, the Kerch reserves were ten times the size of those at Krivoi Rog

(4) Overall note that steel prices in Ukraine and southern Russia fell by 20% from 1880 to 1914, as did world steel prices generally.

vi) **The bulk of the capital investment in the coal and metallurgical industries was foreign:**

(1) For reasons indicated in the previous lecture on banking, the bulk of this capital investment in metallurgy came from Belgium and France – not Britain or Germany, as one might suspect

(2) The French also accounted for 67% of investment in the coal industry

(3) By 1914, coal, iron and steel together accounted for 40% of foreign capital investment in Russia

c) **The Petroleum Industry:**³

i) **The petroleum industry developed entirely in the Caucasus region**, including the adjacent shores of the Caspian Sea around Baku.

ii) **This industry dates from the 1870s,**

(1) when the Swedish firm of Nobel Brothers established petroleum refineries at Baku,

(2) and Baku remained one of the four major Russian oil producers.

iii) **1883:** the construction of the Trans-Caucasian railroad, linking Baku on the Caspian Sea with Batum on the Black Sea, to permit the export of Russian petroleum: by pipeline and then seagoing tankers.

iv) **This petroleum industry was also heavily dependent on foreign capital investment**, especially, once more, French capital.

v) **Mendeleyev Tariff of 1891:** again important, in shutting out American oil, in giving the Russian industry the entire domestic market.

vi) **What was then the primary market for petroleum products:** i.e. primary forms in which petroleum products were consumed?

³ **From Answers.com:** Petroleum has been known throughout historical time. It was used in mortar, for coating walls and boat hulls, and as a fire weapon in defensive warfare. Native Americans used it in magic and medicine and in making paints. Pioneers bought it from the Native Americans for medicinal use and called it Seneca oil and Genesee oil. In Europe it was scooped from streams or holes in the ground, and in the early 19th cent. small quantities were made from shale. In 1815 several streets in Prague were lighted with petroleum lamps. The modern petroleum industry began in 1859, when the American oil pioneer E. L. Drake drilled a producing well on Oil Creek in Pennsylvania at a place that later became Titusville. Many wells were drilled in the region. Kerosene was the chief finished product, and kerosene lamps soon replaced whale oil lamps and candles in general use. Little use other than as lamp fuel was made of petroleum until the development of the gasoline engine and its application to automobiles, trucks, tractors, and airplanes. Today the world is heavily dependent on petroleum for motive power, lubrication, fuel, dyes, drugs, and many synthetics. The widespread use of petroleum has created serious environmental problems. The great quantities that are burned as fuels generate most of the air pollution in industrialized countries, and oil spilled from tankers and offshore wells has polluted oceans and coastlines.

(1) **the automobile industries:** were not yet, contrary to common assumptions, a major source of demand for petroleum products, though admittedly some source;

- we have already seen, of course, the beginnings of this industry, in late-19th century France, Germany, and (in the final lecture), in Great Britain
- but the really dramatic growth of the automotive industries – for automobiles, trucks, vans, bus, and military vehicles – did not come until and really after World War I

(2) **another great future for the petroleum industry lay in chemicals:** petro-chemicals. But that importance really also lay in the future, after World War⁴

(3) **domestic lighting: in the form of kerosene:** ⁵

⁴ Note that our Canadian city of Sarnia had its original economic importance in petroleum and the petro-chemicals. **From Answers.com:** The natural port on Lake Huron and the salt caverns that exist in the surrounding areas, coupled with the oil discovered in nearby Oil Springs lead to the massive growth of the petroleum industry in this area. Since Oil Springs was the first place in North America to commercially drill for oil, the knowledge that was acquired there and strengthened in Sarnia led to Sarnians traveling the world teaching other nations how to drill for oil. What is now known as the Chemical Valley, located down river of Sarnia proper, once adorned the back of the Canadian ten dollar bill.

⁵ **From Answers.com:** Kerosene is an oil distillate commonly used as a fuel or solvent. It is a thin, clear liquid consisting of a mixture of hydrocarbons that boil between 302°F and 527°F (150°C and 275°C). While kerosene can be extracted from coal, oil shale, and wood, it is primarily derived from refined petroleum. Before electric lights became popular, kerosene was widely used in oil lamps and was one of the most important refinery products. Today kerosene is primarily used as a heating oil, as fuel in jet engines, and as a solvent for insecticide sprays.

History

Petroleum byproducts have been used since ancient times as adhesives and water proofing agents. Over 2,000 years ago, Arabian scientists explored ways to distill petroleum into individual components that could be used for specialized purposes. As new uses were discovered, demand for petroleum increased. Kerosene was discovered in 1853 by Abraham Gesner. A British physician, Gesner developed a process to extract the inflammable liquid from asphalt, a waxy petroleum mixture. The term kerosene is, in fact, derived from the Greek word for wax. Sometimes spelled kerosine or kerosiene, it is also called coal oil because of its asphalt origins.

Kerosene was an important commodity in the days before electric lighting and it was the first material to be chemically extracted on a large commercial scale. Mass refinement of kerosene and other petroleum products actually began in 1859 when oil was discovered in the United States. An entire industry evolved to develop oil drilling and purification techniques. Kerosene continued to be the most important refinery product throughout the late 1890s and early 1900s. It was surpassed by gasoline in the 1920s with the increasing popularity of the internal combustion engine. Other uses were found for kerosene after the demise of oil lamps, and today it is primarily used in residential heating and as a fuel additive. In the late 1990s, annual production of kerosene had grown to approximately 1 billion gal (3.8 billion l) in the United States alone.

Raw Materials:

Kerosene is extracted from a mixture of petroleum chemicals found deep within the earth. This mixture consists of oil, rocks, water, and other contaminants in subterranean reservoirs made of porous

(2) In Russia, most of Asia, most peasants in these highly agricultural communities used kerosene to light their homes, etc.

(3) Consider the slogan of US oil cartel headed by Standard Oil: 'Oil for the lamps of China'.⁶

vi) **The Petroleum industry was Russia's fastest growing industry in the 1880s and early 1890s (when it was then overtaken by metallurgy):**

vii) **Russia was in fact the world's leading producer of petroleum up to about 1900**, when it had to yield first place to the United States. See the following table:

Russian Petroleum Exports, in millions of tons

layers of sandstone and carbonate rock. The oil itself is derived from decayed organisms that were buried along with the sediments of early geological eras. Over tens of millions of years, this organic residue was converted to petroleum by a pair of complex chemical processes known as diagenesis and catagenesis. Diagenesis, which occurs below 122°F (50°C), involves both microbial activity and chemical reactions such as dehydration, condensation, cyclization, and polymerization. Catagenesis occurs between 122°F and 392°F (50°C and 200°C) and involves thermocatalytic cracking, decarboxylation, and hydrogen disproportionation. The combination of these complex reactions creates the hydrocarbon mixture known as petroleum.

⁶ Wikipedia: *Oil for the Lamps of China* is a novel by Alice Tisdale Hobart. It was originally published by Bobbs Merrill (Indianapolis) in 1933, and reprinted by EastBridge in 2002 (ISBN 1891936085). The novel, which became a bestseller in 1934, describes the life in China of a young executive from the early 1900s through the Nationalist Revolution of the 1920s. The young protagonist, Stephen Chase, is successful in understanding China and building business, but in the turmoil of China's Nationalist Revolution of the 1920s, he is betrayed by the company and by the new China which emerges. The author's husband was an executive for the Standard Oil Company. It was the basis of a 1935 film by the same name starring Pat O'Brien.

Standard Oil (Answers.com) – later Exxon and Mobil: U.S. company and corporate trust that held a near monopoly over the U.S. oil industry from 1870 to 1911. The company originated in 1863, when John D. Rockefeller started a Cleveland, Ohio, refining firm, which, with other facilities, was incorporated as the Standard Oil Company in 1870. By 1880, through elimination of competitors, mergers, and use of favourable railroad rebates, it controlled the refining of 9095 of all oil produced in the U.S. In 1882 Standard Oil and affiliated oil companies were combined in the Standard Oil Trust, which eventually included some 40 corporations. In 1892 the Ohio Supreme Court ordered the trust dissolved, but it continued to operate from headquarters in New York and later New Jersey. Its monopolistic practices were exposed in Ida Tarbell's *History of the Standard Oil Company* (1904), and after a lengthy antitrust suit by the U.S. government (antitrust law), the Standard Oil empire was broken up in 1911. Although eight companies retained Standard Oil in their names after 1911, by the late 20th century the name had all but disappeared, even though former Standard Oil divisions continued to dominate the U.S. petroleum business. In 1931 Standard Oil Company of New York merged with Vacuum Oil Company (another trust company) to form Socony-Vacuum, which in 1966 became Mobil Oil Corp. Standard Oil (Indiana) absorbed Standard Oil of Nebraska in 1939 and Standard Oil of Kansas in 1948 and was renamed Amoco Corp. in 1985. Standard Oil of California acquired Standard Oil of Kentucky in 1961 and was renamed Chevron Corp. in 1984. Standard Oil Company (New Jersey) changed its name to Exxon Corp. in 1972. In 1987 British Petroleum Company PLC (BP) completed the purchase of Standard Oil Company (Ohio). Further consolidation occurred in 1998, when BP merged with Amoco, and in 2002, when Exxon merged with Mobil.

1890-9	6.648 million tons
1900-9	10.554 million tons
1910-3	10.249 million tons [= 73 million barrels]

4. Cartelization in Russian Industry

a) **Russia, like Germany, came to have a very cartelised industrial structure:**

i) **especially in heavy industry:** i.e., in the coal, iron, and steel, and petroleum industries, by the later 19th and early 20th centuries.

ii) **The largest and most important cartels were:**

(1) Pradamet in iron and steel (1902) and

(2) Prodogol in coal (1906).

b) **Industrial Scale:**

i) **As in Germany,** those cartelised industries were characterized by having very large scale.

ii) **Over 40% of all Russian factories:** employed more than 1,000 workers each.

c) **Very large industrial scale and cartelisation were the result of:**

i) **Direct foreign investment by large scale foreign firms:** who were themselves often members of industrial cartels.

ii) **Industrial financing by syndicates of investment banks,** as in Germany.

iii) **Advantage of being a late starter:** begin large scale with the most advanced industrial technology, to compete with other countries.

iv) **Government policy:**

(1) to promote large-scale industrial cartels, sustained by protective tariffs and sympathetic courts: (2) that was deemed the best policy to promote rapid industrialization in those sectors most likely to increase Russia's military power.

v) **scarcity of industrial labour:** another aspect of Gerschenkron's thesis

(1) in Gerschenkron's view, as noted earlier, the industrial input in scarcest supply in Russia (as a 'backward nation') was skilled labour;

(2) and thus large-scale with extensive mechanization was a reflection of and compensation for that labour scarcity: substituting cheap capital for scarce skilled labour .

(3) There is, however, very little documentary evidence to support that view;

(4) and it overlooks the fact that much Russian industry, especially producing for domestic consumption, was small scale and labour intensive.

4. General Conclusions

a) **By 1914, on eve of World War I, Russia had evidently succeeded in establishing a firm industrial base, ranking as follows in world industrial production:**

i) **in petroleum:** 2nd after the U.S.

ii) **in coal, pig iron, and steel:** 4th after the U.S., Germany, Britain, and France

iii) **in linen textiles:** 3rd

iv) **in cotton textiles:** 4th

b) **Nevertheless that achievement was still only the beginnings of true industrialization:**

i) **Those impressive statistics, those large industrial outputs, really reflect the vastness of Russia:** the abundance of its resources and large size of its rapidly growing population.

ii) **But they did not give Russia a firmly established industrial base:** in per capita terms, Russia was far behind western Europe and North America, with industrial outputs per capita only 20% those of Britain and 15% of the U.S.

iii) **Russia's urbanization and industrial labour force:**

(1) Urbanization, with industrialization

- had more than doubled between 1860 and 1913: from 6.6% to 15.3% of the population of European Russia;

- but still it was only 15%.

(2) The growth of an urban industrial labour force

- had similarly doubled, in fact doubled from the 1880s;

- but again, it was still only 2.3% of the population of European Russia in 1914.

iv) **Employment in peasant-kustar type handicraft production** of industrial goods was still twice the employment in industrial factories.

c) **Russian industrialization was still in the form of a very uneven distribution of small industrial islands in a vast primitive agrarian sea:**

i) **As in Arthur Lewis' dual-sector economy model:** discussed in the first lecture on Russia

ii) **Much of this industrial structure was of course foreign owned,**

(1) the result of direct foreign investments,

(2) though a surprising amount was of domestic Russian creation.

iii) **industrial islands above all in:** the southern Ukraine, the Caucasus, around Moscow (Moscow-Tula region), St. Petersburg; and in Poland, the Silesia-Dombrowa-Warsaw region.

iv) **Much of this was of course destroyed during World War I,** the Russian Revolutions of 1917, and the ensuing civil wars and foreign invasions to 1922.

v) **Real industrialization had to await the Soviet era**, and Stalin's forced-draft industrialization after 1928, at a horrible cost.⁷

d) **Comments on the Bairoch Table (screen):**

i) **Note that per capita Russian industrial output rose 2.5 fold from 1860 to 1913 (from 8 to 20)**, while total industrial output rose 3.81 fold (from 16 to 77);

ii) **Russia's share of total world industrial output increased slightly from 7% to 8%**, while France's share shrank from 8% to 6%.

iii) **But in relation to British industrial output,**

(1) Russian per capita output in 1913 was only 17.4% of the British output,

(2) and 15.9% of the American per capita output;

(3) the index 20 means that it was 20% of British p.c. output in 1900.

e) **Paul Gregory's Statistical Analyses [1994]:**

i) **Gregory has calculated that, from 1883/87 to 1910/13**, Russia's total product grew at a rate of 3.25% per year (i.e. aggregate output),

ii) **and that per capital product grew by 1.65% per year:** With lower bounds of 2.75% and 1.15%

⁷ **Russian History Encyclopedia (Answers.com):** Russian economic planning had its roots in the late nineteenth century when tsarist explorers and engineers systematically found and evaluated the rich resources scattered all around the empire. Major deposits of iron and coal, as well as other minerals, were well documented when the Bolsheviks turned their attention to economic development. Initial attention focused on several centers in south Russia and eastern Ukraine, which were to be rapidly enlarged. Electric power was the glamorous new industry, and both Vladimir Lenin and Josef Stalin stressed it as a symbol of progress. By 1927 the planners had prepared a huge three-volume Five-Year Plan, consisting of some seventeen hundred pages of description and optimistic projection. By 1928 Stalin had won control of the Communist Party from Leon Trotsky and other rivals, enabling him to launch Russia on a fateful new path. The First Five-Year Plan (FYP) laid out hundreds of projects for construction, but the Party concentrated on heavy industry and national defense. In Germany, Adolf Hitler was already calling for more "living room." In a famous 1931 speech Stalin warned that the USSR only had ten years in which to prepare against invasion (and he was right). The First Five-Year Plan was cut short as planning gave way to confusion. A Second Five-Year Plan was issued in one volume in 1934, already behind schedule. The planners were learning that one-year plans were more effective for managing the economy, leaving the five-year plans to serve as propaganda documents, especially effective abroad where the Great Depression seemed to signal the collapse of capitalism. The Third Five-Year Plan had limited circulation, and the Fourth was only a pamphlet, issued as a special edition of the party newspaper, Pravda. The Nazi invasion, starting June 22, 1941, required hasty improvisation, using previously prepared central and eastern bases to replace those quickly overrun by well-equipped German forces. The Nazis almost captured Moscow in December 1941. After Soviet forces rallied, wartime planners organized hasty output increases, drawing on newly trained survivors of Stalin's drastic purges. Russian planners worked uneasily with U.S. and British officials as the long-delayed second front was opened, and abundant Lend-Lease supplies arrived. After the war, improvisation gave way to Stalin's grim 1946 Five-Year Plan, which held the Soviet people to semi-starvation rations while he rebuilt heavy industry and challenged the United States in building an atomic bomb.

respectively.

iii) **For the peak period of 1889 to 1904, the aggregate growth rate is 4.7% per annum, and the per capita rate is 3.4%**

iv) **By comparing these growth rates with those calculated for 14 other countries during their corresponding early and high periods of pre-war industrialization, Gregory concludes that:**

The Russian growth rate of total product compares favourably with the average long-term rates of the industrialized countries between 1850 and 1914. In fact, Russian growth was equalled or surpassed by only the United States, Canada, Australia, and Sweden; and it equalled or exceeded the growth of the two most important 'follower' countries (Japan and Italy) before World War I.

v) **He also cites studies by Angus Maddison:**

(1) which show that in the period 1870 to 1914, the average growth rate for western Europe and North America was 2.7% per annum,

(2) while that for Russia was 3.25% per annum.

vi) **But Gregory does admit that, in the process of Russian industrialization, the fall in the agricultural share and the rise in the industrial share of national output and income was slower than the corresponding changes in most western countries, except for France.**

Table 1.**Per Capita Taxation in Russia, 1885 - 1913**

Year	Excise Taxes Per Capita in Rubles	Total Per Capita Taxes in Rubles	Taxes as Percentage of Net National Income	Taxes as Percentage of Gross Industrial Output
1885	2.43	6.41	12.8%	51.3%
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1913	7.34	11.43	12.9%	25.5%

Source: Arcadius Kahan, 'Government Policies and the Industrialization of Russia,' *The Journal of Economic History*, 27:4 (December 1967), extracted from tables 1-3, pp. 462-63.

Table 3. Decennial Averages of the Output of Pig Iron and Steel in France, Germany, Russia, and the United Kingdom, in millions of metric tons,

1830-9 to 1910-3 (iron) and 1870-9 to 1910-3 (steel)

Average of 1880-9 = 100. 1 metric ton = 1000 kg. = 2,204.6 lb.

Decade	France	Index	Germany	Index	Russia	Index	United Kingdom	Index
IRON								
1830-9	0.286	16	0.129	4	0.172	31	0.921	11
1840-9	0.442	25	0.172	5	0.192	35	1.625	20
1850-9	0.731	25	0.334	5	0.243	44	3.150	39
1860-9	1.164	66	0.813	25	0.304	56	4.602	57
1870-9	1.337	75	1.678	52	0.400	73	6.648	81
1880-9	1.772	100	3.217	100	0.547	100	8.040	100
1890-9	2.192	124	5.155	160	1.539	281	8.090	101
1900-9	3.028	171	9.296	289	2.786	509	9.317	116
1910-13	4.664	263	14.836	461	3.870	707	9.792	122

STEEL								
Decade	France	Index	Germ- any	Index	Russia	Index	United King- dom	Index
1870-9	0.260*	52			0.080*	33	0.695	30
1890-9	1.015	203	3.985	302	0.930	388	3.760	161
1900-9	2.175	435	9.505	720	2.490	1038	5.565	238
1910-13	4.090	818	16.240	1230	4.200	1750	6.930	296

*1875-9 only.

Table 4:**Russian Petroleum Exports, in millions of tons****Decennial Means, 1890 - 99 to 1910 - 13**

Years	in Millions of Metric Tons	in millions of barrels
1890-9	6.648	47.351
1900-9	10.554	75.172
1910-3	10.249	73.000

Table 5. Aggregate and Per Capita Indices of Industrial Production (United Kingdom in 1900 = 100), and percentage shares of world industrial production, for various countries: in 1860 and 1913

Country	Total Industrial Output		Per Capita Industrial Output		Percentage Shares of World Industrial Production	
	1860 Index	1913 Index	1860 Index	1913 Index	1860 %	1913 %
United Kingdom*	45	127	64	115	20%	14%
Germany	11	138	15	85	5%	15%
France	18	57	20	59	8%	6%
Russia	16	77	8	20	7%	8%
ALL EUROPE	120	528	17	45	53%	57%
United States	16	298	21	126	7%	32%
Canada	1	9	7	46	--	1%

Source: Paul Bairoch, 'International Industrialization Levels from 1760 to 1980', *Journal of European Economic History*, 11 (Fall 1982), 269-333, tables 4 - 13.

* The United Kingdom of Great Britain and Ireland: the values for its aggregate and per capita industrial outputs for 1900 are taken as the base 100 for all the indices in columns 1 to 4. Note that columns 5 and 6 are percentages of total world industrial output.

Table 6.

RUSSIA: Population and Urbanization, 1800 - 1913

Year	Total Population in Millions	Index 1860 = 100	European Russia: Population	Urban Population	Index 1860 = 100	Urban Population as percent of Russia
1800	36.5	48				
1860	74.1	100	61.2	6.1	100	6.6%
1885			81.7	10.0	164	12.2%
1897	126.4	171	93.4	12.1	198	12.9%
1913	170.1	230	121.8	18.6	305	15.3%

Russian Industrial Labour Force

Year	No. of Factory Workers (Urban)	Population	Percentage
1887	1.5 million	97.7 million	1.54%
1910	3.0 million	133.0 million	2.26%