Russia Enters the Railway Age, 1842–1855

(Richard Mowbray Haywood)

April 11, 2025

The history of nineteenth-century Russia does not get much attention in the West, and what little it does get usually focuses on people and events seen as precursors to Russia's chaotic later history. As a result, any English-language book on the period, and there are not many, tends to be written by and directed toward specialists. *Russia Enters the Railway Age, 1842–1855* is a quintessential example of such a work. The author, Richard Mowbray Haywood, was the world's leading specialist in nineteenth-century Russian railways, although the only such specialist. He was also my father, and twenty-five years after his death, I decided to read, for the first time, his final work.

Haywood wrote about railways because he was, from a young age, a train buff, and in the family tradition was an academic, so he combined the two into a professional concentration. Growing up in New England, he was fascinated by the many railroads there. In the late 1950s, he earned a master's degree, in Byzantine history, from New College, Oxford, and during that time directly observed and compared English railroads, as they transitioned from steam to diesel-electric power. His Ph.D., from Columbia University, revolved around railroads—Russian railroads, for reasons which are now opaque to me, given the family has no other connection to Russia. The rest of his career he directed to Russian railways, while teaching in the History Department at Purdue University for thirty years.

It helped that he had great talent for languages. He read, wrote, and spoke six languages, and had some facility in others (although he never learned Hungarian, my mother's native language). Such a talent was essential for his main academic task, conducted in several long visits to Russia, which was painstaking research in obscure Russian archives maintained by the Soviet government, mostly in what was then named Leningrad. Many of those documents were in French, the main language used by the Tsarist government until late in the nineteenth century. German was also extensively used in Russia, along with, of course, Russian itself. Upper-class Russians, for example, spoke French to each other, and usually corresponded in French, but they wrote their

memoirs, published or not, typically in Russian. Haywood also had a near-photographic memory, both a blessing and a curse, for he retained all information, but as a result struggled to organize and prioritize the great mass of knowledge thereby obtained. My mother, Piroska Molnár Haywood, therefore assisted him in his writing, helping him focus on the essentials, and it was to her he dedicated this book.

Even so, Haywood's writing is microscopically detailed. This is a six-hundred-page work, published in 1998, which itemizes every matter of consequence related to the construction of the St. Petersburg-Moscow Railway, built from nothing in the years between 1842 and 1851. When completed, this railway was not only the first major railway completed in Russia, but one of the most advanced and impressive railways in the world, even though other countries, especially America and Britain, had more extensive rail networks. (Haywood notes that "today electric-powered express trains [still] travel over the original roadbed at speeds in excess of 100 m.p.h.") Before the Railway, four hundred miles long, was completed, Russia had only one other railroad—the seventeen-mile Tsarskoe Selo Railway, really an excursion railway, between Moscow and one of its suburbs, completed in 1837. That railway was the subject of Haywood's Ph.D. and of his first book.

While *Russia Enters the Railway Age* is primarily a monograph, a book narrowly tied to the facts of a single topic, its thesis is that Russia in the reign of Nicholas I was more absorbed by, and more open to, modernization and industrialization than is currently understood or assumed. "[S]cholars working in all aspects of nineteenth-century Russia have generally found the relatively 'progressive' reign of Alexander II more interesting than the 'frozen Russia' of Nicholas I. What this volume will demonstrate is that there was significant activity directed toward modernization under this 'frozen' surface, and it was specifically the bureaucratic government of Nicholas I, with the Tsar himself in the forefront, that provided the initiative and continued impetus for such activity, rather than other segments of Russian society. . . . The events of the construction of the St. Petersburg-Moscow Railway do not show an obstinate conservatism, a mentality mistrustful of modern innovations. A parallel might, in fact, be drawn between the eagerness of Nicholas I's government to build a technologically advanced infrastructure and the same eagerness of the Soviet government in the twentieth century."

Nicholas desired, rather than feared, most of the changes in Russian society that would be brought by a railroad network—not just the St. Petersburg-Moscow Railway, but an entire web of rail across the vast expanses of Russia, connecting the heartland of Russia with the Black Sea, the Baltic Sea, the Urals, Poland, and Prussia. Nicholas, to be sure, did not want massive social changes. In that sense, he was very conservative, unlike his son Alexander, who was assassinated in 1881 by leftists, despite his strenuous attempts to bring social and political liberalism to Russia. Nicholas, however, assuredly wanted to make Russia "richer and stronger," and he saw rail as one crucial method to accomplish that goal.

As this book discusses, Nicholas faced many obstacles to his desire. Some were natural, most of all the vast distances of Russia, but the hardest obstacle to overcome was the sclerosis of Russian society. Neither the nobility nor Russian businessmen were enthusiastic about risk or entrepreneurship. Both were, especially compared to their counterparts abroad, lazy and corrupt. Profit was not worshipped, though bribes were eagerly accepted. Thus, unlike in America and England, unleashing private enterprise was not a viable option for building railroads. Although later in the century some private railroads were built under Russian state supervision, none of the fierce competition in transportation ubiquitous in America ever developed. Therefore, railways in Russia grew in a very different fashion. What this book documents and demonstrates is the difference between decision-making and action under a benevolent autocracy and that under a system of whole or partial laissez-faire, and not necessarily to the disadvantage of the former, although for every society a different system is appropriate.

Haywood was very aware that his work broke new ground. "More than once this author has had the feeling which the officers of the Russian Corps of Transport Engineers must have had when in 1842–1843 they surveyed the route of the St. Petersburg-Moscow Railway through the inadequately charted swamps and forests of Novgorod and Tver Provinces. Since there has never been a full-scale, definitive treatment of any aspect of the topics discussed in this volume, I have had to locate my source materials, both primary and secondary, almost 'from scratch.' This has entailed searching through contemporary pamphlets, journals, and newspapers issue-by-issue to find previously overlooked and

neglected information. The same approach has been used in dealing with numerous archival and manuscript collections which I have consulted, not only in the former Soviet Union but also in Western Europe and the United States." The difficulty of this was exacerbated by the Tsarist government's tightly controlling the release of any information about this and other public works and industrial projects, both from a habit of secrecy and from a desire to only present positive information. By contrast, the Soviet government, or rather the archivists who were its functionaries, were happy to help Haywood in his work.

As we will see, Americans were intimately involved in helping to build the Railway, and Haywood was also able to use their private memoirs and correspondence. The most important American involved was George Washington Whistler, hired by the Tsar as Consulting Engineer of the Railway (though he died in Russia in 1848, so he never saw his project completed). You have heard, at least indirectly, of Whistler, because his son, James McNeill Whistler, was a well-known painter, whose painting known as "Whistler's Mother," that is, George Whistler's wife, is one of the most famous paintings in American history. Whistler's wife kept a journal of her time in Russia, and that, along with letters among the Americans involved in building the Railway, also proved a rich source of information. Notably, however, Whistler was the only American engineer materially involved in the Railway; Russian engineers were extremely competent, but simply did not have the latest knowledge about rail construction, which is what Whistler, experienced at building American railways, provided.

Other than Nicholas I and Whistler, three men dominated the construction of the railway. The first, Pyotr Andreevich Kleinmichel, was a powerful Russian diplomat and bureaucrat, who during the events of this book was Head of the Main Administration of Transport and Public Buildings, effectively in charge of all aspects in Russia of those two matters. He was a favorite of the Tsar, because of his extreme competence in executing projects ordered by the Tsar, including the rapid rebuilding of the Winter Palace after it was destroyed by fire in 1837 (the subject of an academic article by Haywood). The second, Pavel Petrovich Mel'nikov, under Kleinmichel directed the Northern Administration of the Railway, while the third, Nikolai Osipovich Kraft, directed the Southern Administration. Kraft is almost forgotten today; unlike

Mel'nikov, he has no entry in Wikipedia, and X's "AI," Grok, will deny his existence entirely unless pressed. In part this is because he wrote no memoir, unlike Mel'nikov, with whom he was not on good terms, and who criticized Kraft to posterity. But Haywood makes clear that the two were equals and each competently executed his portion of building the Railway. Whistler, fortunately, got along very well with both men, making what might have been an inefficient and conflict-filled arrangement work reasonably smoothly.

In 1840, Russia had a fairly complex transport network already. (One of the strengths of this book is that is can be read by a layman without difficulty, because Haywood's writing adequately explains technical matters in a non-technical manner.) Primarily this was based on waterways, both natural and canals. It also consisted of chaussées, engineered rock (rather than dirt) roads on important routes, including between Saint Petersburg and Moscow. These could be traversed at all times of the year, even in the harsh Russian winter, using sleighs. When serious discussions first began in 1835 about building a rail network, a major point of contention was whether Russia needed rail at all. The challenges to rail were distance, locomotive and rolling stock technology, and cost. As to technology, Russia had a metal manufacturing industry for basic metals, but Russian metallurgy was nowhere near that of Britain, the world leader, and railroad rails and wheels required very specific technical characteristics. As to rolling stock, Russia could build the frames of carriages, but had essentially zero domestic ability to build locomotives.

Thus, the choice the state faced was whether to import specialty metal items and locomotives from abroad, or to try to manufacture them in Russia. Buying them abroad would both make Russia dependent on foreigners and would not encourage growth of domestic industry. Nicholas and Kleinmichel, therefore, split the baby—they attracted foreigners to come to Russia and set up factories to manufacture necessary elements of the rail system in Russia, with the idea that over time Russians would learn the processes and be able to take over and expand the factories. This strategy was very successful for locomotives, where Kleinmichel convinced a hungry partnership of stellar young Philadelphia and Baltimore locomotive makers to move to Russia and build a factory, offering them an attractive long-term contract. It was

less successful for key metal items, such as rails and wheels, most of which ended up being bought from British manufacturers, who led the world at the time in such technology (although simpler metal items, such as spikes and bridge spans, were built in Russia).

As to cost, the sums involved were very significant. Much of the effort of the Tsar and Kleinmichel was directed to raising the necessary money, floating successive loans both abroad and, to a lesser extent, domestically. Ultimately, the railway cost, exclusive of debt service (interest rates averaged around four or five percent), about ninety million rubles. At the time, the ruble was worth slightly less than the dollar, and the total amount spent was somewhere in the realm, in today's United States money, of three billion dollars (although such comparisons are very imprecise), "the largest and most expensive single construction project undertaken in Russia since the creation of the city of St. Petersburg by Peter the Great [in 1703]." Any way you slice it, this was a huge expense for the nation, at a time when Russia was still almost wholly an agrarian economy.

The Tsar, whose title was "Emperor and Autocrat of all the Russias," ordered the construction of the Railway in 1842. His was not fake autocracy, but the genuine article, although as with all autocracies it was constrained by custom and the web of relationships at the center of which the autocrat sat on his throne. In the usual manner of successful autocracies, however, the Tsar always took detailed counsel on his decision, beginning actively in 1837, even though all ultimate decisions rested with him alone. Most of his advisors, in fact, initially opposed his decision to build the Railway, including the Minister of Finance as well as Kleinmichel's predecessor, who conveniently died in 1842. In the years prior, Mel'nikov and Kraft had been together sent to America to research the latest techniques in building railroads (they clashed, and it was from this trip that their enmity stemmed). They produced a massive report, which formed the basis of planning for the Railway. In general, top-level planning was done with efficiency, competency, and dispatch, even though there was typical bureaucratic infighting at the same time.

Two years were spent on exhaustive surveys, combined with cost estimates and the raising of funds. Whistler arrived in 1842; he was paid no more than he had been paid in America, but he thought that being part of commencing railway building in Russia was exciting and

a great honor (and he is even today remembered very favorably by the Russians). Although technically only a consultant, he exercised great influence both over the railroad construction and over the building of locomotives and rolling stock, among other achievements recruiting the American locomotive manufacturers to come to Russia. The Tsar showered him with honors, ensuring his acceptance by Russian society, as well as deference by the bureaucracy to him. After discussing these preliminaries, Haywood divides the main part of his narrative into three periods: preparation (1842–1843); construction (1843–1849); and completion/operation (1850–1855). For the layman, the maps provided are invaluable, allowing the reader to understand both the discussions of small sections of the Railway, as well as discussions relating to the entire scope of the Railway.

The Railway traversed both relatively even ground and ground with major swamps, rivers, and hills. Much planning revolved around weather; it would obviously be no use to have a railroad that would be shut by snow in winter or by flooding in spring. Therefore, the most expensive part of the railroad was earthworks—all along the route massive embankments (some nearing a hundred feet in height) and cuttings were constructed, both to ensure the way would remain clear in all seasons, and to ensure that at no point would excessive grades be necessary, which would have limited both the types of locomotives usable and the weight of freight that could be carried. Hundreds of Russian engineers, mostly military men, minutely carried out the surveying and construction supervision. The manual labor, the moving of around a hundred million cubic yards of earth, was done by tens of thousands of laborers each summer, either serfs with varying degrees of volition in choosing to work on the Railway or hired contract laborers, all working under the direction of private contractors with widely differing degrees of competence.

Such work was extremely difficult; almost all of it was done with only hand shovels and wheelbarrows, with very occasional use of horse carts and only a few, unsuccessful attempts to use early steam shovels. The conditions of this manual labor are the only aspect of the Railway that received historical treatment before Haywood's work, almost all through the prism of Communist and proto-Communist propagandists eager to smear the Tsar's and Kleinmichel's names and to exalt supposedly

superior Soviet labor conditions. Haywood makes clear that the lot of the laborers, while hard and not always just or comfortable, was very similar to that of American or British railway laborers of the era (and in any case most of the laborers were otherwise unemployed and desired the work, though often only because they owed taxes, which hardly seems fair).

The other major structural engineering challenge was bridging rivers. Numerous span bridges were built, along with the alternative, rails placed on top of waterway-blocking earth embankments pierced by massive culverts. All of these bridges had to withstand not only the weight and wear-and-tear of rail traffic, but floods and ice jams (most bridge piers were built with icebreakers, pointed extensions to prevent excessive pressure of spring ice on the piers). In the bridges, American designs, the most advanced in the world, were extensively used, notably a modified "Howe truss," a design that had been used in many areas of New England.

Innumerable other decisions had to be made during construction. For example, Whistler chose as the gauge, the space between rails, a five-foot distance, which determined many other elements of both roadway construction and of rolling stock design. Contrary to a common modern idea, this was not chosen for military reasons, to make invasions of Russia harder. Rather, it was simply what Whistler deemed best for engineering reasons. Ultimately, a slightly smaller (four-foot, eight-inch) gauge became the European standard, which means that to this day trains going between Russia and Europe must deal with the "break of gauge," which requires either unloading and reloading cargo or complicated changes to the wheel assemblies to allow a train to continue its journey.

Construction took longer than expected, despite demands from and insistence of the Tsar, who maintained an extremely active role in overseeing the building of the Railway. In part this was because of engineering challenges, but the single largest factor in delays was financing, because starting in 1846, money became very tight and budgetary stringency had to be enforced in all aspects of state spending. This was due largely to poor harvests and epidemics, but also to increased military expenses resulting from the European events of 1848. For the Railway, the Tsar prioritized paying foreigners, in order to maintain Russian

status and credit, which led to labor unrest in several instances, as contractors short-paid their men, sometimes because they could not help it, and sometimes because they were greedy. (In addition, Kleinmichel, trying to curry favor with the Tsar, short-paid and slow-paid everyone he could, requiring the Tsar himself to step in, which led to a period of royal "displeasure" with Kleinmichel.) The other method of financial economy was delaying the construction of related buildings, such as locomotive sheds and stations along the line. All this meant that the Railway could not be opened for full operation until three years after its original target completion date, although portions of it were operational before its formal completion.

One area in which total success was achieved was the production of locomotives and rolling stock by the American firm of Harrison & Winans, operating the factory they had built in Alexandrovsk, which still manufactures locomotives in 2025 (and the Americans branched out into making stationary steam engines for industry, along with, of all things, Congreve rockets). They were so successful that minor disputes arose because they wanted to ship production early, while Kleinmichel wanted to delay delivery to stretch cash flow. Regardless, all production was of the highest quality and greatly admired, and contributed to the success of the Railway when it achieved full operation, in late 1851, although with some buildings and the second set of rails running parallel yet to be fully completed. In following years, Harrison & Winans also maintained all the moving elements of the Railway, under another long-term contract which made them enormously rich, to the degree the contract was criticized as excessive by many in Russia, but which was punctiliously honored by the Russian state.

The Railway, in fact, only opened in 1851 because the Tsar, in no uncertain terms, demanded it be open by November 1 of that year. In a country not an autocracy, it would have doubtless been delayed some further years. Despite public trepidation, the Railway performed flawlessly. Haywood relates that "An apocryphal anecdote circulated in St. Petersburg at the time about two government ministers who hated each other and decided to settle their differences not by a duel but by drawing lots to see which of them would ride three times on the railway." The public soon came around. "The St. Petersburg-Moscow railway was one of the premier railways in Continental Europe, having been built

to standards considerably exceeding those of railways in other countries, except perhaps some in France, and being nearly comparable to those of some of the major railways, like the Great Western Railway and the London and North Western Railway, in England, a country in which capital was much more abundant and the distances to be covered much less."

The Railway was not an immediate economic success or game changer. For many years, its revenue barely exceeded its expenses including debt service, although to be sure profit was not a concern in the same way it would have been in a private enterprise. It did not significantly contribute in the short term to the development of heavy industry, although it made travel and freight between the two capitals faster and allowed cheaper transport of bulk goods. Nor was it as useful for military matters as the Tsar hoped; Russia ended up fighting in the Crimea, not in Poland, and no rail line went south during that war. As the core of and base for Russia's rail network completed over the next few decades, however, it was essential, even though for a century or more Russia lagged far behind its Western competitors in its rail capabilities. Its completion showed that Russia could accomplish modern technological wonders, and initiated the modernization of Russia in a psychological sense impossible to quantify.

In a footnote, Haywood, discussing the Tsar's plans for a railroad between St. Petersburg and Warsaw, notes that "The author at some time in the future, after having consulted the materials in the Archivum Główne in Poland, hopes to write a separate study on railway development in the Kingdom of Poland, 1839–1863." This was always a pipe dream, because in 1998 Haywood was already dying of Parkinson's, complications of which would end his life on June 17, 2000. As the titular character says of her father in Theodore Judson's *The Martian General's Daughter*, Richard Mowbray Haywood was a mixture of good and bad, as all men are. Now he has joined the ranks of the men he so minutely studied, and we can hope that, in the land behind the sun, he talks with them of their accomplishments, and of his own.