

The Soviet Problem with Two “Unknowns”: How an American Architect and a Soviet Negotiator Jump-Started the Industrialization of Russia, Part I: Albert Kahn

Sonia Melnikova-Raich

Editor’s Note: This is the first half of a two-part article by on the relationship forged in the late 1920s between American industrialists, especially Albert Kahn, the renowned factory architect, and the Soviet government, which in the late 1920s and early 1930s sought the help of Americans to move the Soviet Union from a peasant society to an industrial one. This first part focuses on that phase of Soviet-American interaction from the perspective of Kahn’s architectural firm. The second part, which will be published in the next issue of *IA* (volume 37, nos. 1–2), will focus on the Soviet-American commercial relationship from the perspective of Saul G. Bron, who headed the American Trading Corporation (Amtorg), the Soviet-controlled agency responsible for contracting with the Americans.

Soviet industrialization was a complex economic and political undertaking about which much remains unclear. Rather than examine the process as a whole, this essay focuses on two fairly unknown players in the history of Soviet-American relations—one American firm and one Soviet negotiator—and their contribution to the amazingly rapid Soviet industrialization of the early 1930s, emphasizing some human and business factors behind Stalin’s Five-Year Plan. Saul G. Bron, during his tenure as chairman of Amtorg Trading Corporation in 1927–1930, contracted with leading American companies to help build Soviet industrial infrastructure and commissioned the firm of the foremost American industrial architect from Detroit, Albert Kahn, as consulting architects to the Soviet Government. The work of both played a major role in laying the foundation of the Soviet automotive, tractor, and tank industry and led to the development of Soviet defense capabilities, which in turn played an important role in the Allies’ defeat of Nazi Germany in World War II. Drawing on Russian and English-language sources, this essay is based on comprehensive research including previously-unknown archival documents, contemporaneous and current materials, and private archives.

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“I listened to what people said they wanted and gave it to them.”

—Albert Kahn¹

Soviet industrialization was a complex economic and political undertaking about which much remains unclear. Few issues are more controversial and ideologically-laden than the intertwined questions about the origin of Soviet “superindustrialization” of the early 1930s, the dual use of imported technology for civilian and military purposes, and Stalin’s policies toward Nazi Germany prior to its invasion of the Soviet Union. Even though Stalin’s crimes against his people were exposed in the 1950s by Khrushchev, it was—and for many in Russia still is—sacrilegious to question his role in industrialization and the Second World War, the Great Patriotic War for people of the former U.S.S.R. who perceived Stalin as their savior.²

But regardless of whether, in the 1930s, Stalin’s Russia had been preparing for aggression, preventive war, or defense, by the time of the signing of the Molotov-Ribbentrop Pact in 1939 Russia was not the weak, poorly-armed ally described in 1924 by Hitler contemplating a German-Russian war against Europe:

Russia would completely drop out of this war as a technical factor. . . . The universal motorization of the world, which will be overwhelmingly decisive in the next war, could hardly be met by us. For not only has Germany itself remained shamefully far behind in this most important field, but with the little it has, it would have to support Russia, which even today cannot call its own a single factory in which can be manufactured a motor vehicle that really runs.³

However, by the time of the Nazi invasion in 1941, the U.S.S.R. had turned itself from a weak country without a single homemade truck into a powerful military force. After the initial *blitzkrieg* advance, Hitler was stunned to discover that the Red Army was much better armed than he expected. In his broadcast to the German people on October 3, 1941, he declared that the occupied Soviet territories appeared to be “a single armaments factory,” and that before the occupation he could not have imagined how far the U.S.S.R. had progressed in its preparation for war. The Soviet arsenal became a major factor in the outcome of the War; but, one may ask, from where had it all come?²

The Problem: “A weak country, unprepared for defense”

Until the 1930s the U.S.S.R. did not have its own tank industry. It did not have automotive and tractor industries either. Before the revolution, there were less than 500 tractors in all Russia.⁴ The absence of tractors in particular was a catastrophic problem, and in 1921 American tractor brigades, organized by the Friends of Soviet Russia Society and the Jewish Joint Distribution Service, arrived in the U.S.S.R. equipped with Fordson and Case tractors and other machinery to help revitalize Russia’s agriculture devastated by the revolution and the three-year Civil War which followed.

The domestic tractor industry in the Soviet Union was formally established by a decree of the Council of Labor and Defense (STO) on March 4, 1923. Later in 1923 the Supreme Council on the National Economy of the U.S.S.R. (VSNKh) created a special commission to develop the production plan.⁵ Its first task was to choose the most appropriate type of foreign tractor for production in the U.S.S.R. and identify domestic factories capable of this production. After considering International Harvester, Holt, and several German models, in May 1923 the commission selected Fordson.

Six years later, when Ford’s production director, Charles Sorensen, came to the U.S.S.R., he visited the Krasny Pu-

tilovets plant in Leningrad and was shown the assembly room. “I stopped in astonishment,” wrote Sorensen in his memoirs. “There on the floor lines they were building the Fordson tractor!”⁶ What Sorensen saw was the Fordson-Putilovets, a wheeled tractor which the Soviets were still trying unsuccessfully to mass-produce. Later Sorensen found out that while the Putilovets managers claimed they were making two tractors a day, the true rate was about twenty a month.⁷ “While the Russians had stolen the Fordson tractor design, they did not have any of our specifications for the materials that entered into the various parts. And you can’t find that out merely by pulling the machine apart,” wrote Sorensen. When asked what could be done to improve the antiquated plant, Sorensen responded that they should bring in a barrel of dynamite and clear it out.

The 1923 plan, which anticipated domestic production of 60,000 tractors over a ten-year period, was never fully implemented due to the division of effort among several small non-specialized plants, a shortage of materials, lack of equipment, and the high cost and poor quality of production.⁸ Instead, in 1925, the Soviet leadership made the decision to build a large, modern plant, with construction to begin within two years, to produce 20,000 tractors annually. The site for the future plant was chosen just north of Stalingrad,⁹ 650 miles southeast of Moscow, but little else was done. The failure of the domestic tractor program prompted the Soviet government in 1926 to approach Ford with an offer to build a tractor plant in Stalingrad as a concession. After spending five months in the U.S.S.R. in April–August 1926, Ford experts expressed a number of concerns, including safety and efficiency, but chiefly the fate of foreign companies whose plants in Russia had been nationalized, making them less than confident that the same would not happen again, especially in the absence of diplomatic relations between the U.S. and the U.S.S.R. Furthermore, VSNKh’s Main Concessions Committee, Glavkonsesskom, asked Ford to advance credit to the Soviet government for the purchase of manufactured tractors at the government-set fixed prices, in addition to investing millions of dollars in a plant.¹⁰ Ford flatly declined this proposal. In September 1928 the site of the future Stalingrad tractor plant, in the words of its first director Vassily I. Ivanov, was still a “vast melon field” in the middle of open steppe.¹¹

In October 1928 Stalin announced the First Five-Year Plan (*piatiletka*). The declared goal was to convert the

U.S.S.R. from an agrarian and backward country into an “industrial and mighty country independent of the caprices of world capitalism,” and to develop heavy industry “with machine building at its core” and with “all the necessary technical and economic prerequisites for increasing to the maximum its defensive capability to enable it to organize decisive resistance to all and any attempt at military intervention from outside.”¹² The supplementary notes to the Plan stated:

Machine-building in Russia prior to the revolution had hardly begun to develop and the major part of the demand for machinery was covered by imports. This condition has not changed greatly up to the present time. . . . Automobiles and tractors, this brunch of industry is practically non-existent.¹³

At the onset of the *piatiletka*, ninety percent of all tractors in the Soviet Union were imported, mostly from the U.S., which in 1930 was still its principal source of tractors.¹⁴ But by 1931 construction of the first giant Soviet tractor plant had been completed and two more were under way. American journalist, H.R. Knickerbocker, the first foreign correspondent to visit those sites, was especially impressed by the plant under construction at Chelyabinsk. Not only was its projected capacity going to be 50,000 ten-ton 60-horsepower crawler tractors annually, but it also appeared to be “most immediately convertible into military purposes,” and its products were “so similar to tanks that they were in fact called ‘tank-type.’”¹⁵

In January 1933 Stalin declared:

We didn’t have a steel industry, the foundation for industrialization; now we have it. We didn’t have a tractor industry; now we have it. We didn’t have an automobile industry; now we have it. . . . Consequently, the Soviet Union has been converted from a weak country, unprepared for defense, into a country mighty in defense, prepared for every contingency, capable of producing on a mass scale all modern weapons of defense and of equipping its army in the event of an attack from outside.¹⁶

By the time of Hitler’s invasion in June 1941, the Red Army indeed was equipped with 24,000 tanks domestically manufactured at three giant tractor-tank plants, in Stalingrad, Kharkov, and Chelyabinsk. Soviet historians hailed Stalin for this remarkable industrial transformation. However, a crucial and largely unknown role in making this possible was played by an American architect from Detroit, Albert Kahn, and by a Soviet negotiator, Saul G. Bron, who during his tenure as chairman of Amtorg Trading Corporation in 1927–1930, contracted with leading foreign compa-

nies to help build Soviet industrial infrastructure and commissioned Kahn’s firm to become consulting architects to the Soviet Government.

“Unknown” No. One: Albert Kahn

Albert Kahn, described by *Time* magazine in 1940 as a “small, merry architectural genius,” was born in 1869 in Germany, the eldest of eight children of an impoverished rabbi. He was eleven when the family emigrated to Detroit. Early on, Kahn showed talent in drawing, but his formal education ended when the family emigrated. To help support his family, he had to take odd jobs, including a job as office boy for the architectural firm of John Scott & Company. At the age of fifteen he started architectural training as an unpaid apprentice draftsman with Mason and Rice, where within seven years—including a year-long study trip to Europe sponsored by *American Architect and Building News*—he rose to the chief designer position. In 1895, with two other Mason & Rice designers, Kahn started his first company, and in 1902, together with his younger brother, Julius, joined later by Louis and Moritz Kahn, he started what would become the most prolific architectural practice of its time in the U.S.A. Besides his talent, Kahn’s personality was to a great degree responsible for the firm’s success. He was described as a self-motivated workaholic, humble yet determined, and was said to possess tremendous energy and clarity of focus, combined with highly professional attitude and outstanding loyalty to his clients, regardless of the project. The latter may have a special significance for this story.¹⁷

Kahn’s firm pioneered standardization and modular systems and developed a new type of industrial construction in which reinforced concrete replaced timber-frame and masonry. Kahn’s buildings were strong, fire-proof, inexpensive to erect, with wide-open inner space unobstructed by columns, and with good lighting and ventilation (they were often referred to as “daylight factories”). Built “all on one floor, all under one roof,” they also were easily expandable. He called them “beautiful factories” and believed that designing a building where human beings work should not be treated differently from designing a house, church, or library.

Kahn was mostly known as the “architect of Ford” but he also built his “beautiful factories” for all the other great Michigan automakers, including Chevrolet, Oldsmobile, Cadillac, Packard, Hudson, Chrysler, and

De Soto, in addition to designing hospitals, banks, temples, libraries, clubs, and handsome mansions. By 1938 the firm handled about twenty percent of all architect-designed industrial buildings in the U.S. and numerous projects around the world. No other architect had a greater influence on the development of modern industrial architecture. Yet, several generations of Soviet architects never heard Albert Kahn's name, and in the West little has been written or remembered about the remarkable history of his work in Soviet Russia and the impact it had.¹⁸

Kahn was noticed by the Soviet leadership in 1926 due to his work on Ford's River Rouge Plant. It could not escape their attention either that Kahn's firm designed more than \$200 million worth of wartime structures during the First World War and that he was the first American architect who fully integrated his practice to provide clients with what today would be called a one-stop approach. He brought architects and engineers under one roof, introduced teamwork in design, and even maintained his own on-site foremen to oversee the construction. The Soviet leaders appreciated Kahn's design centered on the assembly-line method of mass production and his highly productive design process. His staff of 400 could prepare the working drawings for a major plant in less than a month and facilitate its construction within five months. And for the Soviet industrialization program, time was of the essence. In 1928, after a high-ranking commission of VSNKh had combed the U.S. studying the American industrial scene, it paid a visit to Kahn's firm. This, according to Kahn, was followed by an invitation to visit Saul G. Bron, the head of the Russian trading company, Amtorg, in New York.¹⁹ Kahn's trip resulted in his firm being offered a contract for the design of a \$4 million tractor plant, which, as it was described to Kahn, was only part of a program for \$2 billion worth of industrial buildings.²⁰

The development program presented to Kahn encompassed almost the entire industrial construction under the first and second Five-Year Plans. A significant part of the design of this construction would land on the drawing boards of Kahn architects and engineers.²¹ The Soviet government turned to Kahn's firm because in 1929, despite fascinating avant-garde experimentation by Soviet architects of the Constructivist movement,²² no architectural organization in the U.S.S.R. possessed the experience in large-scale construction required for a task of such magnitude. Nor had any architectural firm in the U.S. designed a comparable number of factories

or specialized in industrial construction to the extent that Kahn had. Despite his dislike of Constructivist architecture, Kahn's industrial functionalism actually was similar, although more pragmatic and devoid of an overarching theory. But architectural style was not the Soviet government's priority, but rather practicality, cost, and speed of design and construction. While Soviet avant-garde architects were heavily involved in debates on architectural theory, Kahn's solutions were grounded in F.W. Taylor's labor management theory combined with the "magical powers" of Ford's moving assembly line. Despite their origin in capitalist enterprise, Soviets considered both Taylorism and Fordism to be "ideologically neutral" techniques that could serve the cause of communism as well as they had served capitalism.²³ In fact, Ford production methods became so popular in the U.S.S.R. that in addition to Lenin's electrification and Stalin's industrialization, the terms *fordism* and *fordizatsia* were coined and, ironically, often used in media and propaganda slogans about the advantages of the Socialist system over capitalism.²⁴

Two contracts: "A commercial relationship of great magnitude"

Kahn was initially reluctant to accept the "dream job" offered by the Soviets. He still had plenty of work in the U.S. with many promising prospects ahead (the stock market would crash six months later), and he "knew little or nothing about the Russian Government." But chiefly he was reluctant because the United States did not recognize the Soviet government. He knew that most of his clients were strongly anti-communist and that anti-Semites in the U.S. "echoed what the Nazis were saying and accused the Jews of fostering Communism." And yet the challenge fascinated him. He believed that "the Russian people—regardless of their form of government—were entitled to help after all their generations of suffering under the czars. It was the right thing to do."²⁵

During the next three years, Kahn's firm became engaged in the industrial building program of the U.S.S.R. under the Five-Year Plan. The work was first done at the Kahn headquarters in Detroit and later—in order to handle a much greater volume of projects—in Moscow, with assistance from the Soviet staff, for whom the Kahn architects and engineers were providing training at the same time. The work was done under two contracts, one signed on May 8, 1929, to design the first Soviet tractor plant; another on January 9, 1930, to become consulting architects for all industrial construction in the So-

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viet Union. The work done by the Kahn architects and engineers under these contracts would make a major impact on the ability of the U.S.S.R. to fulfill its ambitious plan for the country’s industrialization.

On May 8, 1929, through the agreement signed with Khan by Amtorg President Saul G. Bron, the Soviet government granted Albert Kahn, Inc., a monumental contract to design a tractor plant in Stalingrad. Under the agreement, Kahn’s firm, at its Marquette Building office in Detroit, would prepare architectural and engineering drawings of the main buildings, including plumbing, heating, ventilation and electrical systems, and road and railroad access. They would also assist in procurement of American construction materials, machinery, and equipment, as well as the installation work. In addition Kahn’s contract called for providing the key construction personnel—the chief construction supervisor, installation specialists, and key foremen. All the drawings and specifications could be used for construction of that plant only and would remain the property of the firm. For its work on the project Kahn’s firm would be paid \$130,000 (\$1,666,273 in 2012 dollars), plus 4 percent of the cost of additional buildings. All the plans had to be approved by Amtorg, which was responsible for the payments.²⁶

The New York Times described the contract as “the beginning of a commercial relationship between the Soviet Government and the Kahn architectural firm of great magnitude.” It also quoted Henry Ford who, when he learned about the contract, instructed Kahn to tell the Russians that they could have all his patents, designs and specifications, and pledged to send his engineers to Russia and to invite Soviet engineers into his plants to learn about mass production. Said Ford: “No matter where industry prospers, whether in India or China, or Russia, the more profit there will be for everyone, including us. All the world is bound to catch some good from it.”²⁷

In Russia the contract was announced in *Torgovo-promyshlennaia gazeta* (Trade and Industry Newspaper), which was running a regular front-page column under the heading “Foreign Technical Assistance in Construction of the Industrial Giants.” It wrote that Albert Kahn firm’s assistance “would guarantee that the plant would be built on schedule and would benefit from all American modern technical achievements.”²⁸ And less than two months after Kahn signed the contract, on June 30, 1929, the paper reported that the first American con-

struction engineers, John K. Calder and Leon A. Swajian, had arrived in Moscow with preliminary drawings for the assembly building, foundry, and forge, and were expected to depart for Stalingrad on July 2. Six weeks later four more Americans followed with complete plans.²⁹

In April 1929, six months after Stalin announced the Five-Year Plan and two weeks prior to signing the Kahn contract, the chairman of the Council of People’s Commissars of the U.S.S.R. (Sovnarkom), A. I. Rykov, raised an alarm about the technical preparedness of the country to meet the goals set by the Plan:

I feel alarmed by many issues related to our technique and our technical cadres. . . . Shall we be able to cope with organizing man-power, technical cadres, skilled labor? . . . Money alone is not sufficient for the new construction work. . . . We also need technical and organizing cadres, from skilled labor to engineers of the highest qualification. . . . We have to make great efforts to assimilate West European and American technique.³⁰

But with the Kahn firm’s work now in progress, Stalin could confidently announce in a *Pravda* article “The Year of the Great Turning Point” published to boost the Soviet people’s spirit for the celebration of the twelfth anniversary of the Revolution:

By the spring of the coming year, 1930, we shall have over 60,000 tractors in the fields, a year later we shall have over 100,000 tractors, and two years after that—over 250,000 tractors. . . . We are advancing full steam ahead toward industrialization. . . . We are becoming a country of metal, a country of automobiles, a country of tractors. And when we set the U.S.S.R. behind the wheel and get *muzhiks* to drive tractors, then let the capitalists try to catch up with us.³¹

When Stalin made this announcement, he certainly had in mind more than a single plant. Negotiations with Kahn about a contract on a much grander scale had already been under way since July 1929. On November 11, 1929, the chairman of VSNKh, V.V. Kuibyshev, reported to the Central Committee that a major agreement with Albert Kahn firm was approaching conclusion.³² On December 26, 1929, the Sovnarkom approved a draft for a new agreement under which Albert Kahn, Inc., would enter into a contract with the VSNKh’s Building Committee to provide consulting and supervision for design and construction of buildings in all areas of light and heavy industry, to which end the firm would install a design bureau in Moscow under the direct control of Kahn architects and engineers. Kahn’s firm would supply standard factory layouts, detailed drawings, specifications, and

other technical documentation “typical for architects working in America,” which by the end of the contract, together with site-specific designs developed by the firm’s specialists while working in the U.S.S.R., would become the property of VSNKh. Besides consulting and assistance in organizing the design bureau, Kahn specialists’ responsibilities included direct involvement in preparing the drawings and specifications for the industrial projects planned by VSNKh and on-site supervision in construction of these projects. Kahn personnel were to include a chief architect; six architects specializing in various types of industrial buildings; chief engineers for construction and computation; chief engineers for equipment and for heating, ventilation, plumbing, sewerage, electrical and power systems, and a number of assistants. The contract would be for two years and the Soviet government would pay the firm annually \$250,000 (\$3,152,000 in 2012 dollars), plus an average annual salary of \$10,000 (\$126,000) to each Kahn specialist working in the U.S.S.R., tax free. Eighty-five percent of the firm’s fee would be paid in dollars and 15 percent in Soviet 9-percent railroad bonds, which would be paid out at maturity in convertible currency. Salaries of Kahn’s specialists would be paid 75 percent in dollars and 25 percent in rubles. For the projects designed in the Detroit office the firm would be compensated separately.³³

This seminal agreement, which made Albert Kahn, Inc., consulting architects for all industrial construction in the Soviet Union, was signed on January 9, 1930.³⁴ (figure 1)



Figure 1. Signing contract: *left*, Albert Kahn; *right*, Saul G. Bron, President of Amtorg. *Standing center*, Moritz Kahn; *left*, N. Ol'khovskiy, and *right*, J. Michaels, attorneys at Amtorg. Detroit, 9 January 1930. Photo courtesy of Albert Kahn Associates, Inc.

On January 11 the *Times* hailed the agreement between Kahn’s firm and the Soviet Government. In total, the program called for the expenditure of nearly \$2 billion dollars in 1930 alone and included the erection of four large car, truck, and motorcycle factories; nine tractor and farm machinery plants; and over 500 other plants and factories for light and heavy industry.³⁵ Albert Kahn emphasized the comprehensive nature of the project: “Not only did the plants have to be designed, but machinery had to be selected and ordered, process layouts had to be prepared, and the very tools needed to build the plants had to be ordered here and shipped over.”³⁶

In his statement to the press, Moritz Kahn, vice president of the firm, who negotiated the contract in Moscow, emphasized that Kahn principles of standardized mass production in industrial construction were intrinsically compatible with centralized planning and government-owned industry in the Soviet Union: “There will be but one client to serve and but one centralized architectural bureau.” All factory buildings for any one type of product could be built on these standardized principles, resulting in great savings in time and cost of design and construction. The Soviet state, operating through Amtorg as a single super-buyer, ensured a unique bargaining position in purchases of materials and equipment. Additional savings of millions of dollars would result from Kahn architects assisting in the revision of Soviet ultra-conservative building codes. In conclusion, addressing American manufacturers, Moritz Kahn reminded them that carrying out the Soviet industrialization program would require the importation by the Soviets of great quantities of manufacturing, mining, railroad, agricultural, and other machinery and equipment.³⁷

On the Soviet side, describing the contract, *Izvestia* wrote that its objective was “to adopt by means of practical joint work of Soviet and American specialists the latest methods and achievements of American technique.” It also reported that Kahn’s Soviet counterpart, Stroiobydinienie, was sending twenty-five engineers to work at Kahn’s office in Detroit to familiarize themselves with all the firm’s projects and to study the latest methods of construction technology.³⁸ At the same time, as provided by the contract, Kahn’s firm was sending the same number of experienced architects and engineers to set up a special design bureau in Moscow and to take leading positions at that bureau.³⁹

This bureau, which by 1932 would employ two thousand Soviet workers, was formed under the Building

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Committee of VSNKh, by a decision VSNKh made on March 5, 1930. It was named Gosproektstroi (State Design and Construction) and became the largest design organization in the U.S.S.R. It was an answer to the prayers of the Soviet planners who, by 1929, realized that in order to implement the Five-Year Plan, instead of scattered small-scale design studios (*masterskie*), they needed “one powerful organization” which would “employ American expertise in its work and at the same time pass on this expertise to as many construction organizations and young Soviet specialists as possible.”⁴⁰

A party of forty-five Americans, headed by Moritz Kahn, who was delegated by the firm to set up the Moscow operation, left Detroit on March 20, 1930. The group included twenty-five specialists, their spouses, and an eleven-year-old child.⁴¹ (figure 2) During a farewell party and press conference prior to their departure, Albert Kahn refuted allegations of sympathizing with Bolshevik Russia by stating that the politics of Russia did not interest him and, as a professional man, his attitude towards Russia was “that of a doctor toward his patient.”⁴² After stops in London and Berlin, and before boarding a train for Moscow, a member of the group, George K. Scrymgeour, mailed a card to Albert Kahn: “All happy and ready for the task come what will.”⁴³

Gosproektstroi: “A marvel of efficiency”

Kahn’s Moscow headquarters at Gosproektstroi opened on April 15, 1930. It was housed in a five-story building at 2/10 B. Cherkassky pereulok, where two floors were

occupied by the architects, one by the structural engineers, another by the mechanical engineers, and still another by the detailers of structural steel. Moritz Kahn, who stayed in Moscow for several months at a time, became the head of the American advisory engineering staff at Gosproektstroi; George K. Scrymgeour became this organization’s chief engineer. The segment of Kahn organization that was dispatched to Russia was “competent within itself to handle all general phases of construction design and structural engineering.” As specialized problem arose, additional specialists were sent by the Kahn firm to supplement the original group.⁴⁴ In his 1934 report to the American Society of Civil Engineers, Scrymgeour described that the Kahn group’s role was “to control, teach and design all light and heavy industry” planned by the Soviet State Planning Commission (Gosplan), and that by the end of the second year, the Kahn group completed the design of buildings costing (according to Soviet figures) 417 million rubles.⁴⁵

According to the annual report of Gosproektstroi, in 1931 Kahn specialists supervised 600 Soviet employees in Moscow, 300 in Leningrad, and 100 in Kharkov, not counting students, and by that time 2,500 Soviet workers had gone through Kahn training. By the end of the second year, additional branches of Gosproektstroi opened in Kiev, Dnepropetrovsk, Odessa, Sverdlovsk, and Novosibirsk, all using the same organizational setup and standardization methods, utilizing the American standard system and details applied to Russian conditions, which was termed *russko-amerikanskaia sistema* (the Russian-American system). Standard con-



Figure 2. Moritz Kahn, his staff, and their spouses at Grand Central Station, New York, en route to Moscow. Center, standing, Moritz Kahn; to his right, his wife Edith. 6 March 1930. Photo courtesy of Albert Kahn Associates, Inc.

struction methods and details were developed in Moscow and then distributed to all branches. At that time Kahn specialists supervised over 3,000 Soviet designers. The American group, together with thousands of Soviet architects, engineers, and draftsmen, formed the largest architectural organization in the world, its size and scope surpassing Kahn's operation in Detroit. It was a marvel of organization, and, considering the fact that the majority of the Soviet technicians were untrained, it was a marvel of efficiency.⁴⁶

But they had to start from scratch. According to Albert Kahn, the difficulties at first seemed insurmountable. Soviet Russia lacked not only factories, but also the pencils and drafting boards to design them. There was only one blueprint machine in Moscow in 1930. The language barrier and cultural differences presented serious problems, not to mention that the Americans had to adjust to metric units, the so-called "uninterrupted working week," an unfamiliar diet, and living conditions that were, by American standards, less than adequate, including a frequent lack of heat at home and in the office during the long winter months. "The problem of adjusting our regular practice to their requirements was indeed an interesting and sometimes a difficult one. Many materials we consider standard here are not to be had in Russia, which necessitated much study to meet existing conditions," explained Kahn in the address he delivered to Cleveland Engineering Society in 1930.⁴⁷

Kahn noted that the Soviet architects and engineers initially looked at his men as intruders. Early in the process, Moritz Kahn commented on what he thought was a real cause of the trouble. He said that the Russians in many instances had a superior education and theoretical knowledge, whereas the Americans had the practical experience in getting the job done "in the American way," which often led to criticism on the part of the Russians.⁴⁸ The greatest resistance was encountered by the Kahn engineers, particularly those in charge of reinforced concrete design. Soviet engineers, who, according to Albert Kahn, were well versed in it, were opposed to the American "short cuts," especially their habit of forgoing some minute calculations and rather relying on their experience. But gradually, as Kahn used to joke, they became convinced that buildings designed by the Americans did hold up in the States and that the chances were they would, as well, in Russia, "irrespective of politics."

In addition to their day jobs, Kahn specialists had to run classes at night to train their Soviet colleagues in

the Ford-Kahn principles of factory design and to teach drafting to their government-assigned assistants, most of whom came directly from school and had no professional training or experience. But perhaps remembering his own beginning as an apprentice draftsman, Albert Kahn praised his Soviet students: "These young Russians are very gifted. They apply themselves intensively, enthusiastically and earnestly. Hours mean nothing to them."⁴⁹ Nevertheless, the lack of skilled help was so dire that American specialists were often compelled themselves to do work which should have been done by Russian draftsmen.⁵⁰ This shortage of skilled workers was the result of a high rate of turnover created by Soviet authorities to get as many workers as possible through "American schooling."

The shortage of materials of all kinds, frequent replacement of the men in authority, orders and counter orders, endless conferences, and exhausting discussions created additional problems for the Americans. Able as the Russians were in theory, remembered Kahn, "they lacked system and the ability to organize." Plans were often drawn with the sites not yet determined, foundation plans ordered and construction actually began before the details of the main structure were finalized, and there was constant struggle to meet the conditions as they changed almost daily: "Today, sheet metal is lacking and ready roofing must be used. Tomorrow, steel is not to be had and wood must be substituted."⁵¹ Scrymgeour added, "Nothing to speak of excepting delay in delivery of drawings to and from branches or plants, and the Russian workers habit of promising '*zafta*' (tomorrow) and tomorrow never comes."⁵²

Interviews at the U.S. Consulate in Riga, Latvia, of nine Kahn engineers returning from Moscow in late 1930 captured the reality of the daily work at Gosproektstroj. They commented on their Soviet colleagues' lack of practical experience in projects of the magnitude they were called upon to carry out and a certain reluctance in adapting to American practice. According to them, the Soviets lacked knowledge about modern norms of building sanitation, and they resisted the introduction of any aestheticism in design; even the beauty which could be derived from simplicity and the straight line was frowned upon as not consonant with revolutionary art. The shortage of skilled labor and the tangle of bureaucratic control over scarce construction materials, especially steel, were the main problems. The Americans also commented on the political climate in the U.S.S.R.: "We feel so free to be out [of the Soviet Union]. They

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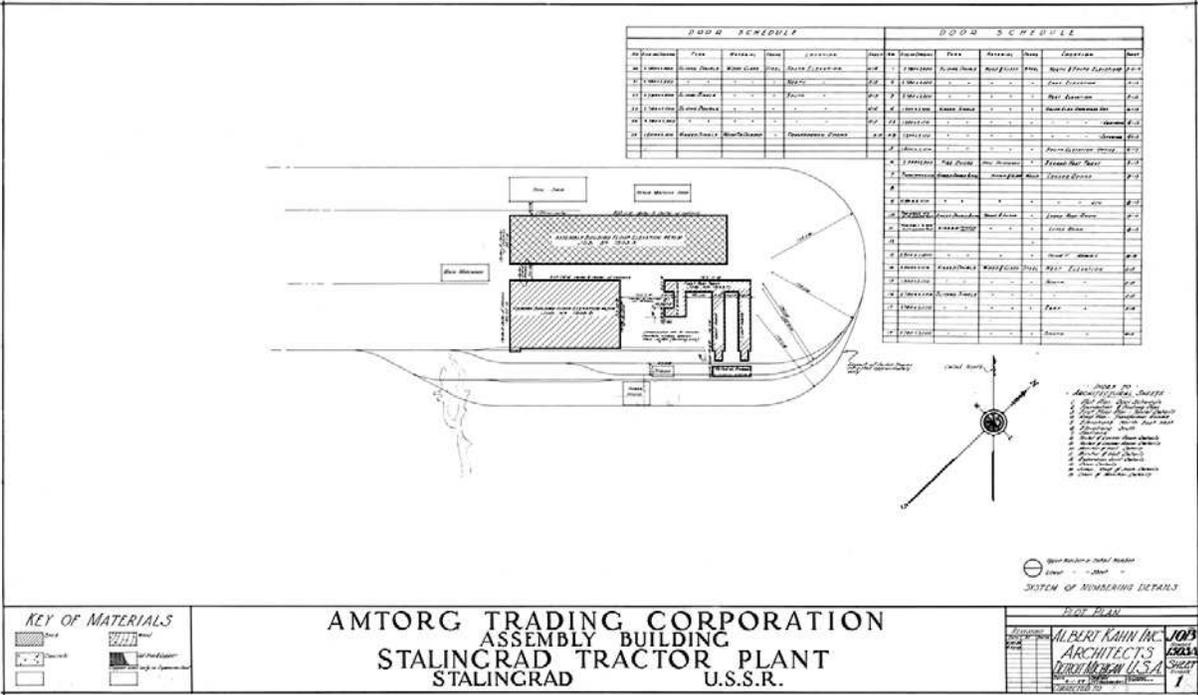


Figure 3. Stalingrad Tractor Plant. Plot plan, rendering by Albert Kahn Architects and Engineers, 1929. Photo courtesy of Bentley Historical Library, University of Michigan.

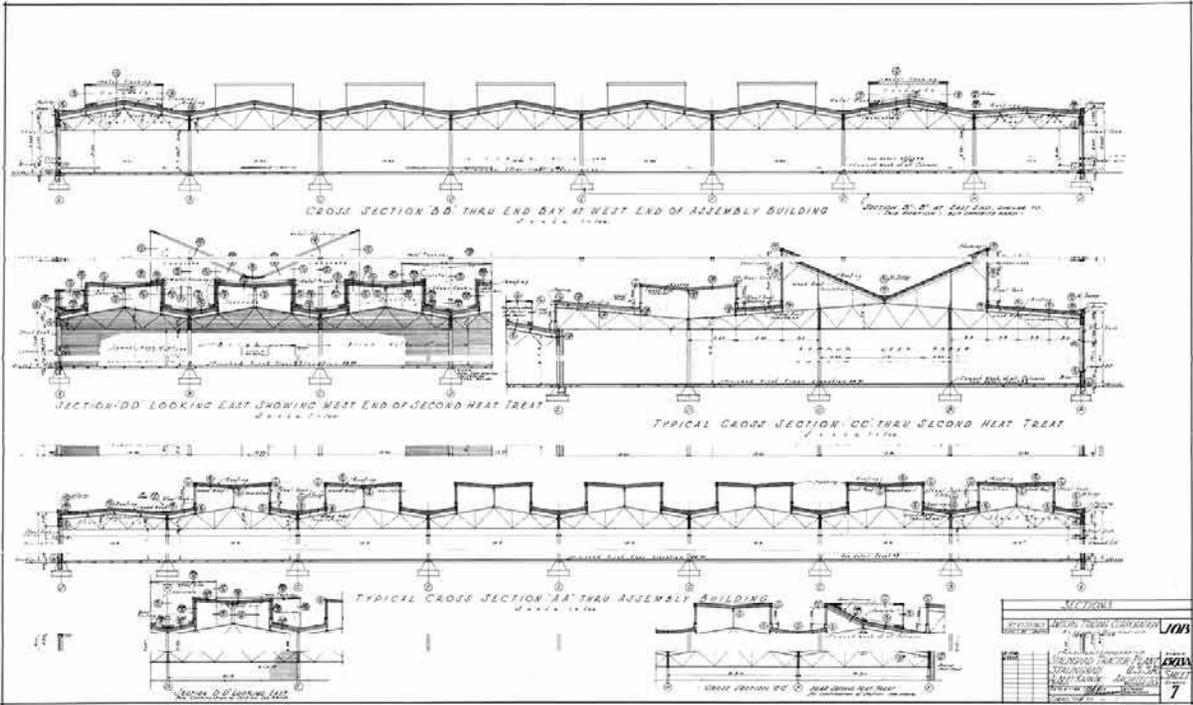


Figure 4. Stalingrad Tractor Plant. Assembly building, cross-sectional view, rendering by Albert Kahn Architects and Engineers, 1929. Photo courtesy of Bentley Historical Library, University of Michigan.

have such systems, resort to such methods! If there is someone missing, one knows—political prison. Fearing to raise suspicion people dare not to say a word.”⁵³

Despite these challenges, between 1929 and 1932 Kahn’s firm designed and equipped hundreds of industrial enterprises, nearly the total Soviet industrial base, spanning the entire map of the U.S.S.R. from Leningrad to Yakutsk and ranging from tractor, automobile, and aircraft plants to power plants, foundries, forges, steel-making and rolling mills; metallurgical, ball-bearing, aluminum, and asbestos plants; machinery and tools manufacturing factories; textile mills and food processing factories. At least \$200 million worth of buildings were designed by Kahn’s firm in Moscow and Detroit during the first year alone.⁵⁴

For almost three years, American construction engineers, foremen, and workers labored at remote sites side by side with the Soviet workforce, struggling with harsh climate, lack of necessities, and an impossibly overloaded transportation system. They discovered that sanitation did not exist outside of big cities and survived (though not all of them) a typhus outbreak in Stalingrad.⁵⁵ But most important, they labored deep inside a country which was not recognized by their own, and so they had no official protection. Yet, on October 10, 1929, Moritz Kahn wrote to his elder brother Albert from onboard the steamer *Karl Liebknecht*, sailing down the Volga River to Stalingrad: “Here is a country of one hundred and fifty million people fighting for its existence, a people sorely needing our help; whether we agree with them or not, we ought to help them get on their feet if only for humanitarian reasons.”⁵⁶ Added Albert Kahn, after one of his visits: “I don’t believe that the world can really get back on its feet until the other peoples help the Russians in transforming themselves into a modern industrial state, working in harmony with the remainder of the world.”⁵⁷

Stalingrad: “American tempo”

The Kahn projects in Russia were designed in two organizations, Gosproektstroi operating in Moscow and Kahn headquarters in Detroit. The major projects designed in Detroit included the tractor plants in Stalingrad and Chelyabinsk, the Avtostroi truck assembly plants in Moscow and Nizhny Novgorod, Gospodshipnik roller-bearing plant in Moscow, and the Stalmost structural steel fabricating plant in Verkhnyaya Salda (near Nizhny Tagil), built to meet the massive need in structural steel

for all the large-scale construction under the Five-Year Plan. (figures 3–6)

The Stalingrad plant was the first of three giant Soviet tractor plants designed by Kahn’s firm in record time. Frank D. Chase, R. Smith, and several other firms assisted in the design of the auxiliary buildings; International Harvester provided the tractor design and the technical advisers.⁵⁸ A group of Soviet engineers was stationed in Detroit to assist with the project. (figure 7) There was particular need for speed in the preparation of the drawings since the steel for the plant had to be ordered and fabricated in the U.S. in time to reach Russia before the winter months. And extreme precision had to be used in design to avoid any adjustments in the field 6,000 miles away.

The projected annual capacity of the plant, originally planned to be 10,000 tractors, was subsequently increased to 20,000, later to 40,000, and finally, to 50,000, twice the capacity of the International Harvester Milwaukee plant on which it was modeled.⁵⁹ All building components, including glass-filled external walls and butterfly truss roof structures with saw-tooth skylights (known as the Kahn Daylight System), as well as essential equipment and tools, were supplied by over 100 American firms. The structural steel elements (figure 8) were prefabricated in New York by McClintic-Marshall Products (owned by the Bethlehem Steel Corp.), then shipped in a knock-down state to Stalingrad, via the Black Sea and the Volga River, and then by land, in 252 carloads, to be assembled under the supervision of a force of American builders and engineers selected by Kahn’s firm.⁶⁰ Long caravans of camels, horses, and oxen were aiding the lines of motor trucks and the special railroads (designed by the Kahn firm) in transporting building materials from the docks. Abe L. Drabkin acted as Kahn’s on-site representative; John K. Calder, a former chief construction engineer at River Rouge, served as general superintendent (also often riding camels to and around the construction site). His assistant was Leon A. Swajian, also from Ford’s River Rouge plant. American engineers, communicating through interpreters, supervised plumbing, heating, welding, and electrical works. For every twenty to thirty Soviet workers, there was an American foreman. Together with about 380 American workers, who came to Stalingrad with their families on a one-year contract, they formed the largest American colony in the U.S.S.R.⁶¹ Most of them came from Detroit, where a Traktorstroi recruiting office opened at 255 West Congress Street.⁶²

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Figure 5. Stalingrad Tractor Plant. Bird's eye view, rendering by Albert Kahn Architects and Engineers, 1929. Photo courtesy of Albert Kahn Associates, Inc.

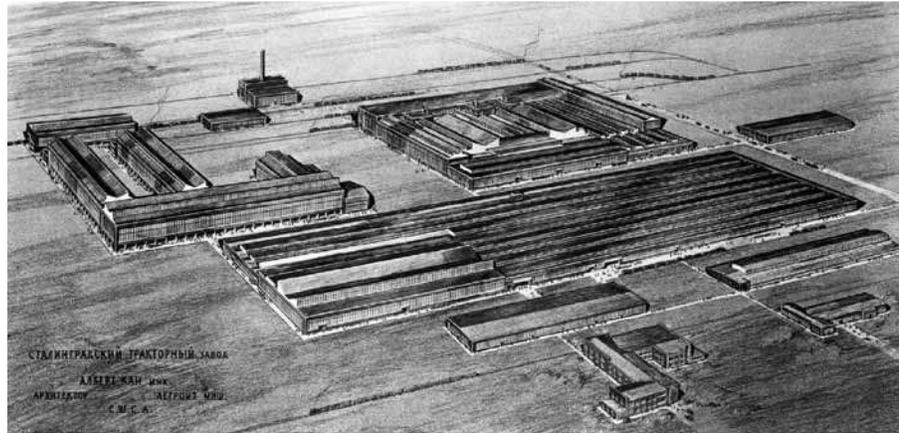


Figure 6. Chelyabinsk Tractor Plant. Bird's eye view, rendering by Albert Kahn Architects and Engineers, 1930. Photo courtesy of Albert Kahn Associates, Inc.



Figure 7. *Sitting, center*, Albert Kahn; *standing, center*, Moritz Kahn; *sitting, left*, Abe L. Drabkin, and unidentified Soviet and American engineers at Albert Kahn offices in Detroit with drawings for Stalingrad Tractor Plant, 1929. Photo courtesy of Bentley Historical Library, University of Michigan.



Figure 8. A truss (for the assembly building at Stalingrad Tractor Plant) being fabricated in New York by McClintic-Marshall Products before being dismantled and shipped to the USSR, 24 July 1929. *Left to right*: Mr. Otto of Albert Kahn Architects and Engineers, M. Dmitrieff of Amtorg, F.W.R. Snyder of Albert Kahn Architects and Engineers. Photo courtesy of Bentley Historical Library, University of Michigan.

The Soviet press at that time was quite open about American assistance and the acute shortage of specialists and skilled workers; secrecy and denial would come later. Every issue of *Soviet Union Review*, published for foreign consumption, carried numerous pictures of American tractors at Soviet collective farms and American workers and engineers at Soviet plants. And at home VSNKh's newspaper *Za industrializatsiiu* wrote:

It is very important to note that the American specialists are not just doing consulting; they are actually supervising the entire construction. The shortage of our own qualified workers has forced us to increase as much as possible the number of American technical specialists invited to work at the Stalingrad Plant.

Such a statement would certainly have landed the editors in trouble during Stalin's later campaign against "cosmopolitanism,"⁶⁵ but the campaign of "self-criticism" (*samokritika*) in the Soviet press at that time was to be interpreted as a manifestation of the strength of the economic system of the U.S.S.R., which was not afraid to expose its shortcomings to its own people and the world outside. In 1929, deputy chairman of Gosplan, G. Grinko, admitted: "In making our plans, we simply worked on the assumption that the people to carry out these plans would be found. We must more and more draw on the foremost technicians of other countries to help carry out our program."⁶⁴ In 1929, in addition to engineers sent to the U.S.S.R. under the technical assistance contracts with foreign companies, the Soviet government announced a policy of employing foreign technical talent directly. In 1931, according to *Economic Handbook of the Soviet Union*, 1,500 American engineers and technicians were engaged in work in the U.S.S.R.⁶⁵

The Soviet slogan "to catch up with and surpass America" could be seen everywhere in Stalingrad along with calls to keep up with the "American tempo." Construction of the Stalingrad tractor plant's main buildings, where the American parallel construction system was introduced instead of the Soviet sequential construction method,⁶⁶ was indeed completed in a record six months instead of the planned eighteen (though it did not reach the planned capacity until 1933). It was the largest plant in the U.S.S.R. and comprised an assembly building 1,340 feet long and 315 feet wide, a forge shop 532 by 450 feet, and a foundry 680 by 440 feet.⁶⁷ The first tractor, "International" (named after International Harvester Farmall 15-30, of which it was almost an exact copy), was assembled on June 17, 1930. (figure 9) Congratulating the Soviet workers on the plant's opening day, Stalin sent a telegram: "Greetings and congratulations on their victory to the workers and leaders of the first giant tractor

plant in the U.S.S.R. The fifty thousand tractors which you are to give our country every year are fifty thousand shells shattering the old bourgeois world."⁶⁸ A strikingly different telegram, in English, was sent to the Albert Kahn engineers, thanking "our technical teachers, the American specialists and technicians, who have helped us in the construction of the plant."⁶⁹

The Stalingrad Tractor Plant⁷⁰ was the first of three giant Soviet tractor plants that had the capability to produce tanks. In May 1931, the Chain Belt specialist, Ellwood T. Riesing, who was installing in Stalingrad a conveyor-belt system (once branded by Lenin as the quintessence of capitalist exploitation) would report that shortly before he left, the preparations were being made at the plant for manufacturing "small tanks."⁷¹ In February 1932 an American engineer from New York, A. Wishnewsky, after completion of his contract with Traktorstroï, would report that in Stalingrad "emphasis was being placed on production of tanks rather than tractors." In his opinion, "the development of tractor production there [had] been designed to lead up to the production of tanks."⁷² By the beginning of World War II, the Stalingrad Tractor Plant had already partially switched to production of T-34/76 tanks. During 1941 and 1942, it became the major producer of T-34s, while the other tank manufacturing plants from the European territory of the U.S.S.R., together with workers and machines, were being evacuated beyond the Urals. Production continued until German troops stormed the plant itself in late 1942.⁷³ It became one of the sites of the crucial Battle of Stalingrad where, in January 1943, the Red Army's victory over the Nazis turned the tide of World War II.⁷⁴ (figure 10)



Figure 9. Assembly line at Stalingrad Tractor Plant, 1937. Photo courtesy RIA Novosti.

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Figure 10. Soviet tank repair in the middle of battle, Stalingrad Tractor Plant. August 1942. *Vokrug Sveta*, no. 1 (January 1983).

In November 1942, a few weeks before Albert Kahn died, Malcolm W. Bingay, the chief editor of the *Detroit Free Press* and a good friend of Kahn's, asked him whether he was surprised by the way the Russians had held off the Nazis. Kahn said that when his Soviet customers insisted that he build plants “with tremendously heavy foundations and extra steel all through the construction,” he told them that it was not necessary, and when they, smilingly, told him about the severe Russian winters, he thought they “were all crazy.” Moritz Kahn was the first to figure out the reason for this requirement: “Albert,” he said, “these people are not crazy. They are building war-production plants and do not want us to know about it.” As Kahn remembered it, “They were kind and considerate but revealed nothing of their purposes.”⁷⁵ However, by the end of 1931, Albert Kahn must have formed a reasonably good idea about the U.S.S.R. preparing for a potential war. “There is no question about Russia's preparing herself as fully as possible for such an event, nor is there any doubt that many of the newer plants are planned for the production of war materials when needed,” Kahn reported in his 1931 presentation to the Detroit chapter of American Institute of Architects.⁷⁶

Kharkov: “Professors, police force, and young bands of pioneers”

After completing their work in Stalingrad in 1930, many American foremen and engineers moved on to the construction sites of other tractor plants designed by Kahn's architects, one in Losevo, in the outskirts of Kharkov

in the Ukraine, and another at Chelyabinsk in Siberia. The Kharkov plant, with a projected capacity of 50,000 to 60,000 tractors annually, was almost an exact copy of the Stalingrad plant, with some improvements but also with new problems caused by the drop in steel imports. It was built largely of reinforced concrete, with the needed steel coming from Germany, not prefabricated.

The construction started on January 28, 1930. In July 1930, Leon A. Swajian, who had just finished his job in Stalingrad, became the general superintendent at Kharkov. (He would be awarded the Order of Lenin for this work in 1933). In an interview in *The Moscow News*, Swajian said that the Kharkov plant was pushed to completion more swiftly than any job he had ever done, and none required so much construction in a single year. It was especially hard for American engineers “accustomed to a country where you can order anything you like one day and get it the next.” He also described the continuing shortage even of unskilled labor. Hundreds of foreign workers and foremen were invited, and virtually all men, women, and even children in Kharkov, “professors, police force, and young bands of pioneers,” were brought in by the hundreds every day to do unpaid work on the construction of the plant.⁷⁷ On the other hand, when it came to production, the Kharkov plant profited by receiving a large corps of trained workers who had “graduated” at Stalingrad, while the Stalingrad plant had been compelled to break in a mass of raw labor, unacquainted with the machinery they had to learn to use.⁷⁸ The Kharkov Tractor Plant—the first tractor plant in the Ukraine and the largest in the U.S.S.R. at the time—began operation on October 1, 1931, like the Stalingrad plant, producing copies of the International Harvester 15-30. By September–October 1941 (before it was evacuated to Altai, in Siberia), the plant was building T-16 light tanks (KhTZ-16) and diesel tank engines.⁷⁹

Chelyabinsk: “More universal”

On May 29, 1929, Sovnarkom decided to build yet another Soviet industrial giant, a tractor plant in Chelyabinsk, 1,100 miles east of Moscow (further away from the western border than Stalingrad). The plant was expected to produce at least 40,000 ten-ton 60-horsepower crawler tractors annually. In June 1929, the future plant's administration, Cheliabtraktorstroi, was formed as a new division at the State Institute for the Design of Metallurgical Plants, Gipromez. In March 1930, after their negotiations with Caterpillar for technical aid in tractor design and production had fallen through, representa-

tives of Cheliabtraktorstroï established an engineering bureau in Detroit called “Chelyabinsk Tractor Plant,” located on the 13th floor of the Union Trust Building at 500 Griswold Street. (figure 11) It was headed by the future director of the plant, Kazimir P. Lovin, and was staffed by twelve American and forty Soviet engineers. The American group was overseen by Warren Noble of Noble Engine Company, Cleveland, and assisted by ex-Caterpillar engineers, including Edward J. Terry. The Soviet group consisted of future engineers and directors of the production facilities in Chelyabinsk and was headed by the future deputy director and a chief engineer of the Chelyabinsk plant, Eliazar I. Gurevich.⁸⁰ An array of machinery parts to be tested by engineers—including a disassembled Caterpillar tractor—filled the rooms on Griswold Street.⁸¹ Based on these tests, contracts were awarded by Amtorg for materials and equipment to a number of American firms, many of them in Michigan.

The Chelyabinsk Tractor Plant was designed at Kahn’s Detroit office in consultation with the Soviet engineers stationed there. Albert Kahn spoke highly of the Soviet engineers with whom he interacted in Detroit: “The men chosen to work with us here have been courteous, eager to learn, men of the highest intelligence, delightful to deal with, and remarkably informed.”⁸² However, the preliminary design prepared by Gipromez was rejected by Kahn architects. Instead of a dozen scattered individual workshops, the Kahn architects proposed three colossal one-story modular structures housing the foundry, forge, assembly, and all auxiliary shops, and they replaced the reinforced concrete supports with



Figure 11. Soviet engineers at Chelyabinsk Tractor Plant office in Detroit, 1930. Photo courtesy of Chelyabinsk Tractor Plant Museum.

an exposed solid steel structure. This allowed for wider spans and greater layout flexibility, making the plant, in Kahn’s words, “more universal.” A 1972 Soviet book on the history of the Chelyabinsk plant contained, for the first time since the early 1930s, a brief mention of Kahn’s involvement in the project. It described Lovin putting his job on the line and risking arrest (“for unnecessary inflation of construction cost”) to support Kahn’s proposal despite the increasing shortage of steel. The book points out that using steel construction allowed swift conversion of the plant in 1941 to production of tanks, which weighed twice as much as tractors, without the necessity of building new gantry cranes.⁸³

The design of the plant was completed by June 7, 1930. In order not to waste any time during the short Siberian summer, the main specifications, such as the principal axis, grid reference, and buildings’ measurements, were sent to Russia by telegram so that excavation for future foundations could begin immediately. The construction began on August 10, 1930, initially without foreign assistance. But on March 19, 1931, *Za industrializatsiïu* published a letter signed by the plant’s engineers and economists stating that the project was “on the verge of collapse.” American engineers, including Calder,⁸⁴ were called in, and early in the fall of 1931 Leon A. Swajian moved from Kharkov to become the general construction superintendent at Chelyabinsk. The chief consulting engineer for tractor design from 1932 through 1933 was Edward J. Terry; former Caterpillar engineers also supervised the beginning of operations.

The tractor plant in Chelyabinsk was even more impressive than the plant in Stalingrad. With three times the capacity of its model, the Caterpillar plant at Peoria,⁸⁵ it spread over a territory of more than 2,471 acres and included approximately 1,780,000 square feet of covered floor area comprised of an enormous assembly building (1,500 by 650 feet and 40 feet high, with 100-foot-wide spans), a foundry (770 by 650 feet), and a forge shop (670 by 420 feet), all connected by a four-mile-long underground tunnel.⁸⁶ (figures 12–14)

On June 1, 1933, the first Soviet crawler tractor, the “Stalinets 60,” came off its production line. It ran on naphtha and was an exact copy of the Caterpillar model 1925–31.⁸⁷ (Through the mid-1930s most of the tractors manufactured in the U.S.S.R. were copied from American designs with no compensation to the patent owners.)⁸⁸ “The Chelyabinsk Plant was built on our own money, through our own energy and with the aid of our

Figure 12. Construction of the assembly building at Chelyabinsk Tractor Plant, 1930. Photo courtesy of Chelyabinsk Tractor Plant Museum.



Figure 13. Forge shop at Chelyabinsk Tractor Plant, 1930s. Photo courtesy of Chelyabinsk Tractor Plant Museum.

own constructors and engineers,” read the front page of *USSR In Construction*, the whole issue of which was devoted to the opening of the plant and featured dozens of photographs of illuminated structures adorned with portraits of Stalin and other party leaders (but contained no references to Kahn and his architects). It described “the grandiose shops flooded with light and air” and especially praised the assembly and foundry buildings, “the largest in the world,” that “neither Ford nor Caterpillar can boast.” In his speech at the opening meeting, a member of the Politburo and Central Committee, M.I. Kalinin, stressed the importance of tractor production for Soviet agriculture and especially emphasized “the tremendous role the Chelyabinsk caterpillar tractor would play in strengthening the defense of our country.”⁸⁹

“For the purposes of war”

In the 1930s, the Soviet Union was balancing economic reconstruction and rearmament. While the immediate goal of *piatiletka* was to “get *muzhiks* to drive tractors,” the ultimate goal was to make the tractor industry “most immediately convertible into military purposes.” In 1924–1925 People’s Commissar for Military Affairs, M.V. Frunze, developed his doctrine, “Front and Rear in Future War,” which was an early blueprint for the Red Army’s vision of the Soviet economy. The task, according to Frunze, was to enable the country, if needed, to

quickly and easily switch to a military track.⁹⁰ The important part of this doctrine was that tractors could be designed to both plow fields and haul artillery. Frunze never implemented his vision (he died in 1925), but his ideas for full integration of military and economic development, with civilian industry subordinate to military needs, continued to circulate among the Soviet military leadership.⁹¹ The decisions of the Soviet government at the end of the 1920s reflected these ideas. In December 1927 the XV Congress of VKP(b) set the course for militarization of the Soviet economy. Commissar of Defense, K.E. Voroshilov, declared that the country's industrial development, especially the automotive and tractor industries, ought to reflect the Army's needs.⁹² In 1928 the Revolutionary Military Council (Revvoenkom) approved a document, "System of Tank-Tractor-Armored Car Armaments of the RKKA," which became the basis of Soviet armor doctrine through the 1930s.⁹³ The Politburo's decision of July 15, 1929, "About the Current State of Defense of the U.S.S.R.," set the goal by the end of the first Five-Year Plan to equip the Red Army with 1,500 operational tanks and create a reserve of 1,500–2,000 tanks ready to engage at the beginning of a war. On December 5, 1929, in the document, "About Implementation of the Tank-Building Program," the Politburo reiterated the Army's needs for powerful tractors and tanks and specifically emphasized the importance of the planned Chelyabinsk Tractor Plant.⁹⁴

In 1931, Marshal-to-be, Mikhail Tukhachevsky, was put in charge of the Red Army's armament. His goal was

to modernize the army, replacing the cavalry with tank-based troops. He believed that the number of tanks needed in a future war would be in the tens of thousands, not in the thousands as it had been in the last war, and that most tanks could be built using the automobile and tractor industries, which needed to be able to sustain this production. On June 19, 1930, he wrote to Stalin:

Special military tanks can make up only about one third of the entire fleet and can be used only for special operations, such as antitank artillery. The rest of the tanks, the second and third echelons, can actually be armored tractors which we could produce in great mass. . . . Military production can mostly be based on civilian industry, with minimum expenses during peacetime and the means for adaptation for the purposes of war.⁹⁵

Attached to Tukhachevsky's memo was a photo of a tankette assembled at Krasny Putilovets, which essentially was a Fordson-type wheeled tractor with 7-mm armor and a mounted machine gun. The Soviet leadership's decisions in 1931 incorporated Tukhachevsky's ideas of utilizing the growing capacities of tractor plants in Stalingrad and Chelyabinsk and the automobile plant in Nizhny Novgorod⁹⁶ to dramatically increase production of tanks and tankettes. The revised tank-building program of January 31, 1931, and the decision of the special commission on tank industry headed by Tukhachevsky on July 5, 1931, set the wartime numbers for production of tankettes at the plant in Nizhny Novgorod at 20–25 percent of its automobile capacity. Given a capacity of 140,000 automobiles, 28,000–35,000 tankettes



Figure 14. Panoramic view of Chelyabinsk Tractor Plant, 1933. Photo courtesy of Chelyabinsk Tractor Plant Museum.

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could be produced in wartime. Likewise, wartime tank capacity of the tractor plant in Stalingrad was estimated at 12,000 T-26 light tanks.⁹⁷

In his speech at the VII Congress of Soviet Councils, the chairman of VSNKh and commissar of heavy industry, G.K. Ordzhonikidze, stressed the urgent need for conversion of the Chelyabinsk tractor from naphtha to the more efficient and less flammable diesel fuel (especially important for tanks in battle).⁹⁸ In 1936 Eliazar I. Gurevich, now the chief engineer for conversion, traveled again to the U.S. to place orders for the essential equipment, which was manufactured by Ingersoll Machine Tools and several other plants in Rockford, near Chicago.⁹⁹ In 1937 the first Soviet diesel tractor “Stalinets-65” was made in Chelyabinsk.

As predicted by Knickerbocker in 1931, the tractor plant in Chelyabinsk proved to be the best prepared for mass production of tanks. In 1939 it began production of the artillery prime mover “Stalinets-2”; in 1940, the self-propelled heavy howitzer SU-152 and tank T-34; and in December 1940 it released the first Soviet heavy tank KV (Klim Voroshilov). In October 1941, as the German army advanced into Soviet territory, the plant was combined with several smaller plants evacuated to Chelyabinsk from the European part of the U.S.S.R., including the Kirov tractor plant from Leningrad (formerly Krasny Putilovets) and diesel engine-building factory No. 75 from Kharkov. On October 6, 1941, the combined tractor plant in Chelyabinsk was renamed Chelyabinsk Kirov

Plant.¹⁰⁰ It became subordinate to the Commissariat for Tank Industry (Narkomtankprom) and switched exclusively to production of tanks; hence, the city of Chelyabinsk was nicknamed Tankograd (Tank City). In 1943 the KV was replaced by the KV-85, and in November 1943 the IS (Iosif Stalin) replaced the KV-85. In December 1943 the plant started production of ISU-152 assault guns. In record time, the Kirov Plant became one of the main armories for the front, delivering 180 heavy tanks and 100 T-34s per month by 1944. At the end of the war, the Chelyabinsk plant was also producing V-11 and V-12 tank diesel engines. A total of 18,000 tanks, 48,500 tank diesel engines, and over 17 million units of ammunition were manufactured at the plant during the war years. The plant’s ability to manufacture diesel engines for tanks was especially important because Germany did not succeed in developing a diesel-powered tank before the end of World War II.¹⁰¹ (figure 15)

“Mad tempo” and a parting of the ways

For carrying out its Russian assignments, Albert Kahn’s firm had to be paid in hard currency that the Soviets mostly obtained from the export of wheat to the U.S., shipped at the height of the mass famine in Povolzhye and the Ukraine. The Politburo decree of August 29, 1930, emphasized that “timely implementation of the mandatory grain collection quota is vital for industrial development in our country and most and foremost for such industrial giants as Magnitostroi and Cheliabstroi.” The decree was preceded on August 24 by a letter to





Figure 15. Assembled T-34 tanks at Chelyabinsk Tractor Plant, 1943. Photo courtesy of Chelyabinsk Tractor Plant Museum.

V.M. Molotov from Stalin, from his vacation house at the Black Sea, where he wrote:

Each day we are shipping 1–1.5 million *poods* [16–24 thousand tons] of grain. I think this is *not enough*. We must immediately raise the daily export quota to 3–4 million *poods* at a *minimum*. Otherwise we risk being left without our new metallurgical and machine-building plants. . . . In short, we must *accelerate* grain export at a *mad tempo*.¹⁰²

But despite the relentless pressure on the peasants to meet unrealistic production quotas and drastic cutbacks of all provisions in the cities, with the poor harvest in the summer of 1931, the Kremlin's hard currency reserves continued to decline. It was compounded during the Great Depression by the sharp drop in prices of raw materials other than grain exported by the U.S.S.R. On August 20, 1931, the secretary of the Central Committee, L.M. Kaganovich, reported to Stalin about a shouting match during a meeting of the Politburo over the payments for completed orders and placement of new orders in the U.S., and he asked Stalin for instructions. He also reported that "the Germans [had] easily agreed to lower the interest rate because they badly need our orders."¹⁰³ Stalin responded on August 25 by telegram:

Due to difficulties with hard currency and unacceptable credit terms, I propose to ban placement of new orders in America, call off any negotiations for new orders that have already begun, and, wherever possible, terminate the contracts for orders which have already been negotiated, transferring those orders to Europe or our own plants. I propose to make no exceptions, neither for

Magnitostroi and Kuznetsstroi, nor Kharkovstroi, Dneprostroi, AMO, and Avtostroi.¹⁰⁴

Many of these "*strois*" were Kahn's sites.¹⁰⁵

Under this pressure, things indeed accelerated at a "mad tempo." Stalin wrote to Kaganovich on August 25, 1931:

The foreign currency shortage is not the only problem. The main problem is that if we don't drop the new orders placed in America on the *draconian credit terms* that America practices, we may lose the *preferential terms* we have secured in Germany, Italy and England (and will secure in France).

Kaganovich responded to Stalin on August 26:

We have received your telegram about the orders in America. It solved our disagreements even more radically than we thought. We immediately sent a telegram to America to stop all new orders. Tomorrow we will review the orders portfolio and see which can be placed in Europe and which in the U.S.S.R.

And Stalin to Kaganovich on August 30: "America aims its efforts to devastate our foreign currency reserve and fundamentally disrupt our currency situation. America today is the main force in the financial world and our main enemy." Kaganovich responded to Stalin on August 31:

Dear Comrade Stalin! We understood your suggestion about America just as you meant it, as a great maneuver which must force Americans to change their terms. We are in a much better position to do it now, since the main orders for our industrial giants have been completed.

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(Of course, what made this position even better was the German-Soviet credit agreement signed on April 14, 1931, which provided for \$75 million of long-term credit on purchases of German products.) And finally, on September 11, 1931, Kaganovich reported to Stalin: “It turns out that 80–90 percent of orders for Cheliabstroi could be obtained in England.”¹⁰⁶

This meant the end of Soviet collaboration with Kahn, who in Stalin’s eyes must have fulfilled his mission. On March 25, 1932, Albert Kahn was in Moscow, negotiating a renewal of the contract which had officially ended on March 1. The negotiations broke down when the Soviets proposed to make the future payments not in dollars but in rubles which had no value outside the U.S.S.R. (By 1932 the Soviet government had stopped paying foreign firms and workers in hard currency, causing an exodus of American specialists and termination or failure to renew many foreign aid contracts.)

I could not meet their terms. I might have if I had been permitted to send an entirely new group of men which of course are easily had today at very low salaries. But they insisted on having the same heads—most of whom cared little about staying at all and certainly not at materially reduced wages,

wrote Kahn to his wife Ernestine from Berlin, on his way back from Moscow. “One thing I am very glad of is that our men did an excellent job, praised by everyone there, and we left with the respect and acclaim of the country.”¹⁰⁷

The New York Times commented:

This was one of the most useful jobs done there by any foreigner. But the foreign exchange ‘economy axe’ sweeps wide and heavy these days. . . . Its effect is to deprive the U.S.S.R. of the American aid best suited to Russian conditions and to replace it by still inadequate native effort or by that of Europeans who, although willing to accept ruble salaries, follow methods less appropriate for that country and who naturally direct orders for foreign equipment to their own homelands.¹⁰⁸

On April 29, 1932, Kahn’s unit in Moscow stopped its work and the staff returned to America. Through August 1932, the People’s Commissariat for Heavy Industry, Narkomtiazhprom (which in 1932 replaced VSNKh), continued its attempts to bring Kahn’s firm back on board. With great urgency they were trying to impress on the Soviet government the importance of the firm’s contribution designing plants under the first *piatiletka* and emphasized the great need for the Kahn specialists’ continuing presence since the massive construction of the plants designed at Gosproektstroi under their supervision had only begun in 1931. They re-

counted numerous innovations introduced by the firm and were trying to convince the government to approve a new two-year contract, emphasizing that preliminary negotiations indicated there was a possibility that Kahn would agree to a new contract with an annual fee of only \$75,000 paid in dollars (\$1,185,550 in 2012 dollars), plus salaries for 30 specialists, of which not more than \$4,000 would be paid in dollars (this would translate into \$200,000 per year instead of \$480,000 per year for the first two-year contract, but it was 1932, after all). However nothing came of it.¹⁰⁹

By the time Kahn architects and engineers left Moscow, several hundred plants and factories in twenty-one cities had been designed and built or were under construction, and over 4,000 Soviet architects, draftsmen, and engineers had gone through Kahn training,¹¹⁰ including, according to Kahn, a number of first-class specialists who were now “able to lead squads and do excellent work.”¹¹¹ The construction of the plants designed by Kahn’s firm continued until the end of the 1930s, and the blueprints, calculations, and specifications the firm was required to leave behind enabled Soviet architects to recycle them with minimal adjustments for similar facilities around the country (a process called *priviazka*). Therefore, while over 500 industrial structures built in the U.S.S.R. using Kahn architects’ designs could be identified, the number of later *priviazki* is impossible to estimate, especially because a complete list of industrial facilities built during the first and second Five-Year Plans (many of which were later converted to military production and classified as “state secret”) was never published. In 1944, Louis Kahn, then President of Albert Kahn, Inc., reported “design and construction of some 570 plants, the equipping of those plants, and supervisory training of Russians to design and build them.”¹¹² In addition, Kahn’s ideas formed the basis of the Soviet school of standardization and prefabrication in industrial design. His assembly-line design process became a universal working method in all Soviet architectural organizations, and the engineering solutions developed at Gosproektstroi, using the American standard system and details applied to local materials and conditions, became standard in the Soviet building industry for many decades.

In 1932 a monumental volume, *Contemporary Architecture of Plants and Factories* by V.D. Tsvetaev, was approved by the government as a textbook for all Soviet industrial architects and engineers. The book created a unique record of Albert Kahn’s Russian legacy with a short reference mentioning that, at the time of writing, the author was sitting on Gosproektstroi’s technical

council, which allowed him to closely study “the work of the American corporation of Albert Kahn.” The book drew extensively on the archives of Gosproektstroi and, in addition to numerous references to “American” methods and engineering solutions, it contained, albeit without credits, detailed descriptions, photographs, and pictures of renderings of the Chelyabinsk and Kharkov tractor plants, KIM automobile plant, Gospodshipnik roller-bearing plant, the Dneprostal’ foundry, the forge shop and foundry in Nizhny Tagil—all designed by Kahn architects. But by the end of the decade, Tsve-taev’s book disappeared from Soviet libraries.¹¹³

In February 1932 Gosproektstroi became a part of Metallostroiproekt, which was later absorbed by Promstroiproekt. A propaganda campaign undermining foreigners’ role in Soviet industrial development became especially vicious in the late 1930s because the new Soviet ideology of “national industrial patriotism” could not tolerate the notion that the West, and especially the United States, played any role in realizing the objectives of Stalin’s Five-Year Plans. In a recent series of articles about the role of foreign architects in Soviet industrial design, M.G. Meerovich, professor of architecture and history at Irkutsk State University, writes:

In the history of Soviet industrial design Albert Kahn’s name had been hidden without a trace under a thick layer of baseless criticism and false accusations and under the shop sign of the Soviet organization Gosproektstroi, created in 1930 specifically to cast exact molds of Kahn’s innovative designs proven in the USA.¹¹⁴

In October 1938, driving the last nail into the coffin of Kahn’s Russian legacy and in response to an article about Kahn’s work in the U.S.S.R. in *The Architectural Forum*, the Soviet journal *Architecture in the USSR* declared:

There has never been any ‘affiliate’ of Albert Kahn’s firm in Moscow. A group of American engineers was indeed invited in 1928 to Moscow under an agreement with Kahn’s firm, but they worked at the Soviet organization Gorstroiproekt [*sic*] and their activity was strictly limited to technical assistance. . . . Soviet engineers, architects, and workers, inspired by the heroic ideas of Socialism, have themselves created plants which overshadow the best industrial facilities in the USA, and by doing so damaged the commerce of Mr. Kahn, for whom architecture is ninety percent business.¹¹⁵

Nevertheless, in 1942 Kahn’s name was still well-remembered in the U.S.S.R. Philip A. Adler of *The Detroit News* reported from Stalingrad in September 1942 that the name of Albert Kahn was “known to every child in Stalingrad.”¹¹⁶ In striking contrast to the official line, a telegram from one of the leading Soviet architects, Viktor

A. Vesnin, to Ernestine Kahn after her husband’s death in December 1942 read:

Soviet engineers, builders, architects send you their sincere sympathy in connection with the death of your husband Mr. Albert Kahn who rendered us great service in designing a number of large plants and helped us to assimilate the American experience in the sphere of building industry. Soviet engineers and architects will always warmly remember the name of the talented American engineer and architect, Albert Kahn.¹¹⁷

Partial list of industrial plants in the USSR designed by or with participation of Albert Kahn Architects and Engineers¹¹⁸

- Airplane parts and accessories plants: Kramatorsk, Tomsk.
- Aluminum plant: Leningrad (St. Petersburg).
- Asbestos plant: Asbest near Sverdlovsk (Yekaterinburg).
- Automobile parts and assembly plants: Chelyabinsk, Gorky (Nizhny Novgorod), Moscow, Stalingrad (Volgograd), Samara.
- Chemical products plant: Kalinin (Tver’).
- Forge shops: Chelyabinsk, Dnepropetrovsk, Kharkov, Kolomna, Luberetsk, Magnitogorsk, Nizhny Tagil, Stalingrad.
- Foundries: Chelyabinsk, Dnepropetrovsk, Kharkov, Kolomna, Luberetsk, Lugansk, Magnitogorsk, Sormovo, Stalingrad, Verkhnyaya Salda.
- Freight-car factory: Nizhny Tagil.
- Heat treatment plants: Chelyabinsk, Dnepropetrovsk, Nizhny Tagil.
- Heavy machinery plants: Chelyabinsk, Kramatorsk, Luberetsk, Nadezhdinsk, Podolsk, Stalingrad, *Uralmash* in Sverdlovsk.
- Machinery and machine tools plants: Kaluga, Novosibirsk, Verkhnyaya Salda.
- Power plant: Yakutsk.
- Roller bearing plant: *Gospodshipnik (Sharikopodshipnik)* in Moscow.
- Steel plants and rolling mills: Kamensk-Uralsky, Kolomna, Kulebaki, Kuznetsk, Magnitogorsk, Nizhny Tagil, Sormovo, Verkhny Tagil.
- Structural steel fabricating plant: *Stalmost (Stal’konstruksia)* plant in Verkhnyaya Salda .
- Tractor plants: Chelyabinsk, Kharkov, Stalingrad.

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On translation and transliteration:

For the convenience of non-Slavic readers, the author uses the Library of Congress system of transliteration with some modifications, including, for Russian names in the body of the text, transliteration of Cyrillic letters in initial and final positions (e.g., Iu=Yu, as in Yudin; iia=ia, as in Izvestia; nyi=ny, as in Krasny), and omitting hard and soft signs. For well-known names of people and places, the customary English spelling is retained (e.g., Chelyabinsk, Nizhny Novgorod, Gorky). However, all bibliographic notes preserve the standard Library of Congress system of transliteration. On first usage, the names of Russian institutions are given in English translation followed by a transliterated Russian acronym. When citing sources from Russian archives, the standard citation convention for these archives is used where every document is identified by its collection number (*fond* in Russian), the number of the record group (*opis*), the number of the file (*delo*), and the page number (*list*), with the name of the archive in the beginning of the citation (e.g., RGASPI, f. 558, op. 11, d. 739, l. 28.) All translations from Russian are by the author, unless specified otherwise.

Notes

1. Maxine Block, “Albert Kahn,” in *Current Biography: Who’s News and Why* (New York: H.W. Wilson Company, 1942), 17:431.
2. See, for example, Y.V. Yemelianov, *Marshal Stalin, Creator of the Great Victory* (Moscow: Yauza, 2007), or “Volgograd renamed Stalingrad for day as the Second World War battle remembered,” *The Telegraph*, 2 February 2013, <http://www.telegraph.co.uk/>

- news/worldnews/europe/russia/9843929/Volgograd-renamed-Stalingrad-for-day-as-the-Second-World-War-battle-remembered.html (last accessed 2 February 2013).
3. Adolf Hitler, *Mein Kampf* (New York: Reynal and Hitchcock, 1941), 958.
 4. “Tractors in the Soviet Union,” *Soviet Union Review* 10, no. 2 (February 1932): 35. *Soviet Union Review* was a monthly bulletin about economic and cultural life in the U.S.S.R. published by Soviet Union Information Bureau, Washington, DC.
 5. *Za industrializatsiiu*, 11 April 1932 (cited in Norton T. Dodge and Dana G. Dalrymple, “The Stalingrad Tractor Plant in Early Soviet Planning,” *Soviet Studies* 18, no. 2 [October 1966]: 165). *Za industrializatsiiu* (For industrialization) was a Soviet newspaper published from 1930 to 1937 by VSNKh.
 6. Charles E. Sorensen, *My Forty Years with Ford* (New York: W.W. Norton & Co., 1956), 201–203.
 7. Allan Nevins and Frank E. Hill, “The Russian Adventures,” in *Ford: The Times, the Man, the Company*, 3 vols. (New York: Scribner, 1954), 2:678.
 8. Dodge, “Stalingrad Tractor Plant,” 165 (see n. 5).
 9. Originally named Tsaritsyn, the city was named after Stalin in 1925; after Stalin’s death and during Nikita Khrushchev’s de-Stalinization campaign, it was renamed Volgograd in 1961.
 10. Report of the Ford Delegation to the U.S.S.R., 1926, Acc. 1870, Box 1, 184–187, Ford Motor Company Archives, Dearborn, Mich.
 11. Y. Ilyin and B. Galin, eds., *Those Who Built Stalingrad as Told by Themselves* (New York: International Publishers, 1934), 29–31.
 12. I.V. Stalin, “Itogi pervoi piatiletki,” in I.V. Stalin, *Complete Works*, 18 vols. (Moscow: Gospolitizdat, 1951), 13:172. For overall analysis of Soviet industrialization under Stalin’s Five-Year Plans, see E.H. Carr and R.W. Davies, *Foundations of a Planned Economy 1926–1929* (London: Macmillan, 1969) and David R. Shearer, *Industry, State, and Society in Stalin’s Russia, 1926–1934* (Ithaca, N.Y.: Cornell University Press, 1996). Alec Nove, *An Economic History of the USSR, 1917–1991*, 3rd ed. (New York: Penguin, 1993), completed just after the collapse of the U.S.S.R., makes for easy reading for the academic and the lay reader alike.
 13. Joseph M. Pavloff, *The Upbuilding of Soviet Russia* (New York: Amtorg Trading Corporation, 1929), 18–19.
 14. Saul G. Bron, *Soviet Economic Development and American Business* (New York: Horace Liveright, 1930), 51.
 15. Hubert R. Knickerbocker, *The Red Trade Menace: Progress of the Soviet Five-year Plan* (New York: Dodd, Mead and Company, 1931), 81.
 16. Stalin, “Itogi pervoi piatiletki,” 13:178–180 (see n. 12).
 17. Important analyses of Albert Kahn’s work include: Federico Bucci, *Albert Kahn: Architect of Ford* (New York: Princeton Architectural Press, 2002); W. Hawkins Ferry, *The Legacy of Albert Kahn* (Detroit, Mich.: Wayne State University Press, 1987); Grant Hildebrand, *Designing for Industry: The Architecture of Albert Kahn* (Cambridge, Mass.: The MIT Press, 1974); George Nelson, *Industrial Architecture of Albert Kahn* (New York: Architectural Book Publishing Company, 1939). The Michigan Society of Architects’ Albert Kahn Memorial Issue, *Weekly Bulletin* 17, no. 13 (30 March 1943) is an important resource of contemporaneous tributes to Albert Kahn and his legacy. Hildebrand’s book also offers Kahn’s overall biography. William R. Brashear, *Albert Kahn and His Family in Peace and War* (Ann Arbor, Mich.: Bentley Historical Library, University of Michigan, 2008) and Edgar Kahn, “Albert Kahn: His Son Remembers,” *Michigan History* (July–August 1985) add personal touches.
 18. Titles in English that address Albert Kahn’s work in Russia in more detail include Milka Bliznakov, “The Realization of Utopia: West-

- ern Technology and Soviet Avant-Garde Architecture” and Anatole Kopp, “Foreign Architects in the Soviet Union During the Two First Five-Year Plans” in William C. Brumfield, *Reshaping Russian Architecture: Western Technology, Utopian Dreams* (Washington, D.C.: Woodrow Wilson International Center for Scholars and New York: Cambridge University Press, 1990), 145–213; Bay Brown, “Albert Kahn: The Russian Legacy,” *Project Russia*, no. 7b (1997): 92–96; Anatole Senkevitch, “Albert Kahn’s Great Soviet Venture as Architect of the First Five-Year Plan, 1929–1932,” *Dimensions* 10 (1996): 35–49. Titles in Russian include I. Kasianenko, “Ispol’zovanie amerikanskogo opyta v period stanovleniia sovetskogo promyshlennogo zodchestva,” in *Vzaimodeistvie kul’tur SSSR i SShA XVIII–XX vv.*, ed. O.E. Tuganova (Moscow: Nauka, 1987), 111–121; Igor A. Kazus’, I. A. *Sovetskaiia arkhitektura 1920-kh godov: organizatsiia proektirovaniia* (Moscow: Progress-Traditsiia, 2009); Dmitry S. Khmel’nitsky, “Tanki za khleb: Amerikanskii korni sovetskoi voennoi promyshlennosti” in *Pravda Viktora Suvorova*, ed. Dmitry S. Khmel’nitsky (Moscow: Yauza, 2007), 332–348; Mark G. Meerovich, “Al’bert Kan v istorii sovetskoi industrializatsii,” *Architecton* (June 2009): 65–73.
19. Amtorg (American Trading Corporation) was a quasi-private Russian-American joint-stock company based in New York. More information about Amtorg and its chairman, Saul G. Bron, is provided in Part II of this article to be published in the next issue of *IA* (volume 37, nos. 1–2).
 20. The full projected cost of the plant including the equipment was \$30 million, with the cost of the buildings about \$4 million. “Contract for Design of Tractor Factory Concluded With American Firm,” *Economic Review of the Soviet Union* 4, no. 11 (1 June 1929): 220. *Economic Review of the Soviet Union* was a semi-monthly survey of Soviet economic developments and of trade between the U.S. and the U.S.S.R. published by Amtorg. Also see Abe L. Drabkin, “American Architects and Engineers in Russia,” *Pencil Points* 11, no. 6 (June 1930): 438.
 21. Albert Kahn, speech delivered at the Detroit Bohemian Club, 29 October 1930, Albert Kahn Associates, Inc.; “Industrial Buildings: Albert Kahn,” *The Architectural Forum* 69 (August 1938): 89–90; Albert Kahn, Inc., *Industrial & Commercial Buildings* (Detroit, Mich.: Albert Kahn, Inc., 1936).
 22. On the Constructivist movement in Russia, see Jean-Louis Cohen, Christina Lodder, and Richard Pare, *Building the Revolution: Soviet Art and Architecture 1915–1935* (London: Royal Academy of Arts, 2011); Anatole Kopp, *Constructivist Architecture in the USSR* (London: Academy Editions, 1985); Richard Pare and Jean-Louis Cohen, *The Lost Vanguard: Russian Modernist Architecture 1922–1932* (New York: Crown Publishing Group, 2007).
 23. Senkevitch, “Albert Kahn’s Great Soviet Venture,” 45 (see n. 18); Lewis H. Siegelbaum, *Cars for Comrades: the Life of the Soviet Automobile* (Ithaca, N.Y.: Cornell University Press, 2008), 40. On the early Soviet planners’ fascination with the Taylor-Ford system of mass-production, see Thomas P. Hughes, *American Genesis: A Century of Invention and Technological Enthusiasm* (Chicago, Ill.: The University of Chicago Press, 2004), particularly Chapter 6, “Taylorism + Fordism = Amerikanismus.”
 24. Alan M. Ball, *Imagining America: Influence and Images in Twentieth-Century Russia* (New York: Rowman & Littlefield Publishers, 2003); Boris M. Shpotov, *Henry Ford: Life and Business* (Moscow: KDU, 2005).
 25. Malcolm W. Bingay, *Detroit Is My Own Home Town* (New York: Bobbs-Merrill, 1946), 308; “American to Build Soviet Auto Plants,” *The New York Times*, 7 May 1929.
 26. Agreement between Amtorg Trading Corporation and Albert Kahn, Inc., for construction of the Stalingrad Tractor Plant, The Russian State Archive of the Economy, Moscow (hereafter RGAE), f. 7620, op. 1, d. 712, l. 25–28.
 27. “Soviet Plans Factory to Build Tractors” and “American to Build Soviet Auto Plants,” *The New York Times*, 5 and 7 May 1929.
 28. “Agreement is signed about technical aid to Traktorstroi,” *Torgovo-promyshlennaia gazeta*, 16 May 1929.
 29. Dispatch 6265 from F.W.B. Coleman, Legation of the USA, Riga, Latvia, 10 July 1929, U.S. State Dept. Decimal File 861.602/Albert Kahn, National Archives and Records Administration (hereafter NARA), Washington, D.C.; Drabkin, “American Architects,” 438 (see n. 20).
 30. A.I. Rykov’s speech at the XVI Congress of VKP(b), *Pravda*, 24 April 1929.
 31. I.V. Stalin, “God velikogo pereloma,” *Pravda*, 7 November 1929 (incl. in Stalin, *Complete Works*, 12:118–135 [see n. 12]). *Muzhik* is a slightly condescending Russian term for a peasant, implying backwardness and ignorance. For Bolsheviks, peasants presented the “cursed problem,” an unyielding mass left over from the tsarist regime, threatening their vision for an industrialized Russia.
 32. The Russian Centre for the Preservation and Study of Documents of Most Recent History (hereafter RTsKhIDNI), f. 17, op. 2, d. 441 (incl. in S.S. Khromov, *Industrializatsiia Sovetskogo Soiuza: novye dokumenty, novye fakty, novye podkhody*, 2 vols. [Moscow: In-t rossiiskoi istorii RAN, 1997], 1:267).
 33. Agreement between the Construction Committee of VSNKh and American Firm “Albert Kahn,” July–December 1930, The State Archive of the Russian Federation (hereafter GARF), Moscow, f. R5446, op. 11a, d. 448, ll. 1–18.
 34. “Kahn Contract Signed,” *Economic Review of the Soviet Union* 5, no. 3 (15 February 1930): 55.
 35. These included 6 asbestos, corundum, and graphite factories; 2 locomotive works; 15 machine tool and appliances factories; 24 cement factories; 126 sawmills; 106 woodworking plants; 27 glass factories; 35 spinning mills; 15 woolen mills; 13 clothing factories; 112 shoe factories; 15 paper mills; and 56 food product plants. “Architects to Russia,” *Time* 15, Part 1 (20 January 1930): 18; “\$1,900,000,000 Building by the Soviet in 1930” and “Albert Kahn, Inc., Get Contract as Consulting Architects in Five-Year Plan,” *The New York Times*, 11 January 1930.
 36. “Industrial Buildings: Albert Kahn,” 90 (see n. 21).
 37. “Moritz Kahn’s statement to press,” *Economic Review of the Soviet Union* 5, no. 3 (15 February 1930): 55.
 38. *Izvestia*, no. 35 (5 February 1930): 4. The group included a prominent Soviet architect, Andrei Burov, who later designed residential development near the plant and taught at the Moscow State Architectural Institute.
 39. Dispatch from Louis Sussdorff, Legation of the U.S., 18 February 1930, Riga, Latvia, U.S. State Dept. Decimal File 861.602/Albert Kahn, NARA; “Moritz Kahn’s statement to press,” 55 (see n. 37).
 40. Kazus’, *Sovetskaiia arkhitektura*, 228 (see n. 18); Resolution of Sovnarkom “About measures for organization of major industrial construction,” 1 June 1928 (incl. in *Resheniia partii i pravitel’sva po khoziaistvennym voprosam* [Moscow: Politizdat, 1967], 1:724–742).
 41. Among those in the initial group were George K. Scrymgeour, Abe L. Drabkin, Frances Grossman (the only female architect in the group), Stanley Walker, Robert Boreland, Derek Van Osenbruggen, John Willis, J. Gordon Turnbull, Robert Mohr, R.B. Wetzel, H.C. Hinez, M.J. McGowan, L.P. Quinn, Norman A. Robinson, Arthur G. Thorpe, Gilbert Growcott, J.N. Hadjlsky, Robert E. Linton, Halliday, Rasmussen, Eno Jolson, Edward Eardley, and William H. Bruss. The latter returned in November 1931 after his

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- contract was not renewed, and Arthur G. Thorpe died in Moscow on 11 February 1931.
42. "Kahn Firm Sends His Ablest," *Detroit Times*, 17 March 1930.
 43. George K. Scrymgeour, postcard to Albert Kahn, March 1930, Box 13, Albert Kahn Papers, Scrapbook "Russia," Bentley Historical Library, University of Michigan, Ann Arbor.
 44. Louis Kahn, memo, 7 February 1944, Box 13, Albert Kahn Papers, Scrapbook "Russian Work," Bentley Historical Library, University of Michigan, Ann Arbor.
 45. Scrymgeour, "Russian Life As I Saw It" (February 1934), Box 20, Folder 37, p. 11, Hoover Institution Archives, Russian Subject Collection.
 46. Annual report of Gosproektstroï, RGAE, f. 5741, op. 2, d. 149; Moritz Kahn, "Work of Soviet Construction Designing Board," *Economic Review of the Soviet Union* 6, no. 14 (15 July 1931): 331; Allen B. Crow, "What Russia Got from Capitalist Detroit," *American Affairs* 8, no. 3 (July 1946): 216–218.
 47. Albert Kahn, "Putting Architecture on a Business Basis," address delivered to Cleveland Engineering Society, 16 December 1930, Box 1, Albert Kahn Papers, Bentley Historical Library, University of Michigan, Ann Arbor.
 48. "Disputes of Reds and Americans Revealed," *The New York Times*, 27 October 1929.
 49. Albert Kahn, "Our Work in Russia," unpublished paper read to the Detroit chapter of American Institute of Architects, 10 December 1931, Albert Kahn Associates, Inc.
 50. Albert Kahn's letter to VSNKh, 14 October 1930, *Za industrializatsiïu*, 17 February 1931 (cited in Kazus', *Sovetskaïa arkhitektura*, 141 [see n. 18]).
 51. Albert Kahn, "Putting Architecture on a Business Basis" (see n. 47); "An American Engineering Firm in the U.S.S.R.," *Economic Review of the Soviet Union* 6, no. 2 (15 January 1931): 41.
 52. Scrymgeour, "Russian Life" (see n. 45).
 53. "Conditions in Soviet Russia," Dispatch 213 from John P. Hurley, U.S. Consulate, Riga, Latvia, 27 November 1930, U.S. State Dept. Decimal File 861.641/9, NARA.
 54. Albert Kahn, Inc., *Industrial & Commercial Buildings* (see n. 21); Kahn, "Our Work in Russia" (see n. 49).
 55. In 1930–33, a typhoid epidemic swept Russia. On 7 November 1930, *The New York Times* reported sixteen cases of typhoid among the American workers in Stalingrad, two of whom died. The outbreak most likely originated in the apartment houses southeast of the tractor plant. Kahn's firm was not involved in the design of the residential houses and sewerage, but it prepared designs for the plant's drinking water purification facility and distribution system. On 22 November 1930, after Abe L. Drabkin was sent to conduct an onsite investigation, Moritz Kahn submitted a report to Amtorg pointing out that according to the design, "the drinking water was to be obtained from the city supply and not directly from the Volga River, and was to be purified before it was distributed around the plant." Evidently, this had not been done. Albert Kahn, Inc., Report on Outbreak of Typhoid Fever at Stalingrad, RGAE, f. 7620, op. 1, f. 712, ll. 1–5.
 56. Moritz Kahn, letter to Albert Kahn, 10 October 1929, Albert E. Kahn family archive.
 57. "Kahn Predicts Soviet Success," *The Detroit Free Press*, 1931.
 58. Hughes, *American Genesis*, 272 (see n. 23). International Harvester's hay harvester factory in Lyubertsy near Moscow, operating since 1911, was nationalized without compensation during the 1920s, but the company was still trying to maintain its presence in Russia. Dodge, "Stalingrad Tractor Plant," 165 (see n. 5).
 59. "The Stalingrad Tractor Plant," *Economic Review of the Soviet Union* 5, no. 7 (1 April 1930): 134–135; Walter S. Dunn, Jr., *Stalin's Keys to Victory: The Rebirth of the Red Army in World War II* (Mechanicsburg, Pa.: Stackpole Books, 2007), 92.
 60. "The Stalingrad Plant," *Economic Review of the Soviet Union* 4, no. 19 (1 October 1929): 336–337; Kahn, "Our Work in Russia" (see n. 49).
 61. Highly skilled American workers received from \$200–\$300 a month paid into an American bank in dollars, plus 300–400 rubles a month paid in Stalingrad. Russian workers who were paid on piece work basis earned from two to five rubles a day; fine mechanics earned up to ten rubles a day.
 62. Drabkin, "American Architects," 438 (see n. 20); *The Iron Trade Review* 86 (1930): 101. See also "44 American Firms Are Aiding Soviet," *The New York Times*, 30 November 1930. In 1930 Amtorg reported that it was receiving 125 applications for jobs in the U.S.S.R. on average each day. In November 1930, the U.S. Department of Commerce estimated that about 2,000 American workers, including engineers and assistants with their families, were living in the U.S.S.R. supervising the building of large manufacturing and electric plants.
 63. The "anti-cosmopolitan" campaign of the late 1940s and early 1950s was steered by Stalin's drive to isolate the country from foreign influences after the war and to bolster the claim that the Soviet Union was once again under threat from the "outside." The campaign especially targeted intelligentsia and Jews, accusing them of "groveling before the West" and helping "American imperialism."
 64. "Technical Help," *Soviet Union Review* 7, no. 5 (May 1929): 72.
 65. RTsKhIDNI, f. 17, op. 3, d. 698, ll. 3–4 (see n. 32); Resolution by Amtorg on inviting foreign specialists to U.S.S.R., 23 April 1929, RGAE, f. 5240, op. 18, d. 243, l. 218 (incl. in *Russia and the USA: Economic Relations 1917–1933*, ed. G.N. Sevost'ianov and E.A. Tiurina [Moscow: Nauka 1997], 286); *Economic Handbook of the Soviet Union* (New York: American-Russian Chamber of Commerce, 1931).
 66. The parallel system allows simultaneous construction of multiple structures on the same site, with the construction time for all buildings being equal to that of one. It is substantially faster than the traditional sequential (linear) method where construction of each structure begins after completion of a previous one. However, the parallel method requires a complete set of working drawings and more workforce and resources.
 67. Kahn, "Our Work in Russia" (see n. 49).
 68. *Pravda*, 18 June 1930 (incl. in Stalin, *Complete Works*, 12:234 [see n. 12]).
 69. *Economic Review of the Soviet Union* 5, no. 14 (1 August 1930): 314.
 70. The plant was named after the head of Cheka/OGPU Felix E. Dzerzhinsky. In 1961, as Stalingrad was renamed Volgograd, the plant was renamed Volgograd Dzerzhinsky Tractor Plant; since 1992, when it was privatized, it became Volgograd Machine-Building Company VgTZ, Ltd.
 71. "Stenographic report of interview with Ellwood T. Riesing," Dispatch from John E. Kehl, American Consul General, Hamburg, Germany (8 May 1931), U.S. State Dept. Decimal File 806.5017, Living Conditions/248, NARA.
 72. Dispatch from Robert D. Murphy, American Consul, Paris, France (8 February 1932), U.S. State Dept. Decimal File 861.20/420, NARA.
 73. Dunn, *Stalin's Keys*, 36 (see n. 59).
 74. On the Battle of Stalingrad and its significance, see Geoffrey Roberts, *Victory at Stalingrad: The Battle That Changed History* (London: Longman, 2003).
 75. Bingay, *Detroit*, 310 (see n. 25); Bingay, "Good Morning," *Detroit Free Press*, 16 July 1942.
 76. Kahn, "Our Work in Russia" (see n. 49).

77. Leon A. Swajian, "Building the Kharkov Tractor Plant," *Economic Review of the Soviet Union* 6, no. 18 (15 September 1931): 414.
78. "Tractors in the Soviet Union," 35 (see n. 4).
79. M.N. Svirin, Bronevoi shchit Stalina. Istoriia sovetskogo tanka. 1937–1943 (Moscow: Yauza, 2006).
80. For more details on the work of the Soviet engineers in Detroit, see Viktor E. Gurevich, *Cheliabinskaia ballada ili kak eto delalos' togda* (St. Petersburg: XXI Vek, 2007).
81. The Soviet designers were especially interested in the Caterpillar's design because the Caterpillar-Holt tractor suspension was adapted for German tank A7V during World War I. See Sergei Ustiantsev, *Elita rossiiskoi industrii: Cheliabinskii traktornyi zavod* (Yekaterinburg: Nezavisimyi Institut istorii material'noi kul'tury, 2008), 12.
82. Albert Kahn, presentation at the Rotary Club of Bay City, Mich., 20 May 1930.
83. L.S. Komarov et al., *Letopis' Cheliabinskogo traktornogo (1929–1945)* (Moscow: Profizdat, 1972), 23.
84. In addition to the plants in Stalingrad and Chelyabinsk, Calder supervised the construction of the largest in the world blast furnace at Magnitogorsk and a copper refinery at Lake Balkhash. He became the chief engineer of the Soviet Steel Trust, a singular honor for a non-citizen and a non-Communist, which made him a virtual director of ninety of the most important plants in Russia. He also became a central character in the famous play *Tempo* by Nikolai Pogodin. W.H.G. Armytage, *The Rise of the Technocrats. A Social History* (London: Routledge, 1965), 222.
85. Dunn, *Stalin's Keys*, 92 (see n. 59).
86. "The Opening of the Chelyabinsk Tractor Plant," *USSR in Construction* 8 (August 1933). *USSR in Construction* was a propaganda picture magazine published from 1930 to 1941 in the Soviet Union in Russian, French, English, and German. Its declared purpose was to "reflect in photography the whole scope and variety of the construction work now going on in the U.S.S.R." Propaganda aside, it became an artistic gem, with oversized pages and multi-page fold-outs offering great examples of early twentieth-century photography.
87. Lennart Samuelson, *Tankograd: The Formation of a Soviet Company Town: Cheliabinsk, 1900s-1950s* (U.K.: Palgrave Macmillan, 2000), 109.
88. Dana G. Dalrymple, "The American Tractor Comes to Soviet Agriculture: The Transfer of a Technology," *Technology and Culture* 5, no. 2 (Spring 1964): 197.
89. *USSR In Construction* 8 (August 1933).
90. M.V. Frunze, "Front i tyl v voine budushchego," *Pravda*, 31 August 1924.
91. The circumstances surrounding Mikhail V. Frunze's premature death in 1925 are rather mysterious. Stalin summoned Frunze to Moscow, where he was ordered to undergo surgery for stomach ulcers, from which he never recovered. His successor as commissar for defense was Stalin's old friend, K.E. Voroshilov.
92. *The Fifteenth Congress of the VKP(b). Stenographic report.* (Moscow: Gosizdat, 1928), 886, 887.
93. Around the same time Krupp developed an experimental tank with caterpillar traction called "large tractor" in order to disguise its real purpose. It was equipped with a BMW engine and a gun turret and would be tested between 1929 and 1933 by the Soviet army. Harold James, *Krupp: A History of the Legendary German Firm* (Princeton, N.J.: Princeton University Press, 2012), 152-153.
94. M.Y. Mukhin, "Amtorg. Amerikanskii tanki dlia RKKK," *Otechestvennaia istoriia*, May 2001, 56, 57; D. Sizov, "Stanovlenie Cheliabinska kak tsentra oboronnoi promyshlennosti," *Rodina*, no. 2 (2008).
95. Russian State Military Archive (hereafter RGVA), Moscow, f. 33987, op. 3, d. 155, l. 91.
96. The story of construction of the automobile plant in Nizhny Novgorod is described in Part II of this article (see n. 19).
97. RGVA, f. 33987, op. 3, d. 179, ll. 122, 123 (cited in Samuelson, *Plans for Stalin's War Machine: Tukhachevsky and Military-Economic Planning, 1925–1941* [New York: St. Martin's Press, Inc, 2000], 133).
98. Speech of G.K. Ordzhonikidze at the VII Congress of Soviet Councils, *Pravda*, 2 February 1935.
99. Komarov, *Letopis' Cheliabinskogo traktornogo*, 168 (see n. 83).
100. Originally named after I.V. Stalin, in 1958 the Kirov Plant was returned to its original name, Chelyabinsk Tractor Plant (less "Stalin"); in 1971 it was named after V.I. Lenin; and in 1992, when it was privatized, it became ChTZ-Uraltrac, LLC.
101. Dunn, *Stalin's Keys*, 36–37 (see n. 59); Samuelson, *Tankograd*, 259 (see n. 87).
102. Russian State Archive of Socio-Political History (hereafter RGASPI), f. 558, op. 1, d. 5388 (incl. in *Pis'ma I.V. Stalina V.M. Molotovu, 1925–1936*. Collection of documents, ed. L. Kosheleva, et al. [Moscow: Rossiia molodaia, 1995], 204).
103. RGASPI, f. 558, op. 11, d. 739, ll. 28–39 (incl. in *Stalin i Kaganovich. Perepiska. 1931–1936*, ed. O.V. Khlevniuk, et al. [Moscow: Russian Political Encyclopedia, 2001], 54–56).
104. RGASPI, f. 558, op. P, d. 76, ll. 33, 34 (incl. in *Stalin i Kaganovich*, 64 [see n. 103]).
105. Agreement for modernization and expansion of AMO (Moscow Automobile Joint-Stock Company, later Stalin Auto Plant or ZIS, then Likhachev Auto Plant or ZIL, now AMO ZIL) was signed in 1929 between *Avtotrest* and Arthur J. Brandt Company of Detroit to assemble trucks modeled after a prototype by the Autocar Company. Some archival materials held at the Historic Bentley Library, University of Michigan, suggest that structural engineering work was done by Albert Kahn, Inc., under a separate agreement with *Avtotrest*.
106. RGASPI, f. 81, op. 3, d. 99, ll. 4–6; f. 558, op. 11, d. 739, ll. 48–55; f. 81, op. 3, d. 99, ll. 12–14; f. 558, op. 11, d. 739, ll. 56–64 and 96–105 (incl. in *Stalin i Kaganovich*, 65, 65, 72, 73, 94 [see n. 103]).
107. Hildebrand, *Designing for Industry*, 130 (see n. 17).
108. "Russians Lose Aid of Kahn, American Who Has Saved Soviet Millions," *The New York Times*, 26 March 1932.
109. "About permission to extend agreement for technical assistance in design of industrial enterprises with American firm 'Albert Kahn,'" July–August 1932, GARF, f. R5446, op. 13a, d. 873, ll. 1–5.
110. Bron, *Soviet Economic Development*, 67 (see n. 14).
111. Kahn, "Our Work in Russia" (see n. 49).
112. Louis Kahn, memo (see n. 44). According to *Weekly Bulletin*, Albert Kahn Memorial Issue (see n. 17), Kahn engineers built not less than 521 factories and trained some 4,000 engineers.
113. V.D. Tsvetaev, *Sovremennaia fabrichno-zavodskaiia arkhitektura* (Moscow–Leningrad: Gosstroizdat, 1933).
114. Meerovich, "Al'bert Kan," 65 (see n. 18).
115. "Khlestakovskie otkroveniiia Al'berta Kana," *Arkhitektura SSSR*, no. 10 (1938), 89.
116. Philip A. Adler, "Stalingrad As I Saw It," *The Detroit News*, 28 September 1942.
117. Viktor A. Vesnin, Western Union telegram to Ernestine Kahn, 16 December 1942, Box 1, Kahn Family Papers, Folder "Letters to Ernestine," Bentley Historical Library, University of Michigan, Ann Arbor.
118. Albert Kahn, Inc., *Industrial and Commercial Buildings* (Detroit, Mich.: Albert Kahn, Inc., 1936).