Spatial Revolution

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Published by Cornell University Press

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Kharkov starts with a year’s experience gained at the expense of Stalingrad [and] shows the swift capacity of Soviet plants to learn from mistakes and improve . . . A year hence, and Kharkov in its turn will be, not the latest—but a landmark which other plants surpass. For so organization and technical skill forge ahead. Developments for which other countries require decades are accomplished in the Soviet Union in the course of a few years.

—Anna Louise Strong (1931)

The new Soviet-Ukrainian capital of Kharkiv / Kharkov was, in 1930, “alive, / laboring, / of reinforced concrete.”¹ In his paean to the city, poet Vladimir Mayakovsky extolled Kharkiv as the materialization of the revolution’s promise: it was a city that grew, buzzed, lived, and labored in a newly expanded environment purpose-built for the dictatorship of the proletariat. The copious construction projects rising in Kharkiv in the decade after 1922, when the capital was transferred eastward from Kyiv, included a new governmental complex, housing, and factories designed by architects who practiced according to Constructivist principles. Because of its political importance as the capital of the second largest Soviet republic, its architectural audaciousness, and its thriving intellectual scene, Kharkiv became a regular stop for foreign visitors to the USSR in the 1920s and 1930s. Ernst May, for one, visited just three cities in his 1930 Soviet lecture tour: Moscow, Leningrad, and Kharkiv.²

Kharkiv experienced a drastic increase in political importance from 1922, but its primary asset as a site for Soviet industry was its urbanity, which ensured pre-existing transportation infrastructure, an educated managerial sector, and a skilled labor force, none of which Magnitogorsk benefitted from at its inception. The city of Kharkiv also adjoined the Soviet agricultural heartland that produced the grain
that filled state coffers and fueled foreign trade. Kharkiv was in many ways a ready-made site, primed to accept a first Five-Year Plan tractor factory hastily added to the ledger a year into the plan’s fulfillment. The Kharkiv Tractor Factory (Kharkivs'kyi traktornyi zavod or KhTZ) and “New Kharkiv,” the sotsgorod to house its workers, was built ten kilometers outside of Kharkiv’s urban center between 1930 and 1931 to manufacture tractors required for the headlong collectivization of Soviet agriculture.

Unlike the other chapters in this book, this one does not focus on socialist housing. A shift temporarily to the architectural program that has been hovering just out of sight throughout the narrative—the factory—sheds light on how the Soviet system of architectural standardization was established and laid the groundwork for mass socialist housing provision. Soviet centralized planning, stabilizing at the end of the first Five-Year Plan, permitted lessons from one construction site to be utilized immediately on the next. The US journalist Anna Louise Strong observed that the hand-over of construction expertise from the Stalingrad Tractor Factory to its near-twin in Kharkiv showed “the swift capacity of Soviet plants to learn from mistakes and improve.”

The steep learning curve that Strong observed in successive Soviet construction projects demonstrated that industrial progress was not reliant on the secrecy and competition built into the capitalist system. Soviets learned about standardization, mass production, and industrial efficiency largely from technical consultants borrowed from the capitalist system, however. In June 1929, Detroit industrial architecture firm, Albert Kahn Inc., signed an agreement with the Soviet government to design and oversee the construction of a single tractor factory in Stalingrad. Six months later, the firm was promoted to become a consultant for all industrial construction in the USSR. The ambitious timetable set by Soviet state economic planners to meet first Five-Year Plan targets did not allow for a period of internal architectural research and development, nor were there experienced Soviet factory designers to lead the charge even if the timetable had been more leisurely. Pragmatism, forced by the schedule, led the Vesenkha to Kahn, Henry Ford’s architect, just as it had led them to Henry Freyn and Co., Arthur McKee and Co., and the Ernst May Brigade to assist with factory and housing designs in Magnitogorsk.

It is Kahn’s involvement with the factory design in Kharkiv—oblique and reliant on typological design—that makes this project critical in the history of socialist architecture and urbanism. The case of the factory and its sotsgorod demonstrates how Soviet planning and architecture were impacted by the “shock-work” culture of the first Five-Year Plan. The tempo of the plan forced Soviet economic and physical planners to devise a host of accelerating strategies; standardization was one that allowed the Kharkiv Tractor Factory to meet the unreasonable construction timetable set by Ukraine’s State Institute for Metallurgical Factory Design, UkrGipromez. The relationship between the Stalingrad Tractor Factory and the
one built immediately afterward in Kharkiv shows how the Fordist model of industrial standardization enabled and empowered the Soviets to settle territory quickly and diffusely, a hallmark of socialist spatial practice in the following decades. The near-impossible schedule of the first Five-Year Plan limited the options designers for both the tractor factory and the sotsgorod could pursue, which made easily replicable architectural types and models particularly attractive.

Priviazka (architectural adjustment) is the Russian term, still in use today, for the architectural practice of tweaking a standard design to meet the specific demands of a new site and also the result of that practice (it can be used as a verb and a noun).\(^3\) In the 1920s and 1930s, the practice of adapting standard types to new circumstances was ascendant, even if the term *priviazka* remained in the realm of professional slang at that time. Texts published during the first Five-Year Plan on architectural standardization used terms and phrases like *popravka* (amendment), *prisposobit’* (to adapt), or *primeniat’* tipovye proekty (to apply typical/standard projects).\(^4\) *Priviazka* is used here because it had staying power, both as a practice and a term. It became the prevailing mode of operation for Soviet architecture and planning professionals working in state-run design institutes in the following decades, yet it has its origin during the rapid capital development of the first Five-Year Plan.

The practice of *priviazka* was tested first on industrial architectural types, but it had a massive impact on socialist housing design and its delivery system in subsequent years. Once tested on an experimental site, a factory, residential block, or housing type deemed successful might join the ranks of those ready for slight adjustment and export to some far-flung site in the Soviet sphere. The logic of these last two chapters follows the scalar expansion of standardization from the object (tractor), to the building (tractor factory), to the socioresidential urban unit (*zhilkombinat*), to territory (Soviet space). Lessons learned about industrial standardization at the object scale ultimately led to the design of repeatable urban units, making *priviazka* the means by which heterogeneous Soviet territories were developed. Although not without its failures and drawbacks, standardization emerged from the Kharkiv experiment as one of the main strategies by which the Soviet Union was industrialized, settled, and housed.

**Soviet Capital of Ukraine and Grain**

The Bolsheviks claimed Kharkiv the capital of Soviet Ukraine as early as December 1917, while Kyiv, the former imperial-era capital, stood as the contesting administrative center of the Ukrainian People’s Republic. When the dust settled in the aftermath of the Civil War, Kharkiv became the sole capital of Soviet Ukraine.\(^5\) From 1922 to 1934, its twelve years as the capital, postrevolutionary Kharkiv proved an excellent site to test socialist space-making and iconography. The city had an
expanded political role, and its population and industry increased precipitously. One 1932 chart plotted ten categories of growth in the city from 1913 to 1932 and projected their continued rise into the late 1940s (figure 7.1). Construction of new governmental buildings, housing, hospitals, schools, and modern infrastructure was needed, and the Soviet state seemed poised to provide them.

State-building iconography was arguably most important, judging by capital project priorities. In 1925, an All-Union competition was held for the design of the first and most prominent governmental building in Kharkiv, the Derzhprom (budynok derzhavnoi promyslovosti or State Industry Building). A jury member later recalled that the winning design by Leningrad architects Samuil Kravets and Sergei Serafinov “looked without hesitation into the future . . . it was the only [submission] that broke with the eclecticism of the past . . . [its] selection is the victory of contemporary architecture in 1925.” From afar, the complex resembles an “organized mountain,” as Henri Barbusse, the French critic and visitor to Kharkiv, noted in 1930 (figure 7.2). The building’s compositional liveliness is due to its variable massing, from six to twelve stories. At the ground the building splits into three parts to allow two of the five radiocentric streets that spring from the foregrounding plaza to sneak under it. The buildings are then reconnected by skyways at various levels to visually represent cooperative collaboration in concrete and glass. Unlike most architectural competitions of the day, the winning Derzhprom entry was actually built; construction began immediately after working drawings were completed. The complex was under scaffolding from 1925 to 1929, four years fraught with great technical difficulty. Since reinforced concrete, the primary structural and finish material, was virtually unknown to the Ukrainian building trades, the building’s constructional methods had to be learned from scratch. Completion of the complex was a Herculean feat intended to signal persistence and ultimately Ukraine’s readiness for the world stage.

Kharkiv boasted qualities that made it an attractive choice for the new Ukrainian Bolshevik capital. The considerable population of Russian-speaking factory workers already living in the city offered culturally aligned support and immediate industrial potential. From the 1880s, Kharkiv had been the logistics center of mining in southern Russia, the control center of the southern railway, and the center for five regional factory districts. The city stood to play an even more significant role in the early Soviet period as the transit and administrative center of the Donets’ko-Kryvoriz’ka industrial basin. The official map of the first Five-Year Plan underscores the importance of the basin to the Soviet industrialization drive (plate 19). Only three sites merit inset maps at a larger scale: Leningrad, Moscow, and the Donets’k Basin, which was home to the raw materials of coal and iron ore needed to feed industry, and the plants to process them. Just to the west, and also within Kharkiv’s sphere of influence, was the Dnipro Hydroelectric Station (DniproHES) at Zaporizhzhia, the largest infrastructural project to grow out of Lenin’s GOELRO (State Commission for Electrification of Russia) Plan. Grain harvested in the agricultural heartland just beyond Kharkiv’s borders funded these heavy industrial projects.
Figure 7.1. Diagrams of dynamic growth, city of Kharkiv, c. 1932. Ten categories of growth are plotted from 1913 to 1932, and their continued rise is projected into the late 1940s. MUAR, 8-33295. Key translation and diagram by the author.
Grain was a crucial raw material in the Soviet industrialization drive, as indispensable as Baku's oil and Magnitogorsk's iron ore. At the start of the first Five-Year Plan, the Soviet state established grain as the primary commodity to fund industrialization. It was a resource that the Soviet Union was capable of producing in excess, but it did not, administrators understood, “come by itself.” It had to be extracted from peasant farmers, as the immediate postrevolutionary period
had proven. To feed the Red Army and the starving Russian cities, armed Bolshevik units stormed Ukrainian villages in 1920–21 to forcibly requisition grain. In retaliation, peasants refused to grow crops; their dissent, coupled with a drought in 1921–22, brought famine to the region and economic collapse. Peasant and worker uprisings followed, and while suppressed, mutual distrust between the rural population and perceived outsiders became the prevailing attitude that the Soviet government had to reckon with through the 1920s and 1930s. For a seven-year stretch during NEP, the Soviet state halted grain requisitioning in Ukraine, and peasants instead paid a moderate tax-in-cash to the government and were allowed to sell surplus crops at market value.

The era of self-organization and relative prosperity in the Ukrainian farmlands ended in the lead up to the first Five-Year Plan. At the Fifteenth Party Congress in December 1927, Soviet leadership codified a strategy that became known as *perekachka*—pumping agricultural resources into industrial projects. Because the USSR was not in a diplomatic position to receive international credit (the US government, for instance, did not recognize the Soviet Union officially until 1933), Soviet grain was exported to provide capital funds for the purchase of foreign machinery and expertise necessary to meet the targets of the plan.

In November 1929, Stalin announced the kick-off of a comprehensive collectivization effort for Soviet agriculture. Mobilization crews conducted mass searches for hidden grain and livestock in the countryside and assessed stiff fines and issued arrests for peasants caught with concealed property. Many kulak (wealthy peasant) families were rounded up and deported to the Urals and Siberia, and their property assumed by the state. Small-scale family farms were assessed an unduly high percentage of their crops for requisition, which forced many of them into debt to the state and finally into collective farms (kolkhozy). The bumper grain crop in 1930/31 only caused the government to raise requisitioning totals, forcing more small landowners into poorly organized and inefficient kolkhozy. By 1931, so much grain was being utilized to feed the industrialization effort that there was not enough to sustain the agricultural effort. Preparation for the 1932 crop was stymied by insufficient seeds to sow and peasants who were, in any event, too hungry and exhausted to do so. Increasingly violent state-peasant interactions occurred in the immediate vicinity of the Kharkiv Tractor Factory, a plant built to manufacture agricultural machinery that many displaced and hungry peasants would not survive to use. At least 3.9 million Ukrainian peasants died in the Holodomor, or forced famine, of 1932–33.

“To Common Work on Common Land! Integrally with Industry!”

The interdependent economic relationship between industrializing Kharkiv and the Ukrainian countryside is illustrated through the tractor, an object coproduced and integral to the Sovietization of both territories. The tractor was among a small
number of industrial products that carried specific objectives in the 1928 version of
the first Five-Year Plan, even though its critical role in collectivization was not yet
formulated. Despite early distrust of mechanized horsepower (some peasants purp-
portedly spat at the first tractors they saw), the tractor did become a coveted means
to modernize Soviet farming life. The most common and reliable model was the
US Fordson tractor. Fanaticism for Detroit’s agricultural machinery manifested in
many ways, not least in Russified Ford-based baby names invented by Soviet peas-
ant families.

The tractor also became a powerful propagandizing tool in 1920s Soviet culture,
as evidenced by its central role and frequent appearance in popular films released
during the first Five-Year Plan. In The General Line (Staroe i novoe, director: Sergei Eisenstein, 1929) and Earth (Zemlia, director: Aleksandr Dovzhenko, 1930), the
long-awaited tractor promises to enact transformation of byt and rural landscapes
in particularly spatial ways. At the most intimate scale, the tractor lifts the former
peasant, now collective farm worker, above the ground. In this elevated position,
a new perspective emerges that focuses on the extended smooth horizon rather than
the immediate tactile foreground. The tractor’s efficient plows are capable of alter-
ing and inscribing the earth with the clean Euclidean geometries of mechanization,
a purposeful conquering act of society over nature. Finally, and most important from

Figure 7.3. Tractor dance. As tractors altered the landscape beyond the frame, a new boundless scale
was planted in the Soviet imagination, one that coincided with the diffuse patterns in the first Five-Year
a planning perspective, the efficiency of the tractor drastically increases the productive range the agricultural worker can traverse in a day. The tractor-plowed landscape can be cognized as a vast territory of continuous fertile fields, commonly owned and worked without the historical divisions of contiguous family plots. All of these spatial repercussions are celebrated in the final minutes of *The General Line*. In shots montaged from various angles, the mass-produced steel wheels of a Fordson tractor approach, knock down, and snap the hand-hewn branches that formerly marked individual plots. Once the clearing is accomplished, a fleet of tractors engages in a remarkable choreographed dance (figure 7.3). They begin in a rigid line at the top of the shot, and then one by one they roll diagonally across the field joining rank to inscribe a perfectly plowed circle so large that it exceeds the limits of the camera’s viewfinder by the end of the sequence. As tractors altered the landscape beyond the frame, a new boundless scale was planted in the Soviet imagination, one that coincided with the diffuse patterns in the Plan’s graphic representation.

**Assembling the Soviet Tractor Industry**

In the common narratives of *The General Line* and *Earth*, small kolkhozy were able to usher themselves into agricultural modernization by acquiring a tractor for their collective farm. Tractor procurement for Soviet agricultural needs was more complex, and the tractor a less accessible object for individual kolkhozy, than these films suggest. Throughout the early and mid-1920s, tractors were few and far between in the Soviet Union. In 1922, the Soviet government repurposed their small store of wartime crawler tractors for agricultural use and organized state-run tractor columns, but the effort was patently unsuccessful. By the end of 1922, a mere 177 old and motley tractors existed in the entire Soviet Union, a fleet that could cover just 0.02 percent of arable land. By the end of the 1920s imports had increased the number of tractors on the ground, but these added machines did not change the complexion of Soviet agriculture appreciably. In 1928, only 1 percent of agricultural land in the Soviet Union was sown by tractor.17

Before 1929 the Soviet Union relied almost solely on imports of tractors from the United States. According to Anthony Sutton, the Ford Motor Company alone sold 20,000 tractors to the USSR between 1922 and 1926, and by 1927, 85 percent of all Soviet trucks and tractors had been built in Ford’s Detroit factories.18 Importation was so expensive—and the number of tractors so insufficient—that Soviet industrial planners recommended development of a Soviet-built version of the coveted agricultural machine. Charles Sorensen, one of Henry Ford’s deputies, traveled to the USSR in 1928 to negotiate a contract for a new auto works. His host from the Vesenkha, vice chairman Valerii Mezhlauk, brought Sorensen to the famous Putilov Steel Works in Leningrad.19 What the American saw on the factory floor was one of Ford’s patented products. “We came right on into the assembly room and
I stopped in astonishment. There on the floor lines they were building the Fordson tractor . . . What the Russians had done was to dismantle one of our tractors in the Putilov works, and their own people made drawings of all the disassembled parts. [But] it was apparent that, while the Russians had stolen the Fordson tractor design, they did not have any of our specifications for the material that entered into the various parts. And you can’t find that out merely by pulling the machine apart and studying the pieces.” 20 The Soviet Fordzon-Putilovets tractors produced by this reverse engineering method were, simply, unusable. Because Soviet engineers could not recreate the precise forging process required for each steel component, the Putilov-made tractors fell apart as soon as they hit the fields. Sorensen’s final assessment was that this “most ancient out-of-date plant” should be blown up with a barrel of dynamite. 21 After three years of trying and failing to replicate US technology through industrial espionage and literature review, the Soviet government brought US industrial specialists and their technology to the Soviet Union through above-board technical trade agreements.

A high-ranking delegation from Vesenkha visited the United States in 1928 and sought out architect Albert Kahn in his Detroit office. 22 Kahn’s work for Henry Ford at the River Rouge auto plant was well known to Soviet development experts. The architecture and engineering firm had a reputation for designing flexible industrial complexes driven by the exigencies of assembly-line production. In the 1920s, Kahn’s 400-person staff included architectural designers and draftsmen; structural, mechanical, electrical, and ventilation engineers; specification writers; estimators and expediters; field superintendents; and office workers. 23 In standard architectural practice at the time, coordination was sequential, meaning that architects developed a spatial scheme and then handed off drawings to outside technical specialists. Only after spatial or technical conflicts were flagged could negotiation between the architect and the engineers begin. By contrast, Kahn’s office hosted all specialties under one roof and engaged in simultaneous design, touting itself as a streamlined one-stop project delivery shop. Once expedited bids for a project were in, Kahn’s construction foremen could head directly to the field, and a completed factory could be up and running six months after the architect-client contract was signed. His firm’s efficiency, coupled with technical know-how gleaned from his work for Ford, made Kahn an attractive consultant in the context of the breakneck pace set for Soviet industrialization.

Albert Kahn, Inc. was in an early group of US construction consultants to the Soviet Union that included specialists in auto, tractor, steel, hydroelectric power, chemical fertilizer, and baking plants. 24 The Detroit-based firm signed a $4 million contract in June 1929 to design a single tractor plant for the southern Russian city of Stalingrad (now Volgograd) to produce 40,000 tractors annually. In the same month, the Economic Review of the Soviet Union noted that in addition to the expected production in Stalingrad, other tractor plants would help reach a goal of 100,000 Soviet-made tractors by the end of the first Five-Year Plan. Kharkiv
would produce 3,000 heavy tractors toward that goal, conceivably in the extant tractor shop at the Kharkiv Locomotive Factory, which turned out a small number of machines starting in 1924. By October, the *Economic Review* reported that the Soviet Chief Machine Building Administration “had revised its program for the production of tractors and agricultural machinery during the remaining four years covered by the Five-Year Plan . . . based on the demand of the newly organized state and collective farms.” Due to the uptick in demand, the tempo of construction on tractor plants already under construction would increase. Additional factories would be swiftly built, preferably in the Central Black Soil region or the broadly defined “South.” The tractor shop at the Kharkiv Locomotive Factory would be reconstructed to increase output from 5,000 (an inexplicable increase of 2,000 from the June numbers) to 10,000 tractors per year, and total tractor production in the USSR would reach 245,000 by the end of the Plan. This accounted for an overall 250 percent tractor production increase from estimates published just four months before (figure 7.4).

Concurrent events in the countryside just outside of Kharkiv put the astronomical tractor production increase in context. In October 1928, the Ukrainian Council of People’s Commissars announced to the Council of Labor and Defense

![Diagram](image)

**Figure 7.4.** Tractor output projections for Kharkiv, Ukraine in 1929. Between August and December, the number of tractors projected for production at the future Kharkiv Tractor Factory increased from 5,000 to 50,000 units. Diagram by the author based on data from the *Economic Review of the Soviet Union.*
that new tractor allocation for the spring sowing season was insufficient simply to replace the hard used and poorly maintained tractors that had gone offline that year.27 In October 1929, the month of these new projections, Stalin’s announcement about increased agricultural collectivization was a month away. Yet not nearly enough tractors were in the fields to meet the state’s escalating procurement demands. Soviet tractors needed to be produced en masse, which meant that Soviet tractor factories needed to be built, and quickly. A standard tractor factory model had to be found, one that could be as readily replicated as the Fordson tractor itself.

**Standardization and Speed**

Progress toward the first Five-Year Plan’s ambitious capital construction goals was repeatedly thwarted by shortages. There were insufficient technical drawings, building materials, skilled foremen, and laborers to build the complexes already inscribed as active industrial sites on the plan’s projective maps. In August 1929, the Building Committee of the USSR (Stroikom) issued a series of directives intended to usher the Soviet planning and construction industries into a new, more rationalized era.28 The directives addressed settlement planning and building-scale design problems separately. Planning regulations for urban environments would be developed by the People’s Commissariat for Internal Affairs (Narodnyi komissariat vnutrennikh del, NKVD), and regulations for agricultural stations would be handled by the newly established People’s Commissariat for Agriculture and Food (Narodnyi komissariat zemeledeliia, NKZ). Each ministry would determine the amount and tempo of planning for its given sector, but all decisions were pegged to the timeline for national industrialization.

A separate section of the directive addressed “typification, normalization, and standardization of building design” through four requirements.29 First, Stroikom required that each governmental department develop standard building types specific to its sector, draft measures to implement these types, and ensure their use in “real projects” by a set date. Second, building types critical to the first Five-Year Plan (especially industrial facilities) would be developed and put into use immediately. Third, nonindustrial programs such as housing and sociocultural facilities would be constructed based on only preapproved types by Stroikom. Fourth, building-related organizations would also be standardized, so that by the end of the plan all design would occur within state-run offices. Private design firms would no longer be permitted within the Soviet system. Solo practitioners like Aleksandr Ivanitskii would henceforth be subsumed into state-run design offices like Giprogor and Standartgorproekt.

Despite concerted internal efforts to satisfy the Stroikom conditions, design and construction standardization did not occur fast enough to meet the first Five-Year
Plan’s schedule. On December 26, 1929, two concurrent decisions pushed the Soviet construction industry toward a model of internationally assisted national standardization. The Sovnarkom issued a decree “On measures to cure the ills of building affairs” that commanded immediate rationalization of professional practice and foundation of a special standardization institute that would develop, publish, and distribute albums of type-projects. Additionally, “foreign firms and specialists will be entrusted to the construction of individual factories,” Pravda reported. “It is also considered expedient to attract a few engineering-construction firms to open branches to the USSR.” The same day, behind closed doors, the Sovnarkom signed off on a draft for an expanded contract with Albert Kahn, Inc. Under the new agreement, Kahn’s firm would direct the design and supervise construction for all industrial projects in the USSR for a period of two years. In his previous contract with the Soviet government for the design of the Stalingrad Tractor Factory, Kahn had retained rights to the architect’s instruments of service—drawings, specifications, and the intellectual property contained in the design—as is common practice in the United States. Under the new agreement with the Soviet government, Kahn’s firm would provide its client, Vesenkha, “standard factory layouts, detailed drawings, specifications, and other technical documentation ‘typical for architects working in America,’” all of which would become the lawful property of Vesenkha at the end of the term.

The importance of this proviso that released Kahn’s intellectual property to the Soviets, and the timing of the agreement, cannot be understated. When Kahn signed the expanded contract in January 1930, the Stalingrad Tractor Factory was nearing completion; the first Soviet-built “International” tractor rolled off the line six months later. The Wall Street stock market crash just two months before contract signing also put the future of Kahn’s work in the United States in question. Although the Stalingrad factory was designed under the restrictive US-style contract, once the client-favoring agreement was put in place, the Stalingrad blueprints fell under the new legal regime. On January 28, 1930, just nineteen days after the contract was inked, construction began on a new Soviet tractor factory outside Kharkiv, the capital of the Ukrainian Socialist Republic. It was to be an exact copy of Stalingrad.

**Ukrainian Tractors and Stalinist Tempo: The Search for a Site**

The Kharkiv Tractor Factory was not included in the original version of the first Five-Year Plan published in 1928; neither was industrialized agriculture, at least not on the scale instituted after 1929. The circumstances and the timeline of the factory’s inclusion in the modified Plan are worth considering in some detail, for they reveal the mercurial and ultimately frantic nature of economic decision-making during the early stages of the plan’s fulfillment. This single capital construction
project also demonstrates how particular sites became implicated in the Union-wide race to Soviet industrialization and, further, how architectural strategies like standardization became invaluable in meeting the Plan’s goals.

The Ukrainian branch of the State Institute for Metallurgical Factory Design (UkrGipromet) generated a feasibility and siting study in November 1929 to investigate possible Ukrainian Republic locations for a new tractor factory. It opened with a list of preconditions:

1. Guarantee of a fifteen-month construction period, in agreement with the directive provided by the highest economic bodies, such that the construction of the factory will be complete in the fall of 1931.
2. Guarantee that, even given this short period, full production will be met within a period of two years—that is, in 1931–32 the factory will turn out 30,000 units, and in 1932–33 50,000 units.
3. Achievement of a minimum cost.
4. Possible reduction of capital expenditures.33

The first precondition set the nearly impossible schedule. When one notes the published date of the feasibility study and calculates back fifteen months from the hard fall 1931 completion deadline, only seven months were allotted to prepare the drawings and site and gather the management and labor pool to construct the tractor factory. The second precondition stipulated that production targets be met in a timely fashion. This requirement attempted to head off a problem common to accelerated construction jobs in the first Five-Year Plan. Namely, that pressured officials would declare a factory complete before it was ready for production. The Stalingrad Tractor Factory, although still under construction at the time the report was filed, fell victim to this temptation. Leon Swajian, the US engineer and chief of construction from Detroit who oversaw Albert Kahn Inc’s work on the Stalingrad, Cheliabinsk, and Kharkiv tractor factories, revealed this fact a year after Stalingrad was declared complete. “We learned a lesson from Stalingrad, which ‘opened’ more than a year ahead of schedule, but didn’t make many tractors,” Swajian noted in 1931. “At Kharkov we’ll turn out a few tractors first, and then call her ‘open.’”34

The concern of the final two conditions was cost reduction, which was difficult to ensure given the expedited construction tempo. Architectural standardization was the only solution that could meet all four preconditions. The project could be either a kit, in which all components are factory fabricated and shipped to the site for rapid erection, like at Stalingrad, or a 1:1 copy of a preexisting factory, to forgo the design process altogether.

Three factors drove the tractor plant’s siting. Local building materials had to be available and affordable. Quick, uninterrupted delivery of these materials had to be assured, and delivery costs minimized. Finally, the site had to be in a location from which ample construction workers could be drawn, up to 10,000 at the height
of deployment (a number contingent on the requisite supply of food, medical, and cultural services). The report’s authors quickly winnowed the list of possible sites down to “large industrial centers with the presence of a developed metal industry,” and Kharkiv was ultimately selected because a new plant there could capitalize on a cadre of pretrained technical specialists from the small tractor shop embedded within the Kharkiv Locomotive Plant.35

The feasibility study’s authors looked for a site no more than fifteen kilometers outside the city center of Kharkiv for a factory with an annual output of 5,000 tractors. They conducted reconnaissance on ten sites either on or adjacent to existing heavy rail lines, with areas ranging from 16 to 400 hectares. An exploratory extraurban plan shows the newly expanded Kharkiv city boundary (hatched) plus major roads and rail lines radiating from the urban center (plate 20). The ten potential sites are indicated by white rectangles coincident with their footprint; most read as tiny flecks within the greater Kharkiv region. Only one site, Losevo, a preexisting station stop on the southeast heavy rail line out of the city, could be construed as a city-sized parcel in its own right. When UkrGipromez received word that tractor output projections for the future factory would increase to 35,000 and finally to 50,000 units per year, “it became abundantly clear from the perspective of future expansion that the only site within the given radius that satisfied all requirements for such a powerful plant and factory village—really factory city—was Losevo.”36

The Losevo siting would not have surprised the local planning community. In 1924, under the direction of local engineer A. F. Voitkevich and architect A. A. Main, Kharkiv city limits were expanded to accommodate industrial enterprise within municipal boundaries. Moskovskii Prospekt, running in a southeasterly direction from the center along the heavy rail line, was designated as an industrial growth zone where factories for machine tools, turbines, and tractors could be located.37 Losevo was so far removed from Kharkiv city center and yet so rationally placed along the designated trajectory for future industrial growth that the site could have found support from both urbanist and disurbanist camps.

Documentary film footage of the Losevo site just prior to construction shows a snow-covered and windswept plain with a few structures in the far distance.38 “Before” photographs show nothing more than a black strip of unoccupied land, topped by a slim strip of sky.39 The territory was spoken for and controlled, nonetheless, by five local entities including the Stalin Kolkhoz.40 UkrGipromez began negotiations in October with the People’s Commissariat for Agriculture and Food to reassign existing tenants to parcels off the Losevo site.41 It is no small paradox that a Ukrainian kolkhoz, undoubtedly under intense grain procurement pressure in late 1929, was uprooted to make way for a factory whose tractors were intended to bolster agricultural productivity.

The feasibility study concluded with a summary of why Losevo was the ideal site for the future tractor factory. The favorable natural conditions of the site included
good local water supply; solid soil; flat topography; “healthy” qualities due to its distance from marshlands; local wind patterns that blew away from the site; and local stores of building material ingredients nearby like clay, sand, and stone. Equally important were the infrastructural and demographic resources of the site. National and local rail linkages permitted easy transportation of building materials. Proximity to Kharkiv was crucial, “so as to use all of the technical and scientific strength of the capital of Ukraine, and to rationally utilize local workforce to maximize cost reductions in the construction of the factory itself.” Finally, the site benefitted from its location near the existing Kharkiv Locomotive Plant tractor shop and its cadre of experienced workers.42

Despite the fact that the socialist urbanism debate was at its peak when the Kharkiv Tractor Factory siting report was issued in late 1929, its authors only seriously considered sites in or adjacent to established urban nodes. The three main criteria for site selection—access to building materials, quick and inexpensive delivery of those materials, and proximity to a preexisting labor pool—are not explicitly socialist. No discussion took place about the importance of dissolving the urban-rural divide, expanding industrial efforts beyond existing urban centers, or creating a site where new socialist relations could be inculcated.43 When UkrGipromez discussed the tractor plant’s siting with the Land Department of the Regional Executive Committee and with US consultants, all parties agreed that Losevo was the ideal site.44 The single most important factor that determined the site choice was speed. By jettisoning socialist settlement dispersal theory, UkrGipromez was able to site the factory based on project delivery criteria to meet the deadlines imposed on it.

From Stalingrad to Kharkiv: The Factories Compared

As the poor performance of the reverse engineered Fordzon-Putilovets tractors had proven, only an all-inclusive, vetted tractor production facility could ensure a faultless end product. As soon as Kharkiv was chosen as the site, negotiations began between Traktorstroi, the Kharkiv-based organization set up to oversee the construction project, and the US machine-building company Caterpillar to deliver full plans and construction support for the Kharkiv factory.45 Talks broke down quickly over two crucial issues: cost and transparency. Traktorstroi’s executives were affronted most by the US company’s refusal to share industry secrets. A contemporary account followed the swift breakdown of negotiations:

When a group of executives from Traktorstroi approached the owner of the US company “Caterpillar” with a proposal to order a project for the Kharkov Tractor Plant, the price quoted was 7 million rubles gold (!) and he agreed to develop and submit it to us only under the condition that Soviet representatives remain uninvolved in his enterprise, without the right to study the production or the machines (?!). These conditions were rejected, and technical
“aid” of US capitalists was replaced with the study of other tractor factories in the United States.46

The exclamatory punctuation interjected in this Soviet version of the story underscores misaligned expectations between the two parties. The first point of friction was the price tag for the factory design. After the poor 1929 agricultural season, Soviet currency reserves could not satisfy Caterpillar’s fee. Second, the US firm correctly intuited that the Soviet objective in ordering the tractor plant was to possess a wholly replicable system of production. At such a price, the Soviet government expected nothing less than keys to the whole industrial process.

The expanded design consultancy contract with Albert Kahn, Inc. was solidified just before the Caterpillar talks collapsed. In mid-April 1930, the Council of Labor and Defense (STO) elected to change the tractor type at Kharkiv to the “International,” and to duplicate the plans from the Stalingrad tractor plant to speed up and reduce the cost of construction.47 By the time this decision was made only eighteen months remained before tractors were expected to roll off the assembly line in Kharkiv. Even without clear planning direction, building materials were being “energetically” transported to the Losevo site in the dead of winter. A brick factory was also built three kilometers away from the future factory site, purportedly in a record eighty-two working days.48 Ultimately, the decision to build the Kharkiv plant as a duplicate of Stalingrad came so quickly on the heels of Kahn’s second contract that it seems likely that decision makers at Vesenkha and STO discussed the idea before the expanded agreement with Kahn was signed. Seen in this light, the accelerated completion schedule for the Kharkiv factory is the reflection of Soviet industrial planners’ faith in architectural standardization.

Neither Soviet-era archives nor Kahn’s Detroit office hold original Kharkiv Tractor Factory drawings. A comparison of the Stalingrad and Kharkiv Tractor Factory complexes emerges only through the aggregation of graphic, textual, and anecdotal evidence. But before comparing, it is important to invoke the difference between architectural type and model, which should not be conflated, as they work at different scales and require differing degrees of exactitude. A discrete tractor factory structure (foundry, forge shop, assembly building) constitutes a type: each is a building so integrally designed to meet functional requirements that it asks to be copied near exactly. The factory site plan, on the other hand, is a model: a formal template that may be tweaked to respond to geographic, topographic, industrial, or social needs. Another way of articulating the difference is to insist that a type is tied to its plan and cannot deviate from it, whereas a model can be abstracted into a diagram that may generate any number of plans. The term “standardization” covers both: it is the practice by which a type or model is replicated and widely disseminated. The Soviet-inflected standardization process of priviazka allowed for slight adjustment of both architectural types and models to meet the specific contours and needs of each site, and to respond to lessons learned from one installation of a project to the next, as the Stalingrad and Kharkiv pairing demonstrates. A methodical
comparison of the factories in three registers—at the building scale, in terms of materiality, and as site plans—reveals that these projects were far from identical, and furthermore that 1:1 standardization of the tractor factory was not the goal of Soviet industrial planners; strategic use of US industrial types, and improvement of the factory model, was.

The Stalingrad Tractor Factory complex is composed of three large industrial buildings seen in a bird’s eye perspective: a nearly square foundry at the upper right corner of the site, a large narrow rectangular assembly building stretching from the site’s lower right edge, and a three-legged forge shop at the upper left (figure 7.5). To compare the plan, or type, of one individual building, it is instructive to consider the forge shop, which has the most distinctive footprint of the trio with a narrow rectangular bar for the first heat treatment and three slim legs attached perpendicularly to hold the heavy and light forge shops and die machining. Though the three-legged planometric idiosyncrasy of the forge shop is evident from the aerial, the rationality of the Albert Kahn Inc. design is revealed in the plan’s structural grid (figure 7.6). The building’s columnar organization, indicated by both horizontal and vertical dashed lines capped by circles, plats the site with a perfectly square six-meter grid. This neutral system, isometric in both directions, holds each leg of the building within strict structural logic and permits infinite expansion beyond the confines of the enclosed structure. The detached material storage building to the south of the forge shop, for instance, registers this infinite grid by snapping neatly into place. Kahn’s outward architectural signature is in the myriad daylighting solutions illustrated in the building sections and elevations (figure 7.7). The butterfly trusses, popped monitors, and saw-tooth skylights—known in concert as the Kahn

![Figure 7.5. Bird’s eye perspective, Stalingrad Tractor Factory, 1929. Included are the foundry building (upper right), assembly building (lower right), and forge shop (upper left). Architects: Albert Kahn, Inc. Albert Kahn Associates records, Bentley Historical Library, University of Michigan.](image)
Figure 7.6. Forge shop plans, Stalingrad Tractor Factory, 1929. Architects: Albert Kahn, Inc. Albert Kahn Associates records, Bentley Historical Library, University of Michigan.

Figure 7.7. Forge shop sections, Stalingrad Tractor Factory, 1929. The Kahn Daylight System—butterfly trusses, popped monitors, saw-tooth skylights—and generously glazed elevations provide a working environment filled with natural light. Architects: Albert Kahn, Inc. Albert Kahn Associates records, Bentley Historical Library, University of Michigan.
Daylight System—work along with generously glazed elevations to provide a working environment filled with natural light from multiple directions.\(^{49}\)

The dimensional precision and custom detailing promised by the drawings were quality-assured on the Stalingrad site by the project’s material delivery system. The Stalingrad Tractor Factory was a fully imported artifact: a US-produced erector set constructed largely by US and German workers under the former’s supervision in Stalingrad.\(^{50}\) The structural columns—designed with US steel profiles—were manufactured in the United States and shipped to the USSR, as were the trusses, the door and window frames, and the technical equipment to run the factory such as steel presses imported from Toledo and Erie.\(^ {51}\) The construction process at Stalingrad should have been as straightforward as matching the pieces to the drawings, hoisting the members in place, and securing the joints. The relative chaos of the site and the lack of local skilled laborers to assist with construction were nonetheless stumbling blocks to the smooth and timely erection of imported pieces. Anna Louise Strong visited the Stalingrad Tractor Factory site in 1931 and noted that “around [the] finished buildings, to the north, south, east and west there is still the debris of construction, a year after the tractor works was formally declared open.”\(^ {52}\)

The only architectural drawings of the Kharkiv Tractor Factory to have surfaced come from a 1932 pamphlet published at the completion of construction, and two later publications from 1962 and 1987 on the architecture of Soviet Ukraine. According to the 1987 book, four Soviet architects designed the “second phase” of the Kharkiv factory; Albert Kahn, Inc. is not mentioned (figure 7.8).\(^ {53}\) The three-legged forge shop is the sole building illustrated in the later books, and is well documented in a plan, long elevation, partial section, and axonometric projection. When this Kharkiv plan is placed on top of Kahn’s Stalingrad forge shop plan, the building footprints perfectly align, down to the six-meter structural bays. Yet in a photograph, the Kharkiv factory buildings are notably heavier and more opaque than their Stalingrad siblings—thick-walled structures with punctured window openings, not the light steel-framed window walls of Stalingrad (figure 7.9).

Speed, cost, and labor supply pushed Soviet engineers and planners to differentiate the Kharkiv project materially. By April 1930 (the date of the STO resolution to produce “International” tractors at Kharkiv, which linked it to Stalingrad), imports from the United States had slowed. The tempo and economics of full factory importation were unsustainable in both the short and long term. As imported steel members slowly made their way from the United States to the USSR, tying the project schedule to foreign supply chains, on-site engineers used the downtime to rethink the structural constitution of the factory altogether.

Numerous texts confirm that significant material changes were made in the transformation from the first tractor factory complex to the second, namely from fully prefabricated steel structures at Stalingrad to hybrid steel and reinforced concrete structures at Kharkiv. Leon Swajian, the construction foreman from Kahn’s office who was transferred to Kharkiv once Stalingrad was complete, noted in a 1931 interview that “Kharkov was supposed to follow the designs made for Stalingrad, but this
Figure 7.8. Forge shop elevation, section, plan, and axonometric projection, Kharkiv Tractor Factory, 1930. Architectural similarities render the Kharkiv factory a close sibling to the Stalingrad factory, although numerous material changes were made to the original (an enactment of *priviazka*). Architects: none cited. G. V. Golovko, ed., *Narysy istorii arkhitektury Ukrainskoi RSR* (radianskyi period) (Kyiv: Derzh. vyd. lit. z bud. i arkh., 1962), 2:70.

Figure 7.9. West entrance, with the forge shop’s butterfly trusses visible in the background, Kharkiv Tractor Factory, Kharkiv, Ukraine, 1930s. Akademiiia budivnytstva i arkhitektyry URSR, *Ukraina: Arkhitektura mist i sil* (Kyiv: Derzh. vyd. lit. z bud. i arkh., 1959).
proved impossible. Imports of the steel had to be economized, so the Kharkov plant was built largely of reinforced concrete.” A Soviet engineer filled in the details:

Initially, the project of the Kharkov tractor plant was fully purchased in the United States. The design department of “Indbudu” [Industrial Construction] developed only an adjustment (priviazku) to the overseas drawings to fit the site of the plant. But when the equipment and metalwork for workshops began to come from overseas, O.I. Nerovetsky [the Ukrainian head engineer] proposed for the first assembly plant, and then for all workshops of the plant, to replace the metal structures with reinforced concrete and to abandon the US project . . . Despite the large penalty paid for the refusal of the “US factory” due to the use of concrete on KhTZ, the country received savings of about five million rubles in gold.

The Kharkiv Tractor Factory was intended to be Stalingrad’s twin, an entire industrial installation preordered from US manufacturers. Ukrainian engineers in the local design bureau Indbudu were at first tasked only to tweak the project slightly to fit the Losevo site, but as the project progressed, the structural system at Kharkiv was more invasively redesigned by the Soviet technical team.

By that point, the nascent Soviet steel industry was able to produce the rough reinforcing bars for a concrete structure, which would be quicker and cheaper to build. In the final accounting, the Kharkiv factory was redesigned as a hybrid industrial complex that utilized three structural systems. The forge shop retained its full steel structure and became the only building on site that truly replicated its Stalingrad sibling; the mechanical assembly shop was redesigned as a reinforced concrete building; and the foundry was built as a concrete base topped by a steel frame. Some Kahn-like roof trusses in the complex were even redesigned by the Soviet engineers in wood. All remaining walls, and wall infill, were constructed of red brick produced at the new brick factory three kilometers from the tractor factory site.

Labor diversity was a side benefit of the material changes, since “it helped with the lack of a good working cadre on site and the general deficit of qualified construction workers in the USSR,” wrote one contemporary author. The revised structural designs allowed Traktorstroi to employ construction workers from a number of different specialties: metal workers, stone workers, and those capable of doing the reinforcing and concrete work. Some newly skilled concrete workers were enticed to transfer their skills from Stalingrad to Kharkiv (figure 7.10). A comrade Marusin, who was “born and bred on a farm” but learned concrete-mixing at Stalingrad, became a shock brigade leader at Kharkiv, and later won the Order of Lenin for his work on both tractor factory sites. His fellow concrete-mixing colleague comrade Movlev “won fame and glory by establishing the record of 1,000 concrete mixings each day,” claimed a Soviet pamphlet author. It is also possible that some newly skilled local concrete specialists who had worked on the Derzhprom building (completed in 1929) came on to the project. Skilled laborers trained on one site were put into leadership positions on the next.
Figure 7.10. “Concrete-mixing brigade headed by comrades like MOVLEV and MARUSIN guarantee the rapid construction of the Kharkiv Tractor Factory.” Fred E. Beal, Foreign Workers in a Soviet Tractor Plant (Moscow: Co-operative Publishing Society of Foreign Workers in the USSR, 1933), 12.
Although the building plans at the Kharkiv factory remained typologically related to Stalingrad’s, the factory precinct’s site plan changed by necessity, just as the construction materials had. Soviet chief engineer of construction, A. D. Bruskin (who also won the Order of Lenin for his work on the Kharkiv factory), oversaw both design and construction of the complex.59 At the start of the project in April 1930, his construction management team was given a set of drawings similar to those provided by Albert Kahn, Inc. for the three main buildings at Stalingrad. “It is important to note,” a contemporary account stressed, “that the construction management did not have a definitively established final master plan at the beginning of actual construction with the exception of the exact location of the three main shops and the repair shop, as well as the main office of the factory. The remaining parts of the general plan were worked out in detail almost over the whole length of the construction, and there were up to twelve variants of the general plan during that period.” What was fixed on the Kharkiv site was the relationship between the three primary buildings, as a comparison of the site plans reveals (figure 7.11). All other planning decisions were left in the hands of the estimated 600+ local technical-engineering staff who participated in redesigning the project and drafting the working drawings needed by Traktorstroi.60 Local designers determined the general plan of the entire factory territory, which included the organization of the support buildings, the location of underground tunnels and roads, and the placement of shops, canteens, and other social-service buildings that a socialist factory required. Planning decisions were made based on the particulars of the Losevo site, but also on lessons learned from Stalingrad. The tool and repair shops, located at the top of the Stalingrad site plan, were moved to more fitting locations within the assembly building and between the foundry and forge shops, respectively. Not only did these planning adjustments improve workflow, but they also opened up a more logical site for the main offices facing the future sotsgorod and tramline into Kharkiv. Smaller internal tweaks improved day-to-day working conditions. The wheel-room in the assembly shop in Kharkiv was placed not in the center of the open workspace with its deafening noise.

Figure 7.11. Site plan comparison between Stalingrad Tractor Factory (left) and Kharkiv Tractor Factory (right). Planning and logistical improvements were made on the Kharkiv site including moving the tool and repair shops to improve workflow and preserve a logical site for the main offices to face the future sotsgorod and tramline into Kharkiv. Diagram by the author based on materials from Albert Kahn Associates records, Bentley Historical Library, University of Michigan, and N. Baltuzevich, Opyt i uroki stroitel'stva KhTZ (Moscow: Gosstroizdat, 1932), 34.
and combustible oil but in its own brick-walled chamber at the end of the building. Internal monorail lines and storage rooms were also adjusted and improved on the Kharkiv site to avoid the chaos and clutter that plagued Stalingrad.61

Priviazka, Brotherly Resemblance, and Tolerance

Given the significant differences between the factories at Stalingrad and Kharkiv, can the Kharkiv Tractor Factory be considered evidence of standardization? To answer this question requires carefully defining the term in the early Soviet context. Architectural standardization during the first Five-Year Plan was not a matter of identically duplicating a product; it required strategic reconfiguration of the original artifact to meet the conditions of a new site. At its core, the first Five-Year Plan was the accelerated effort to devise a distinctly Soviet version of standardization, one that mapped on to the realities of a transitional context. Soviet standardization may have originated with the direct importation of US industrial materials, systems, and management styles, but it morphed through trial and error into a set of practices applicable to wildly varied environments—from industrialized Ukraine to the Ural steppe.

Unlike the emphatically precise US version, the Soviet system of standardization was heuristic and flexible of necessity, forgiving of imperfect sites, supply chains, and labor conditions. Although these loosely standardized practices were appropriate for difficult circumstances, they were not without serious challenges.62 In Swajian's opinion, Kharkiv's tractor factory was more difficult to build than Stalingrad's. Not only were the structural materials of the second factory changed for the reasons outlined above, but the success of any material request hinged on uncontrollable supply factors. As Swajian noted, US engineers were “accustomed to a country where you can order anything you like one day and get it the next,” whereas in the Soviet context the construction manager either had to anticipate long lead times and make early material orders or, on a rushed project like Kharkiv, simply change tack. In the USSR, Swajian adopted a flexible management style to counter instability. “We must learn to take account of what material is available here, instead of imposing absolute standards,” he concluded.63 Swajian's comments refute the outdated but persistent narrative of unidirectional technology transfer between the United States and the USSR in the 1920s and 1930s. US efficiency and precision had to bend to Soviet contingency, and Swajian and other US experts acquired new skills of ingenuity and resilience during their Soviet tenure that they brought back to the United States and utilized on New Deal capital projects upon return. Turning out a successful project in the early USSR required more than competent administrative skills from the expert. Success hinged on the ability of the expert to solve problems on the fly, to use the materials and labor at hand, and to work toward acceptable tolerances, not perfection.

The long-term implications of the tractor factory standardization experiment become clearer at the Union scale. The Kharkiv Tractor Factory was a model project for the priviazka system of typological replication that continued well after
Kahn staff left the USSR in 1932. This Soviet version of standardized architectural production assumed that strategic adjustments to the original model would be necessary to permit the final product and its model to bear a family resemblance even if the material and labor conditions under which they were created differed drastically, as Yves Cohen aptly notes in his study comparing the US and Soviet versions of Ford tractors:

Compared side by side, a *Fordson* and *Fordzon-Putilovets* resembled each other like brothers. At this level they were standard products; the artifact was well copied. At another level, the parts and the mechanical assemblies resembled each other, but there the resemblance ended. I do not at all mean to say that standardized products have to be identical. On the contrary: it is this very paradox of mass production that Henry Ford was the first to solve; to be identical at the level of the complete product, its constituent parts need not be identical.64

What is important to control in the process of replication is not equivalence but tolerance, Cohen stresses, a reasonable distance between the original and its copy so that the two act satisfactorily alike. In the case of the Fordzon-Putilovets tractor, external tolerance was acceptable for propagandistic purposes. A photograph of a Soviet-made Fordzon-Putilovets plowing collectivized fields was good enough for Stalin to claim socialist cooptation of US technology. As Ford's colleague Sorenson found, however, poor manufacture of mechanical parts rendered the internal tolerance of the Fordzon-Putilovets unacceptable. The Soviet-made tractor could not perform its task; it disintegrated on the field. The Fordzon-Putilovets might have looked like a Fordson, but it did not act like a Fordson. Soviet standardization of the tractor was a failure.

Cohen's notion of tolerance is helpful to answer the question of whether the Stalingrad and Kharkiv tractor factories are early evidence of Soviet architectural standardization. If judged by external tolerance, Kharkiv was a poor copy of Stalingrad. The structural systems and material constitution of the two factories differed so greatly that the buildings could never be mistaken for one another. But the architectural DNA—the plans—reveal that the forge shops, at least, were typologically identical, as were the relationships between the three main factory buildings on the site plan. Since the task of the factories relied on spatial congruence, not appearance, internal tolerance was well within acceptable limits. The Kharkiv factory might not have looked like Stalingrad, but it acted the same. Soviet standardization of the tractor factory was a success.

Another way to assess whether the Kharkiv Tractor Factory was an example of architectural standardization is to pose the question to the architect of the original. Would Albert Kahn, well versed in Ford's philosophy of mass production, have considered Kharkiv his project, despite the copious material changes made to the copy?
In fact, he did. In a 1939 monograph, *Industrial Architecture of Albert Kahn, Inc.*, a two-page spread illustrates a map of the world peppered with cities in which Kahn architecture resides. Kahn projects are found on all six habitable continents, with the United States and the USSR sharing the highest density of building. Stalingrad, Kharkiv, and Cheliabinsk are all indicated as Kahn sites, despite the fact that Soviet sources cited him as the architect of Stalingrad solely. In total, Kahn office records confirm that 531 factories based to some degree on the firm’s drawings and specifications were completed in the USSR by the time the firm’s two-year consultancy was over, and more than 4,000 Soviet technicians were trained by Kahn management in Detroit, Moscow, and in the satellite construction offices. The number of unconfirmed facilities based on plans or details developed by Kahn’s office, *priviazka* copies of brotherly resemblance, will probably never be known but is likely in the thousands.

Nearly a decade after the Soviet consultancy, Kahn noted that, in the firm, “all departments start work simultaneously instead of working in successive stages and this, in addition to speeding up the work of making the drawings, means that plans and specifications for all trades can be submitted for bids at one time. With this procedure, the drawings for a large factory can be completed in a week or ten days’ time if necessary.” This speedy turn-around was bolstered by lessons Kahn’s designers learned in the USSR. *Assembly Plant Plans* (1934), a booklet of automobile assembly building designs for numerous US sites, was compiled two years after Kahn’s employees returned from the Soviet Union. It shows slightly tweaked versions of the same plan adjusted for site particularities, possibly inspired by the Soviets’ practice of *priviazka*.

Anna Louise Strong compared the two tractor factories in a 1931 article. “Poor Stalingrad,” she lamented, “that had not only to start with a solid mass of unskilled labour, but to develop skill for itself and Kharkiv too! Shop by shop, the Americans [in Kharkiv] showed me improvements, made on the basis of Stalingrad experience.” Her most poignant observation followed. “Those who point to improvements made under capitalism through competition of opposing plants, overlook the improvements made in the USSR by passing on experience from one plant to another.”

Within the confines of Soviet socialism, a new kind of architectural research and development process was invented. Each construction project presented an opportunity to learn from internal mistakes and improve on the model within the limits of a still-developing industrial complex. The Kharkiv Tractor Factory was not a mere copy of Stalingrad, or even a younger brother. It was its genetically superior offspring.

Two types of Western standardization—architectural and managerial—were assumed by the Soviets during and after the conclusion of the first Five-Year Plan. First, standard Western architectural details, plans, sections, and entire multibuilding projects were absorbed into everyday Soviet design practice. As promised by the Sovnarkom in 1929, “typification” was accelerated by the publication of books like *Modern Prefabricated-Factory Architecture* (*Sovremennaia fabrichno-zavodskaia*...
This manual, full of architectural details of the “American type,” was pulled from the shelves in the later 1930s, when the story of US involvement in Soviet industrialization was no longer ideologically palatable, but the renamed details remained in circulation. Second, centralized design organization, pioneered in Kahn’s Detroit office, was quickly adopted as the Soviet managerial standard. One Soviet example, the State Institute for City Planning (Gosudarstvennyi institut po proektirovaniiu gorodov or Giprogor), founded in 1929, employed architects, transportation engineers, and sanitation experts among other specialists within a single agency.

Most important, out of this period a distinctly Soviet version of architectural standardization emerged: priviazka. When the Kharkiv Tractor Factory was nearing completion in 1930, People’s Commissar for External and Internal Trade, Anastas Mikoyan, laid out the official Soviet stance on standardization going forward. Mikoyan was well acquainted with US industrial practices but believed that only under a planned economy would standardization be optimized. “If we had such technology as America has, we would succeed fully in realizing a system of mass production and standardization and we would reduce wastefulness in the economy to nothing, for there are no such social barriers in our way,” Mikoyan claimed.
“When we overcome technical backwardness then doubtless we shall achieve colossal results. We will have a planned economy, high technology, mass production, standardization, and specialization of plants as well as regions.” In Mikoyan’s view, once the planned economy and mass production were successfully combined, Soviet technology would leapfrog US technology. Mikoyan went so far as to implicate national space in his long-term standardization schema. He envisioned not only individual industrial installations like the Kharkiv Tractor Factory, but whole regions planned as standardized units. The diffuse settlement diagram justified by citations of Marx and Engels and forwarded by socialist urban theoreticians like Sabsovich and Okhitovich, could be instantiated by predesigned blocks colonizing the Soviet landscape. New Kharkiv, the name given to the sotsgorod constructed across the tram tracks from the Kharkiv Tractor Factory, was one of the first successful test cases of just such a standardized urban unit.