SCIREA Journal of Sociology
ISSN: 2994-9343
http://www.scirea.org/journal/Sociology
May 4, 2025
Volume 9, Issue 3, June 2025
https://doi.org/10.54647/sociology841388

Soviet Engineers and the West European/ North American Legacy, 1917-1930s

Rolf Torstendahl

Department of History, Uppsala University , Uppsala, Sweden

Email: rolf.torstendahl@hist.uu.se

Abstract

Were Soviet engineers less good than those in the West in the crucial years of the two first five-year plans? Did the Soviet government ruin the engineering education? These questions form the background of the present article. The answer follows three different lines. The first line is the quality of engineering education in the late Russian empire. The second is the Soviet demand for foreign, primarily American and German, engineers during the first two five-year plans. The third line is the ideological propaganda set going by Stalin in 1928 and continued until the war, that engineers were liable to be enemies of the state (O. Kryshtanovskaia). Both the US positive attitude to the USSR and the Soviet anti-engineering policy "were swept under the rug" (T. Hughes) during the Cold War.

Keywords Engineers, education, Soviet Union, American engineers, industrialisation, bureaucracy

1.The Problem

In books and articles from the time of or after the Cold War one can often meet a notion of Russian technology as a vague copy of the technology of the West. Already the Soviet achievements during the space race might raise some doubts of the correctness of such ideas, and any historical knowledge of Russian iron industry from the 18th century and Russian industrialisation in the late 19th century will enforce such doubts. The question arises if the Soviet power from 1917 onwards could have ruined the engineering education and the quality of engineers, which would have been quite contrary to the needs of Soviet ambitions as testified by the Five-Year Plans, starting in 1928. Industrial development was a cornerstone for the kind of Marxist ideology, which dominated all social thought in the Soviet state. Were Soviet engineers different from their predecessors in Russia and were they different from those in the West in the crucial years of the 1920s and 1930s? This is the problem that the present article wants to answer.

2. Historical Introduction

Russian technical education before the revolutions in 1917 is hardly known at all in the West. Occasional mentions exist of the Imperial Petersburg Technological Institute, founded in 1828 and its predecessors as schools of mining from the 18th century but no real treatment of this institute or the lower schools in other parts of the country is offered in overviews of the history of technology, nor in many encyclopaedias.[1] Loren R. Graham's book on science in Russia and the Soviet Union only mentions that technological institutes grew in the late nineteenth century and that their students increased in number from 1 777 in 1882 to 2 826 in 1895.[2] Another book by the same author gives specific information on Russian topics concerned with engineers and engineering, and these are related to the subject matter of this article and will be treated in due course.[3] Since the Russian revolution of 1991 and the opening up of research and culture during the two following decades many books and articles have been published in Russian,[4] which have left few traces in Europe and the USA.

---

[1] The *Wikipedia (Eng)* article on the Saint Petersburg Technological Institute (accessed 23 August 2023) is striking, as the article just mentions the shifting names of the institute during the revolution and later and then presents some data about the current version of Institute/University.
[2] Graham 1993, 38.
[3] Below, section 5.
[4] These are often regional studies, see for instance two heavy volumes on the Urals by Veniamin Alekseiev and Dmitrii Gavrilov (Alekseiev & Gavrilov 2001, Alekseiev & Gavrilov 2008), which often touch upon technology

The February Revolution of 1917 brought a change, but a moderate one, The October Revolution was the more subversive. The Bolsheviks gripped the power and thenceforth its doctrine said that the Communist Party was to govern the state and that all citizens had to profess their loyalty to its leadership. The head of the party was also the head of the state, first Lenin and after him Stalin. They made clear that they demanded obedience from their subordinates and the citizens of Russia.

For education this meant that a new cornerstone in all teaching was introduced. The tsar had not been the head of any party, even though almost all politicians looked to the tsar for guidance, all state bureaucrats promised to obey the tsar, and all ministers felt that they were ministers just because of the will of the tsar. Obedience thus was no news to Russians, but obedience to a party that had a specific development of society in view was something quite new.

In his article from 2012 on engineering education in Russia, with the subtitle "history, concepts, perspectives", D. L. Saprykin – after a short introduction on the rise and use of the Corps and Institute of Engineers from 1809 – focusses the historical part of his article on engineering education. He emphasises that Russia would not have been able to take its steps in engineering education and in industrial growth during the second half of the nineteenth century without observing the examples of Germany and the USA with their industrial growth. During the reign of Aleksander III the St. Petersburg Technological Institute, founded under Aleksander I, was vitalised and another TI was opened in Kharkov. A new period of growth came with Nikolai II (and his advisors) during the last two decades of the 19th century. That was a period when a "massfounding" of (higher) technological institutes took place: in St. Petersburg, Kiev, Tomsk, Warsaw (then inside the Russian realm, but evacuated during wartime to Nizhnii Novgorod), Rostov na Donu, Moscow (for road engineering), Ekaterinburg (for mining & ironworks), a second TI for mining in the Urals, and finally, an electrotechnical institute that was elevated to TI. Of course, the main flow of graduations from all these new institutes occurred only from 1908 and onwards Saprykin underlines.[5]

In a first table Saprykin compares the development in Russia and Germany in the number of TIs. The institutional growth of Russian technological education was certainly impressive, and in the number of non-specialised technological institutes Russia could well match

---

and schooling, and Gavrilov 2005, chap.3, which *inter alia* deals with the role of the Ural school for "metallurgists". See also [Present Author], on knowledge and its transfer.

[5] Saprykin 2012, 126-27.

Germany in 1913/14 according to this data, in spite of starting from a clearly inferior position in 1898.[6]

A second table in Saprykin's article compares the graduation of engineers in Germany, France and the USA with graduation in Russia before the First World War – in fact he compares also the graduation from universities as regards natural sciences and from specialised institutes (for mining, agronomists, and veterinaries) – of these only what is called "polytechnic and technical institutes" are included here. The Russian institutes were technological *vuzy*, that is, what corresponds to the TIs in the USA (*vuz* is a Russian abbreviation for a teaching institute on a tertiary level). His numbers seem reliable,[7] and they show that in all four countries the number of graduated engineers grew rather continuously from 1850 to 1914, most in the US from 0.9 (in 1870) to 55.4 thousand, next in Germany from 3.3 to 65.2 thousand, third in Russia from 4.3 to 40.1 thousand, least in France from 6.7 to 42.9 thousand.[8] This implies that in all these countries there was thus a rapid growth of formally educated engineers during the sixty years 1850-1914.

So far, Saprykin's numbers are in accord with what the author of the present article has found about engineers in Western Europe.[9] In the late nineteenth century a growth started in the output from a few most renowned TIs that continued to 1914. However, in the period from 1918 up to 1939 the development of the output from the TU Berlin, the ETH in Zürich, and the CGC in London was more uneven. Periods of rapid growth alternated with periods of slight contraction in these TIs. We cannot compare with Russia, as Saprykin does not follow up with numbers of graduates in Russia after the revolution. Corresponding numbers have not been found from the St. Petersburg institute.

Saprykin leaves the topic of the quantitative development of Russian engineering education at the revolution. The rest of the article deals with the "intellectual breakthrough in the beginning of the 20th century" and the final part with the concept of education. In the last part he occasionally touches upon historical matters, but the history of engineers is left behind. This is perhaps not just accidental.

---

[6] As sources for Germany and pre-revolutionary Russia Saprykin states that they are fetched from reports by state administrative authorities and TIs ("otchetam vedomstv i vuzov").
[7] Saprykin refers to two works for Germany, France and USA, Ahlström 1982 and Byrkjeflot, 2002), and two Russian works (Ivanov 1991, and another by Mashkin, N. A., on the Russian military academy) for Russian data after 1900.
[8] Saprykin 2012, 128.
[9] Present Author…...

3.The Russian Scene from 1917

While tsardom shunned every form of constitution, all parties in late imperial Russia excepting the most conservative ones wanted a constitution, though of different forms.[10] However, there was no formal legal organisation of government during the period between the February Revolution and the October Revolution and this state of affairs continued during the years 1917-1923, the period of the Russian Socialist Federation of Soviet Republics, RSFSR. Only in 1923 the Union of Soviet Socialist Republics, USSR, was formed with a constitution.

During these years the state formally had a federative character, but Lenin, the most influential of the leaders, favoured centralisation of power. Through nationalisation of all big industry the party, already after a year under Lenin's guidance, could contend that they had won over many leading industrial engineers from resistance and sabotage to acceptance of leading posts in the socialised economy, as Ol'ga Kryshtanovskaia states in her pioneering sociological analysis from 1989 of the Russian engineering profession.[11] A gradual centralisation of politics and administration took place in the years of the federation at different levels, central and local and in pure administration as well as political.[12]

The new USSR from 1923 was a state with some internal federative elements, but its centralised structure was undisputable. However, the Soviet system is incomprehensible if the guiding role of the party is not taken into regard. "The state stuck out as the fundamental link in the political system of Soviet society, but the party played the leading role as the centre of the whole society", says Korzhikhina.[13] In one short sentence, the situation for Russians in general was to accept as guiding principle to do nothing that could challenge the watching eye of the SUKP, and the party's eye came to be the CH-K (pronounced as Cheka), later the OGPU, still later the NKVD, and, again renamed, the KGB. If citizens wanted to be on good terms with the authorities, they had to interpret as well as possible the goals of the party and the state and act in accordance with them. Being a good citizen meant to be striving for the goals of the society, which were set by the party.

This guiding directive for citizens of the Soviet Union was directly applicable on education and especially on technical education, at least after 4 years, when the first five-year plan had become decided by the party leadership to start by 1 October 1928 and delegated to the proper

[10] For details of the autocratic system, see Natalia Selunskaya & Rolf Torstendahl 2011, esp. 19-23.
[11] Kryshtanovskaia 1989, 84.
[12] This paragraph summarises part II of the book Korzhikhina 1995, 41-108
[13] Ibidem, 7-8.

state authorities.[14] This plan had ambitious goals for the economic development of the country, with three different main points. One was agriculture, which should be reformed through state ownership and large estates. A second was infrastructure which should be improved by new canals, new railways to industrial centres and improved roads. The third was industry, which should use better machines and where workers should be used in a better way.

The last-mentioned item was heavily influenced by the American Frederick W. Taylor's scientific management,[15] which was admired by both Lenin and Stalin, and had several adherents among party activists.[16] The leadership of the SUKP was thus not opposed to American influences on the development of the Soviet Union provided they were efficient. In a way it is more unexpected that Americans took part in the building of the Soviet state. For in fact, some Americans did take part, especially some engineers and some other technical personnel. F.W. Taylor was dead since 1915, but none of his closer collaborators (they were not many) offered their service to the communist experiment.

As Thomas Hughes points out scientific management fitted well into the project of building the Soviet Union by revolutionising the earlier Russian production system. Industry had spread rapidly in Russia from the middle of the nineteenth century, but it failed in efficiency compared with Western Europe and the USA. The communist leaders saw this and they wanted to import from the USA and Europe not only ideas but whole conceptions of specific production and sometimes whole plants, for instance, a Ford plant for T-Fords and Ford tractors. When Henry Ford he visited the Soviet Union, he was greeted as a great industrial innovator.[17]

As is evident from the preceding, Thomas Hughes has written informatively and interestingly on the subject. Hughes was, among other things, a specialist on electrification, and has written a book *Networks of Power* (1983) where electrification in Germany, Britain and the United States is treated "for the first time as elements within a single interpretive frame" (Staudenmaier).[18] Therefore it may be a bit astonishing that Hughes only devoted less than six pages (text, plus several pictures) to electrification in his treatment of the Soviet industrial transformation of Russia and Hugh Cooper's role in the Soviet parade project, Dnieprostroi in the river Dnieper. This should not deceive. Hughes gives a clear picture of Lenin's fervent

[14] A.S. Orlov, V.A. Georgiev, N.G. Georgieva, T.A. Sivokhina, 2008, 494-498.
[15] F. W. Taylor 1911.
[16] Orlov et al., 2008, 495. For influences of Taylor on Lenin and Stalin, see Hughes, 1989, 250, 255-260.
[17] Hughes 1989, 269-278.
[18] Staudenmaier, 2001, ix-xx, quote p. xiv.

conviction that electrification must play a central role for both industrialisation and the improvement of the life standard of the people and not least for their possibility to increase their knowledge and would bring the ultimate victory of communism over capitalism.[19] Neither Hughes, nor other researchers on the American participation in Dnieprostroi mention any controversies between Cooper, who was chief consultant, and I. Aleksandrov, the Soviet engineer who was the head of the project.

Electrification with an aim to promote industrialisation was one of the huge projects that the first five-year plan focussed on. The inspiration and model came from the Tennessee Valley projects, headed by the Tennessee Valley Authority (TVA), which was authorised by the U.S. Congress on the initiative of President Franklin D. Roosevelt. The first dam built in Tennessee was called the Norris Dam, after Senator Norris, whose dam project in 1930 was vetoed by the then president, Herbert Hoover. The TVA then became a fundamental part of Roosevelt's New Deal.[20]

4. American Support and Its Influence on the USSR

Soviet reformers found several models in the USA. Actually, Russian radicals, not only Bolsheviks but many on the left, showed a passion for American efficiency in all economic matters, and both theoretical model-makers as F. W. Taylor and entrepreneurs in the grand style, foremost Henry Ford, as well as their close entourage gave inspiration. In spite of being deeply-rooted in capitalism, they included men who had worked with increasing efficiency in industry either as planning engineers or as workers on the spot. Both these categories tempted the Soviet planners and, consequently, they recruited American engineers and skilled workers to employment at several levels in the projects of the five-year plan.

Even if many Americans must have hesitated and some are known to have declined to accept, there were several who accepted the job offer. In a pamphlet published in 1944 by the Russian Economic Institute in New York, Andrew J. Steiger says: "While the list [the preceding paragraph enumerates a lot of persons and firms] is still incomplete, it is representative of the 1500 Americans who contributed their highly varied industrial talents to assist in the Soviet industrialization carried out under the First Five-Year Plan alone – from 1928 to 1932".[21]

---

[19] Hughes 1989, 261.
[20] *Wikipedia* (Eng), article "Tennessee Valley Authority", section "History" (accessed 13 September 2023).
[21] Steiger 1944. (19 pp.). Within brackets Steiger refers to *Journal of Commerce and Commercial*, New York 26 April 1937, after the quoted sentence.

Steiger's thin booklet is a printed version of a lecture he held in New York, and it is published with a short Foreword by Robert S. Lynd. In this Lynd says: "In a world accustomed to taking vigorous sides 'for' or 'against' the Soviet Union, one of the areas of relative neutrality and sanity is the world of science and engineering. The plant geneticist and the man who builds strip-steel mills may be 'political men' in their off-hours; but their main concern is with the impersonal sequences of science and technology." This is followed by a recommendation of John D. Littlepage's and Demaree Bess's book from 1939, *In Search of Soviet Gold*.[22]

Robert Lynd was at this time on the top of his reputation and career as a sociologist. He and his wife Helen had coauthored the two Middletown studies, which had given both of them a new standing. He was recruited to President Herbert Hoover's Research Committee on Social Trends and subsequently to President Franklin D. Roosevelt's Consumers' Advisory Board of the National Recovery Administration and he became a member of the advisory board's executive committee in 1935.[23] Thus, he was directly engaged in Roosevelt's New Deal programme.

The above-mentioned John D. Littlepage was an engineer from Alaska, who helped Soviet gold industry to introduce "modern mining technique" and had assisted in making the gold output "what it is today" (quotes from Steiger). Among American industrialists who had been active in transferring American knowledge to the USSR, Steiger also mentions Walter Arnold Rukeyser from asbestos industry, Chester S. Allen from concrete industry, and Charles R. Crane for his creative moves for better understanding in manufacturing industry.

Most of these Americans were industrial managers or even entrepreneurs who sought for expansion in the Soviet Union. Such business leaders formed one part of the estimated around 1500 Americans (Steiger's estimate) who had worked in the USSR. Another part of them were employed there by Soviet authorities in order to contribute to reform working procedures of manual labour or the organisation of labour and machine usage in production. A third part were engineers. The Russian Economic Institute in New York sent out a questionnaire to those who were known to have worked as engineers in Russia in the 1920s and 1930s and they received "a score of replies" from all over the USA. If they calculated with hundreds of American engineers in the USSR during the period, a score was not many, so any statistics based on these answers may be questionable. Anyway, most respondents had been there during the first Five-Year Plan, mostly1930-1933. "None had been there earlier

[22] Lynd "Foreword", in Steiger 1944, 1. Littlepage & Bess 1939. Littlepage was generally distrustful of politicians and especially of their plans for industry. See further below.
[23] "Robert Staughton Lynd", article in *Wikipedia Eng*. (accessed 5 Oct. 2023).

than 1927 and the latest date is 1938," is what Steiger tells.[24] Among engineers employed by Soviet authorities were different specialists and they stayed between one and five years, according to the same source. Roughly, Steiger's numbers tally with the most detailed and most reliable overview of foreigners engaged in the Soviet Union up to 1940. It is written by the Italian social historian Andrea Graziosi. Her focus is, however, on workers, and engineers (of different nationalities) are only mentioned in passing now and then in her article.[25]

As the American engineers (including entrepreneurs) have been mentioned in several studies,[26] the present article will substantiate only the fates of three of them, Hugh L. Cooper, John D. Littlepage, and Zara Witkin. All three signed personal contracts with Soviet authorities, and all three were employed through these contracts by the Soviet state to help with specific tasks, which were applications of their professional knowledge. In this way they took on to use their personal expertise in favour of the goals that the Communist party had set in the five-year plan. They did not subscribe to the plan as such but only to certain parts of the reforms of ongoing technical operations in the Soviet Union. Thereby they indirectly served the goals of the planners, something that can hardly have escaped their knowledge. However, contrary to many manual labourers who volunteered for employment in the building of the Soviet state, none of the three had any sympathy for the communist party or the Marxist political goals.

Cooper was born in 1865 and a self-educated civil engineer. Yet, his knowledge of dam constructions for the generation of electrical power was obviously solid enough, as the list of constructions that he supervised includes four in the Canada and the United States between 1906 (Niagara Falls) and 1924. He worked also in Brazil and Egypt and finally in the Soviet Union.[27] A more detailed account of Cooper's engineering career is given by Harold Dorn, in spite of the fact that he is less interested of Cooper as engineer than in his engagement for the sake of a détente between the USA and the Soviet Union. Dorn shows that Cooper through his many-sided experience of hydroelectric works in the USA and abroad had become regarded as a great authority in the field. When the Soviet government sought a specialist to be a leading authority in the building of the Drieper dam at Zaporizhzhia (in nowadays Ukraine) they gave the task to lead it to Cooper, but only after a test period and with a German

[24] Steiger 1944, 5-6.
[25] Graziosi 1988, 38-59.
[26] Sutton vol, 2 1970, esp. 249-61; Gelb, "Introduction", 1-17 in Memoirs of Z, Witkin 1991, Steiger 1944, 7, Webb 1949, 258,
[27] *Wikipedia* (Eng), article "Hugh Lincoln Cooper", accessed 15 September 2023.

competitor. Cooper spent about two months a year from 1928 to 1932, when the project Dnieprostroi was declared fulfilled and Cooper was awarded the Order of the Red Star.[28]

Dorn shows repeatedly in his well-documented article with both American and Russian sources that Cooper was highly respected by his subordinated Soviet engineers. They were impressed by his matter-of-fact attitude to big problems that came up during the construction of the then biggest dam in the world for hydroelectric production. He did this for a very good payment but in spite of his conviction, declared on several occasions, that socialism and communism were less appropriate social steering systems than free competition.

Littlepage and Witkin were apolitical from the start and especially Littlepage continued to insist that he would not go into political matters, although this was hard to avoid in a society where engineers, especially those of foreign origin, were not given the leadership of big industrial projects. The book used here for Littlepage's opinions is written in U.K. English by a British journalist, Demaree Bess, who became a friend of Littlepage's during the last two of the years he spent in Russia, 1928-1937. I must underline that the double authorship gives reasons to question whose are the views expressed about Soviet politics. Exactly which opinions Littlepage held is uncertain, but here are related what the book ascribes to him.[29]

The Alaskan goldmine engineer Littlepage was recruited by a Soviet representative, Alexander P. Serebrovsky, who made a very favourable impression on him. Serebrovsky straightforwardly told Littlepage that he was a Bolshevik when Littlepage said that he had low thoughts of Bolsheviks. However, Littlepage found him trustworthy when he accepted to dress in working clothes and to go down a goldmine among workers in order to actually see the American way of doing mining. Littlepage was finally convinced of Serebrovsky's expertise in the field when it turned out that he had a diploma as mining engineer and that he had worked as such before he made a political career.

Littlepage was persuaded to go to Russia and he brought his wife and two young daughters as well. He became head engineer for a gold mine district in the south of the Urals in Kochkar. There he soon found out that the figures of the administration of the mine for the output per worker was less than one-tenth of what American workmen produced in Alaskan mines. In a general meeting with workers and engineers he proposed that they needed a piece-work payment or a bonus system and some kind of contract labour. His proposals were met with

---

[28] Harold Dorn, "Hugh Lincoln Cooper and the First Détente", *Technology and Culture*, 20:2, 1979, 322-347

[29] Critical opinions may be Bess's, as the text on other occasions mentions that Littlepage wanted to underscore his apolitical character.

silence and he was advised not to mention this again. In the book Littlepage comments that industrial practice in the Soviet Union had changed much since 1928 (the book was published in 1939) and that it was "now" hard to believe that Communists ever possessed this attitude towards piece-work, contract labour and cost-accounting.[30]

When Littlepage is summarising his experience from Kochkar's mines, he somewhat proudly states that he had "put things in running order at the mines in Kochkar" in spite of the fact that the Russian workers had a belief that American machinery could do everything by themselves. From the text (with its co-author, the journalist Bess) it is quite clear that he looked upon the two first years in Russia as idyllic both in the mines and among people he met in the countryside compared to what he met in the following years with "de-nomadisation" of the population and especially the "liquidation of the kulaks",[31] which he regarded as inhuman consequences of the first Five-Year Plan with its collectivisation of agriculture and relocation of masses of people from their old homes on the steppes or in the agricultural villages to industries and mines. Littlepage saw these changes with compassion and reflection, but at the same time understanding the government's difficult choices. The great ambitions of the government are contrasted to the sufferings among the people. And the author(s) obviously feels that he was a co-actor in this industrial upheaval.[32]

Littlepage met these problems when Serebrovsky (now as head of a comprehensive administration of nonferrous mines) gave him order to clear up the situation at some Ural copper-mines, where the output had diminished radically. It is understandable that Serebrovsky may have looked upon Littlepage as a human relations' problem-solver, as he must have known that Littlepage had succeeded well with this in Kochkar.[33] Now, in the copper-mines of Kalata, situated in northern Urals, Littlepage found another kind of managers with a bureaucratic background but no knowledge of mines, who had irritated both Russian and seven American engineers who were employed there. The Americans had even started a boarding-house to spend their time (with their "large salaries") when they were not allowed to go into the mines and manage the work from there. Littlepage then used his contacts with superior authorities from his task as supervisor and inspector, and Serebrovsky made him chief engineer of the mines around Kalata, where he rapidly got both engineers and workmen

[30] The pages treating the problems of managing the workers to a result that Littlepage could approve are to be found in Littlepage and Bess 1939, 47-52, 62-63. Much of the rest consists of observations of habits and traditions among the native population in the region, which testify a wide social anthropological interest.
[31] The expressions were used by Stalin and the party. They refer to the expropriation of the farms from their owners and the relocation of the latter as forced labour to the mines and other projects.
[32] Littlepage and Bess 1939, 69-84, 78-84
[33] Littlepage and Bess 1939, 48-49

to resume their work, which soon resulted in an output of normal quantities, according to his own relation.[34]

Time after another Littlepage comes back to two major problems in the Soviet mining operations. One was that even if some Russian engineers were easily melting into the American way of integrating engineers and workmen who were stationed at the same workplace, quite often he met engineers who wanted to be regarded as superior and would accentuate class differences in dress and relations to manual workmen. The second problem was the financial management, often represented by a party official, who did not pay attention to the views of the engineers. By this attitude they wanted to cement their position in the party, but Littlepage could not conceal his satisfaction when such behaviour was found out and punished with several years' imprisonment. Littlepage left Russia only in 1937, after nine years (with one break) of employment on different posts. He was then disappointed, though more from what he had seen of hard-handed treatment of simple people than from any difficulties in his work.

The third American engineer I want to draw attention to is Zara Witkin. He has written memoirs, which are his own production contrary to Littlepage's book. He seems to have written his memoirs altogether by himself, even though he had a friend, Eugene Lyons, a journalist who was the only reader of these memoirs during Witkin's lifetime. Lyons cooperated with Witkin in a couple of endeavours to make them public through a publishing firm. These contacts failed, and the manuscript (or a copy made for or by the friend) was finally, several years after Witkin's death, found deposited in a box in the archive of the Hoover Institution. The editor points out some peculiarities of Witkin's style, which the author of this article thinks would not have been left, if the well-known journalist Lyons had worked them through.[35]

Witkin's interest in Russia may be explained by his origin in a family of Jewish immigrants from Russia, and he went to Russia in 1932. Born in 1900, he had made a rapid career as a construction engineer. He graduated with honours from the College of Civil Engineering of the University of California at the age of twenty. He worked at railway companies, designed a theatre and served as chief engineer of a major construction firm in Los Angeles. In this capacity he supervised construction of many buildings and he developed ideas of manufacturing prefabricated housing components, which he made into reality when he came

[34] Littlepage and Bess 1939, 88-93.
[35] Gelb in Witkin 1991, ix,

back from Russia in 1934. His memoirs are a detailed survey of his life during two years in several places and in somewhat varying capacities in different parts of the Soviet Union. Only approximately half of the text deals with his activity as engineer, most of the rest is devoted to his efforts to make Emma Tsesarskaia marry him. She was a Soviet film star whom he had seen and fallen in love with through films already before he left for the USSR, and they became friends, but she would not marry him.[36]

Witkin had prepared for his journey to the USSR by interviewing several people with experience of working there, among them Hugh Cooper.[37] In his work as an engineer in the USSR he was employed as a consultant expert by the Soiuzstroi, the main state agency for construction. In a Moscow office of Soiuzstroi he was developing a comprehensive plan for the manufacturing of prefabricated elements for housing constructions. He found that these were shelved in a workshop for such production but not used, which made him ask for other tasks. Therefore, part of his time he was sent around to different places to examine ongoing projects.[38] His impression of the ongoing constructions was not very positive and, as he relates things, he was straightforward in his criticism. Such criticism, based on detailed observations and combined with proposals of alternative ways of doing things, was often well accepted by subordinate engineers and skilled workers but less well by managers of each project. The latter category, consisting of bureaucrats with party support, then often counteracted Witkin's efforts by sending in negative reports of the results of Witkin's work to superior bureaucratic bodies or to political instances.

Witkin's experiences correspond closely to those of Littlepage, although they worked in different branches. Witkin (differently from Littlepage) sought contact with the party levels that could command the state bureaucracies that he found obstructive to changes, and he tried to get remedies for the weaknesses of the used system. Witkin even used his friendly contacts with some people inside the secret police, at this time OGPU, in order to remove hindrances for what he regarded as obvious improvements of production processes. As he reports the result, the OGPU official examined each case and gave orders to follow Witkin's proposals.[39]

Witkin, contrary to Littlepage, had a series of fights with Soviet bureaucracies, where his memoirs show him as the victor, partly because of Soviet's need for American support and

[36] Gelb in Witkin 1991, 2-3.
[37] Witkin 1991, 36-37.
[38] Witkin 1991, 72-79.
[39] Witkin 1991, 106, 140-142, 143-147, 198-200, 211-212 (Witkin not involved), 216-217, 220-221,

mainly because of his own precision in facts and calculations.[40] In spite of this both he and Littlepage show great sympathy for the people of Russia, both Russians in ethnic understanding and other inhabitants of Russia. None of them seems to have been driven by ideological preferences for communism, and they often push ideology aside for factual circumstances, which was also the case with Cooper, as mentioned above.

The important question is if American support did play a role. On the evidence available it did so for certain projects, where men like Cooper, Littlepage and Witkin worked and really tried to make American experiences in specific technical matters useful for those Soviet projects that they worked with. It is much harder to tell if they had any educational effects on Soviet engineers in general or engineers of a coming generation.

5.Was Something Wrong with Engineers in the USSR?

The question posed in the above title should not be confused with discussions of planned economy in general and the ideological difference between private enterprise and state direction of national economy. What is meant here is: Was there something wrong – or irrational, or misleading – in the education of Soviet engineering education that led students astray from the European/North American model of a good engineer.

In the foregoing section of this article is shown, that American engineers were very well accepted by Soviet authorities and mostly also by their colleagues and workmen, when they showed their ability at work for the plan goals in the Soviet society. Russian engineers seem not to have criticised Americans for the quality of their work. On the other hand, Americans often showed respect for what Russian engineers had done even if they found the instruments and methods used by them inadequate and outmoded for the purpose. Instead, they recommended other methods or arranged import of American machines. There is nothing in the memoirs of Littlepage or Witkin that indicates that they had difficulties to understand their Russian colleagues in professional matters or that they and their colleagues disagreed with each other professionally. Rather, it is striking that the Russian engineers seem to have had no difficulty to cooperate with the Americans, even if these were new temporary superiors. Russian bureaucrats, on the other hand, seem to have adopted a negative attitude to the favoured position of the American engineers.

[40] For instance, his fight with Intourist, in Witkin 1991, 72-74, and with Zavodostroi, ibidem, 75-79, 91-98.

The matter of professionalism is crucial. Loren R. Graham, whose book on science in Russia and the Soviet Union was mentioned in the beginning of this article, has written another book, which is called *The Ghost of the Executed Engineer. Technology and the Fall of the Soviet Union*.[41] The engineer who was executed bore the name of Piotr Palchinskii (Graham's transcription is Peter Palchinsky). He was born in 1875, and he died in 1929, "executed for being the leader of an anti-Soviet conspiracy"[42] after one year of imprisonment. Graham's book devotes its first 48 pages to a biography of Palchinskii and the remaining 73 of its 121 pages to what he calls an attempt "to help explain why the Soviet Union failed to become a modern industrialized country".[43] When he starts this second part of the book, his motivation is:

"The life and death of Peter Palchinsky provide vivid clues to the failures of Soviet industrialization policies. Palchinsky serves well as an example of the type of engineer destroyed in early Soviet history who was sorely needed in later years. His fate and that of like-minded engineers of the late 1920s had a negative effect on industry in the Soviet Union for many years – just as the similar elimination of enterprising farmers, the so-called kulaks, damaged agriculture. As Gorbachev, Yeltsin, and their colleagues tried to revivify agriculture and industry in the late eighties and early nineties, they had to overcome the lingering effects of the removal of the economy's best representatives and their replacement by individuals determined, at all costs, to avoid their predecessors' fate."[44]

The Palchinskii biography is followed by two chapters on the Soviet society in Graham's book. One brings up the big projects in the first Five-Year Plan and what Soviet experts and foreign engineers said about them. The Dnieprostroi, that is the construction of a great dam for hydroelectric purposes close to Zaporizhzhia, Graham estimates as "probably the most sensible from an engineering standpoint" of the big projects. "It was preceded by more careful analysis than most of the others, it relied less on prison labor, it utilized more labor-saving machinery, and its Soviet administrators were more willing to listen to expertise – both foreign and domestic – than was the case in most later projects. Colonel Hugh Cooper, the maverick American engineer (whom Palchinsky knew), was a major consultant to the project, as were several German engineers."[45] The second big project that Graham scrutinises with an eye on Palchinskii's reactions to it was called Magnitostroi, that is a complex construction of

[41] Graham, 1993a.
[42] Graham 1993a, 1, where Graham quotes the newspaper Izvestia
[43] Graham 1993a, xi.
[44] Graham 1993a, 49.
[45] Graham 1993a, 51-55.

enormous ironworks and a town for those who worked in mines and ironworks and infrastructure of the city of Magnitogorsk in southern Ural. Palchinskii wrote articles where he questioned the location from the viewpoints of infrastructure (coal had to be transported by railway from far away to the steel works) but he did not exclude that Magnitogorsk was the right place, even if the adequate studies of the conditions had not been made in his opinion. However, Graham adds other points of criticism, that Palchinskii could not have known of because of his decease.[46]

The third of the big projects of the first Five-Year Plan which is scrutinized by Graham is the Belomorstroi, that is the building of a canal connecting the Baltic and the White Sea. He points out that Stalin was since long a fan of canals, but also that Stalin expressed a conviction that "if kept under surveillance, even hostile technical specialists could be forced to yield their expertise for the benefit of the state" in Graham's words. Four Russian imprisoned engineers were to lead the project. From their two investigated alternatives they proposed the one that had more secure water supply by the possibility to build large dams and use machinery and concrete constructions for this purpose. They were told that the project had to be ended in twenty months and that no mechanised equipment or concrete could be used. "Against their better judgment, they assented to the eastern plan and threw themselves into the supervision of hundreds of thousands of prisoners using the most primitive means of construction," Graham says. Wood had to replace concrete, and even lock gates and cranes were of wood.[47]

What is interesting here for the problem of the present article is the connection made by Graham between the fate of Palchinskii and other "like-minded" engineers and the economic difficulties of the Soviet Union at the end of its existence. He states also that the Soviet Union had hereby lost a "type of engineer" who would have been of great use to the society of the USSR in "later years". The question to be raised here is if Soviet politics in the late twenties and thirties really changed the minds of the engineers to make them less productive and less inventive. As mentioned above, this was not what three American observers thought, who had American experience to lead them in their work together with Russian engineers and labourers. They did not like what they saw of the social development of Soviet society, but none of them has indicated that he regarded political managing especially directed against engineers and their freedom.

---

[46] Graham 1993a, 55-61. Scott was a worker who for ideological reasons wanted to participate in the building of the new Soviet society.
[47] Graham 1993a, 61-65.

6. Did Soviet Engineering Education Diverge from the European Model?

In her thin book *Engineers. The formation and development of a professional group* (1989 – in Russian) the sociologist Ol'ga Kryshtanovskaia has given valuable information on the conditions for the engineers in the 1920s and 1930s, which are usually omitted in Russian publications. On the basis of published collections of decisions by the communist party and the government and other original material she has shown that engineers were regarded both as potential enemies of the revolution and as valuable assets for the building of the communist society. This ambivalent attitude was given at least three different expressions. First, Russian engineers with a pre-revolutionary education should be distrusted both because of the bourgeois content of the education they had got and because of their background that had to be bourgeois, as no workers at that time could afford the education. Second, working-class persons might be promoted to managers of industrial companies or other technical businesses to check the activities of engineers and other educated specialists. This procedure was given a special word in Russian, *vydvizhenets*, a worker who had been promoted to manager. Third, the need for engineers and other specialists might be filled by foreigners, preferably non-communists, who had to accept not to intervene in political matters and stayed in the Soviet Union only on time-limited permits.[48]

Both Lenin and Stalin took part in and animated the distrust of engineers, but it was only after Lenin's death that it was elevated to state policy, Kryshtanovskaia says.[49] Then, Stalin repeatedly characterised engineers as a kind of *burspitsy*, that is, as specialists with bourgeois-capitalist evaluations and, therefore, as enemies of the Soviet state.[50]

In spite of his avoidance of any examination of the Soviet engineering education after 1917, Saprykin has managed to present good indications for the conclusion that Russia (before the Revolution) had managed to establish an engineering education on a level with the best European. This is very important and it matches with what American engineers, such as Littlepage and Witkin, say about their Russian colleagues in the late1920s and early 1930s. The question remains, if this education became destroyed in one or the other way in the Soviet period or, eventually, in the period from around 1935 to 1991.

Again, Kryshtanovskaia provides information that other consulted Russian sources are silent about. They often mention that engineering education was reformed in the early 1930s, but

[48] Kryshtanovskaia, 1989, esp. 87-96.
[49] Kryshtanovskaia 1989, 84-86.
[50] Kryshtanovskaia 1989, 86-88.

only Kryshtanovskaia (among consulted sources) makes it clear that Stalin from 1928 to 1931 in several different party fora propagated that bourgeois specialists (*burspitsy*) were liable to be enemies to the class struggle which was a foundation of the Soviet state. They were such enemies, he said, either openly, or secretly, or with arms in the air proclaiming neutrality, vacillating between the Soviet power or animosity against it. Following a lecture by Stalin, party authorities made selected workers to managers (so-called *vydvizhentsy*) with superior position to educated engineers.[51] A special path was also opened to workers in some technological institutes. This path was intended to make workers into engineers though not with the pre-revolutionary demands on their schooling. This secondary sort of engineers may be said to correspond to the lower degree of engineers that had become usual in Western Europe in the late part of the 19th century.

In Russia, however, only the Moscow and St Petersburg institutes upheld the pre-revolutionary demands on graduates through the thirties and the Second World War. The many new technological institutes that then grew up normally gave strictly specialised education, which made Soviet-Russian engineers known abroad to be extremely narrow in their outlook.[52]

Saprykin and other Russian sources consulted for this article do not mention another part of Soviet higher education, which then was also a part of engineering education. This part was entitled "nauchnii kommunism", that is "scientific communism", which meant Marxist theory in Soviet interpretation. This interpretation changed under influence of political situations and wars during the whole period of Soviet Union, that is, from 1923 to 1991. The history of the communist party, which was another obligatory part of all tertiary education, was closely connected with scientific communism, and together these two parts filled the educational space of theory of society and social science.

The intention of these two parts was to make all citizens with a higher education conscious of their obligations to state and party and make them into loyal citizens. As my informants tell, this was a successful form of brain washing. Therefore, persons who were allowed to travel abroad (mostly with higher education) had to accept to be accompanied by a guide or, if they

[51] Kryshtanovskaia 1989, 87.
[52] Graham 1993a, 70 (on the general phenomenon), 69 (on an individual case).

travelled alone, to make regular visits to the Soviet embassy and give some sort of account for how they spent their time.[53]

Loyalty to the party and the state, was thus expected from all Soviet professionals, not least from engineers, which became evident already in the period of the realisation of the first and second five-year plans. As related above this has been discussed in detail by Loren Graham in his book on Palchinskii and related matters.[54] None of the projects had more than started at the time when Palchinskii was executed in 1929 after one year's imprisonment,[55] when he probably had little chance to follow engineering projects in the first Five-Year Plan.

Another witness, Stephen (Stepan) P. Timoshenko, has also treated Russian, West European and American engineering education and engineers. His experiences from both Russia and the USA plus his renown as a physicist and an engineering teacher in both countries makes it impossible to pass over his experiences as they are related in his memoires.[56]

Timoshenko had started his work in the U.S. as an engineer at the research department of The Westinghouse Company in 1923. He and two other Russians had expected to be fired soon from Westinghouse. Reflecting on this in his memoirs 40 years later, Timoshenko says: "I come to the conclusion that not a small role was played by the education that we had received at Russian engineering colleges. The thoroughness of our training in mathematics and the basic engineering subjects gave us an enormous advantage over Americans, especially in the solving of nonstereotyped problems."[57]

Timoshenko thus continued to think highly of Russian traditions in engineering education when he had become well established in America. At the same time, he did not appreciate the normal American foundation of engineering studies. Still at Westinghouse in 1924, Timoshenko had been asked to take part in the trimming of the new recruits to Westinghouse, about 300 young engineers each year. His experience of American engineering graduates was that even a hand-picked selection had only learnt "a much skimpier curriculum than that in Russia". Their knowledge was only based on theory, which was not checked by experiments,

---

[53] It would be an abuse of their confidence to spell out the names of my informants, some of whom are active in the present Russian society with its return to many Soviet practices, and others with close connections there. The information reproduced here is, however, hardly sensational but rather common knowledge with those who lived in the Soviet society.
[54] Graham 1993a, 49-65.
[55] Graham 1993a, 1.
[56] Timoshenko 1968. This is a translation from the Russian original edition, Paris 1963. In the following the American edition is used. The memoirs were written in the early 1960s, according to Vetchorine, the editor of the Paris edition (Vetchorine 1968, viii-ix). Timoshenko also wrote *Engineering Education in Russia* (1959), a booklet that has not been available for the author of this article.
[57] Timoshenko, 1968, 244.

and they had no experience of testing materials with measurement of their elastic properties. Timoshenko also points out that they had not been taught "newer methods of calculating beam deflection and investigating flexure in statistically indeterminate cases… In the face of so feeble a background I could not dream of giving them any kind of advanced course. I gave them a course usually given to Russian sophomores."[58] With his long experience of both Russian and American engineering education, Timoshenko's judgment must be taken seriously, especially as he, when he wrote the lines quoted, was an established authority in the U.S. on engineering education.

There are good reasons to agree with Graham that Palchinskii's view of good engineering had much in its favour and that it was a shame that he was executed. But it is less certain that his execution was signalling that the Soviet authorities wanted to diminish the quality of engineering education. It is true that a reform of specialist higher education came in 1930, and through this new law institutes that provided specialist professions were from then on to be under the jurisdiction of the ministry of the same specialised competence. Thus, they no longer were related to the Ministry of Education. Specialisation was the byword from then on, and the reforms of 1930 also meant that the TIs (*vuzy*) were reorganised in disciplines and schools for different professional specialities. The intention was to make them correspond with the needs within the businesses and administrations that the different Soviet ministries had to look after.[59] It may also be true that this explains the narrow specialisation of Soviet engineers, which astonished some foreigners after the Second World War and made them think that Russian engineers generally had a less useful education than those in the West.[60]

Strong evidences indicate that Russian engineering education never let go of the European legacy, on which a flourishing technological education was created in the years around the turn of the century. However, two elements were added in the 1930s to this legacy. A specialisation followed the 1930 reforms of technological education, and a distinct political ideology influenced both the curriculum in and the recruitment to engineering studies.[61] Thus, Russian engineering education became a forerunner to the Chinese revolution of the formation of engineers, starting in the Cultural Revolution, something which deserves a separate treatment.

---

[58] Timoshenko 1968, 253-254.
[59] Saprykin 2012, 129.
[60] Graham 1993a. 70 (on the general specialisation), 69 (an individual example).
[61] Occasional present-day statements by engineers from the old TIs in St Peterburg and Moscow rather indicate that these schools continued with the curriculum tradition from the imperial era, which might be an object of study.

References

[1] Ågren M (ed.)(1998), *Iron-Making Societies. Early Industrial Development in Sweden and Russia, 16001900* : Providence & Oxford: Berghahn

[2] Ahlström G (1982) *Engineers and Industrial Growth. Technical Education and the Engineering Profession During the Nineteenth and Early Twentieth Centuries: France, Germany, Sweden and England*, London: Croom Helm

[3] Alekseiev V & Gavrilov D (2001) *Metallurgicheskie zavoda Urala. Entsiklopedia*, Ekaterinburg: Institut istorii i arkheologii, 2001

[4] Alekseiev V & Gavrilov D (2008) *Metallurgia Urala c drevneishikh vremen do nashikh dnei*, Moskva: Nauka, 2008

[5] Byrkjeflot H (2002) *Management Models and Technical Education Systems: Germany and the United States 1870-1930*, Palo Alto: Stanford U.P.

[6] Dorn, H (1979) "Hugh Lincoln Cooper and the First Détente". *Technology and Culture*, 20:2, 322-347

[7] Gavrilov D (2005) *Gornozavodskii Ural XVII-XX vv.* Ekaterinburg: Inst. for History and Archaeology,

[8] Gelb M (1991) "Introduction", in *An American Engineers in Stalin's Russia. The Memoirs of Zara Witkin*, Berkeley, Los Angeles, Oxford: U of CalP, 1-17

[9] Graham L R (1993) *The Ghost of the Executed Engineer. Technology and the Fall of the Soviet Union.* Cambridge, MA: Harvard U.P.

[10] Graham L R (1993) *Science in Russia and the Soviet Union*. Cambridge: CUP.

[11] Graziosi A (1988) Foreign workers in Soviet Russia, 1920-1940: Their experience and their legacy. *International Labor and Working-Class History*, 33 (Spring, 1988), 38-59.

[12] "Hugh Lincoln Cooper", in *Wikipedia (Eng)*, (accessed 15 September 2023).

[13] Hughes, T P (1989) *American Genesis. A Century of Invention and Technological Enthusiasm*, New York: Viking Penguin.

[14] Hughes T P (1988), "How America Helped Build the Soviet Machine", *The Home Magazine*, vol. 39:8

[15] Ivanov A E (1991) *Vysshaia shkola Rossii v kontse XIX – nachale XX v.*, Moskva: ANSSSR: Institut istorii SSSR.

[16] *Journal of Commerce and Commercial*, New York 26 April 1937.

[17] Korzhikhina, T P (1995) *Sovietskoe gosudarstvo i ego uchrezhdeniia*, Moskva: Rossiskii gosudarstvennyi gumanitarnyi universitet.

[18] Kryshtanovskaia, O (1989) *Inzheniery:.Stanovlenie i razvitie professionalnoi gruppy*, Moskva: Nauka, 1989

[19] Littlepage, J D & Bess(1939) D, *In Search of Soviet Gold*, London: Harrap.

[20] Lynd, R S (1944) Foreword, in Steiger 1944

[21] Orlov, A S & Georgiev, V A & Georgieva, N G & Sivokhina, T A, *Istoria Rossii*, Moskva: Prospekt, 2008

[22] "Robert Staughton Lynd", article in *Wikipedia Eng* (accessed 5 Oct. 2023).

[23] "Saint Petersburg Technological Institute"*, Wikipedia (Eng)* (accessed 23 August 2023)

[24] Saprykin, D L (2012) "Inzheniernoe obrazovanie v Rossii: Istoriia, kontseptsiia, perspektivy" , in *Vysshee obrazovanie v Rossii*, no.1.

[25] Selunskaya, N & Torstendahl R (2005/2011) *The Birth of Democratic Culture in Late Imperial Russia. Reforms and Elections to the First Two National Legislatures, 1905-1907* (transl. from Russian, ed. by M S Conroy), Denver CO: Altus History, 2011, esp. 19-23.

[26] Staudenmaier, J M (2001) Disciplined Imagination: The Life and Work of Thomas and Agatha Hughes. In *Technologies of Power. Essays in Honor of Thomas Parke Hughes and Agatha Chipley Hughes.* Cambridge, MA: MIT Press & London.

[27] Steiger, A J (1944) *American Engineers in the Soviet Union*. New York: Russian Economic Institute, Pamphlet series, No. 3

[28] Sutton, A C (1968-1970) *Western Technology and Soviet Economic Development*. Vol. 1, 1917-1930 and 2, 1930-1945, Stanford: Stanford UP

[29] Taylor, F W (1911) *The Principles of Scientific Management*. New York: Harper & Brothers

[30] "Tennessee Valley Authority", *Wikipedia (Eng)*, article-section "History" (accessed 13 September 2023)

[31] Timoshenko, S P (1968) *As I Remember, The Autobiography of Stephen P. Timoshenko*, Princeton etc.: Van Nostrand.

[32] Vetchorine, E A (1968) Foreword to the Russian Edition, in Timoshenko 1968, viii-ix.

[33] Webb, M (1949), *Soviet Economic Development Since 1917*. Vol.2, London: Routledge and Kegan Paul.