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THE TRANSFORMATION OF THE STEPPE: ECOLOGICAL IMPERIALISM AND LIVESTOCK-AGRICULTURE IN KAZAKHSTAN, 1891-1964

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For my parents

An organism without an external environment supporting its existence is impossible; hence the scientific definition of an organism should include the environment which influences it, since without the latter the organism cannot exist.

I. M. Sechenov, 1861

At the center of the modern doctrine "on the relationship between so-called *living* and *dead* nature" lies *soil science*, understood in our Russian sense of the word...
The *earth* is the most hope for man in particular and the organic world in general: it has always been the most compliant and gracious for its temporary inhabitants, and therefore, of course, the most important for us and for our culture; secondly, *soils* are a *mirror*, a bright and quite truthful reflection.

Vasily Dokuchaev, 1898

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Introduction

In 1929, 7,442,000 head of cattle were spread across the vast territory of the Kazakh Soviet Socialist Republic. By 1931, the number had dropped to 2,800,000 animals.[1] By 1935, only 1,830,000 animals remained, nearly an 80% reduction.[2] Over the course of the First Five-Year Plan, Kazakh livestock herds—once the wealth of nomadic pastoralists and the lifeblood of Russian imperial food systems—were on the brink of collapse. Yet decades later, First Secretary of the Kazakh Communist Party, Dinmukhamed Kunaev would celebrate the restoration of these livestock herds in the republic as the conquering of a "second Virgin Lands [*vtoraia tselina*]." In the process of this tremendous destruction and resuscitation of animal life, nomadic pastoralism as a traditional mode of Kazakh animal husbandry faded away. In its place stood gigantic fields of grain monocultures, barns with the capacity to shelter hundreds of animals, and Ukrainian, Belorussian, and Caucasian cattlemen that measured their work in feed units per hectare rather than seasonal migrations across ancestral pastures. This dissertation began from a basic, awestruck question: *How did this transformation occur—all in less than a century?*

The answer lies in the title of this dissertation, "The Transformation of the Steppe," itself a nod to 1967 compilation of essays from leading agricultural ministers in Kazakhstan entitled *The Transformed Steppe* [Preobrazhennaia step']. Political ideology, economic policy, and even a monopoly on violence were necessary but not sufficient conditions to transform the Kazakh steppe from the domain of nomadic pastoralists to the home of Soviet collective farmers. Russian and Soviet statesmen, with the help of natural scientists, systematically transformed the biological

[1] Sarah Cameron, *The Hungry Steppe* (Cornell University Press, 2018), 109.
[2] *Kazakhstan za 40 let: statisticheskii sbornik* (Gosstatizdat, 1963), 156.

foundations of the steppe itself. Through the lens of what I call "steppe epistemologies"—the changing ways that Russian and Soviet scientists and administrators understood and categorized soils, plants, animals, and their relationships—this study traces how imperial and Soviet power operated through the material transformation of nature to achieve cultural and political dominance.

The Transformation of Steppe Biota

Central to this analysis are the transformations of four key biological components of the steppe ecosystem: human populations, livestock (specifically bovines), plant communities, and soils. Rather than treating these as mere background to human political and economic activity, I draw on insights from critical soil studies scholars who seek to "socialize the soil, and soil the social" by examining the "relational materiality" of ecosystems. In their introductory article for a special issue on soils in *Environmental Humanities*, interdisciplinary scholars Anna Krzywoszynska and Greta Marchesi "call for forms of soil investigation and action that acknowledge symmetrically the emergent biophysical agency of soil ecosystems, their sociocultural constitution, and the dynamic interactions between those factors."[3] As a historian, I trace the evolving "ontological politics" and epistemologies of steppe biota across nearly eight decades of Russian and Soviet rule.

Natural scientists are key protagonists in this story as they provide the vocabulary and concepts for the epistemological and ontological meanings of these steppe biota. Through their investigations, selections, and classifications, they helped define what soils *were* and how they should be related to, what constituted appropriate plant communities, and how livestock should be bred, fed, and managed. Scientific knowledge was not neutral information that Tsarist and Soviet

[3] Anna Krzywoszynska and Greta Marchesi, "Toward a Relational Materiality of Soils," *Environmental Humanities* 12, no. 1 (2020): 194.

statesmen then used or misused. Rather, the way scientists categorized, measured, and understood steppe relationships directly shaped what kinds of interventions seemed reasonable, necessary, or possible. Even still, the relationship between scientific knowledge production and environmental policy was neither linear nor automatic. Indeed, as I will show, Khrushchev and Kunaev's Virgin Lands Campaigns is precisely the period of the greatest environmental destruction, and yet this destruction occurred not when scientific knowledge was absent, but when it was systematically subordinated to political and economic imperatives.

Tsarist Russia was the home of the founder of modern soil science, Vasily Dokuchaev, while the Soviet Union became the world's first socialist state to systematically apply Marxist principles to agricultural science. Surprisingly, few scholars have investigated the importance of soil science to socialist thinking in its historical manifestation or examined how Russian soil science shaped imperial, colonial, settler colonial, or postcolonial relationships with land. John Bellamy Foster's *Marx's Ecology* enthralled social scientists of the Anthropocene two decades ago, and more recent discoveries of Marx's writings on soil metabolism and political economy have been teased out by pioneering scholars such as Kohei Saito.[4] Mieke Erley shows how soil science and Marxism went hand in glove in radical circles of Russian intellectuals at the end of the nineteenth century.[5] This dissertation is an attempt to show how the science of soils informed socialist agricultural production as it was historically practiced. I show how successive "steppe epistemologies"—from Dokuchaev's holistic understanding of soil formation through Stalin's dialectical-materialist agrobiology to Khrushchev's mechanized agricultural modernization—

[4] See John Bellamy Foster, *Marx's Ecology: Materialism and Nature* (Monthly Review Press, 2000) and Kohei Saito, *Karl Marx's Ecosocialism: Capitalism, Nature, and the Unfinished Critique of Political Economy* (Monthly Review Press, 2017).
[5] Mieka Erley, *On Russian Soil*: *Myth and Materiality* (Cornell University Press, 2021).

provided the scientific justification for transforming the material basis of nomadic life in the world's first socialist state.

Rethinking Environmental and Colonial History

Environmental historians have increasingly recognized the importance of multispecies relationships and more-than-human agency, but studies of the Russian Empire and Soviet Union have been slower to incorporate these insights. Sarah Cameron's account of collectivization and forced sedentarization in Kazakhstan understands these processes as tensions between Moscow's attempts to make the Kazakhs into a Soviet nation and guide the republic into Soviet modernity. She draws upon environmental history to claim in her introduction that through the collectivization policies, the Soviet state attempted to remake the Kazakh steppe itself. But aside from highlighting the years of drought and *dzhut*, Cameron's understanding of "the environment" is as a background upon which Soviet policies were enacted. The environment comes to the foreground when it thwarts production goals. She concludes that one result of Stalin's policies was that "pastoral nomadism was destroyed as an economic system. Collectivization sparked a dramatic increase in Kazakhs' integration into the institutions of the party-state. Nationality became a key element of Kazakh identity." But on the very next page, she concedes that "the postfamine years would see a shift toward the use of seasonal migrations as a method of pasturing livestock," but that this "represented its final desecration" because the former institutions of nomadic life were given new, Soviet names.[6] In this dissertation, I shift the focus from abstract, qualitative notions of "nationality" and "identity" toward the materiality of the steppe. This study places the biological

[6] Cameron, *The Hungry Steppe,* 170-171.

transformations of soils, plants, and animals at the center of analysis, showing how changes in steppe materiality both enabled and constrained political possibilities.

Similarly, while scholars of Russian and Soviet empire have productively applied frameworks of colonialism and settler colonialism to Central Asia, these analyses often focus primarily on human populations, administrative structures, and cultural assimilation. This study argues for understanding colonialism as a fundamentally multispecies process, taking inspiration from Jennifer Keating's pioneering *On Arid Ground*.[7] The "Sovietization" of the Kazakh Steppe occurred not only through demographic changes or cultural impositions, but through the deliberate transformation of what Marx called the "natural means of production"—the soils, plant communities, and livestock herds that formed the material foundation of nomadic life.

Historiographies of Tsarist Russia and the Soviet Union have wrestled with questions of colonialism and settler colonialism on the Eurasian landmass since at least the beginning of the nineteenth century. In one oft-quoted quip, Russia was described as the country that repeatedly colonizes itself, referring to the ever-expanding borders to the south and east that were populated by less-than-reliable peasant populations. After all, Tsarist Russia was a self-consciously colonial empire, while the Soviet Union was a self-consciously *anticolonial* polity. Recently, historians have amended these gross characterizations by describing the different modes of domination on different peripheries of the Russian heartland at various times and by various means. This dissertation is an attempt to contribute to the historiography of Russia and the Soviet Union as an empire on the Kazakh Steppe across radically different political regimes. The basic model that I propose is the following: a differential relationship between the metropole (Saint Petersburg and then Moscow) and the peripheral Kazakh Steppe that metamorphosed from an imperial

[7] Jennifer Keating, *On Arid Ground: Political Ecologies of Empire in Russian Central Asia* (Oxford University Press, 2022).

coexistence from the late-nineteenth century to 1928, a formal colonial expression of power during Stalin's Great Break from 1928 to 1932, a caesura from 1932 to 1953 to recover from collectivization and world war, and finally a period of settler colonialism during Nikita Khrushchev's Virgin Lands Campaigns. There are important asterisks in this rough chronology of imperial power that I have sketched and times and places where practices on the Kazakh Steppe do not neatly fit the broad categories that I outline below. This, too, is an important aim of my dissertation: to nuance with empirical specificity Slavic agricultural and Kazakh pastoral interactions on the steppe from the first wave of Slavic peasant migration in the 1890s to the Virgin Lands Campaigns of the mid-twentieth century.

During the last three decades of the Romanov dynasty, Slavic presence on the Kazakh Steppe was characterized as an extension of imperial power. Despite what other scholars have argued, I contend that the Russian imperial presence during the late-nineteenth and early-twentieth centuries on the Kazakh Steppe was neither colonial nor settler colonial. There were, however, political and cultural hierarchies that resulted in unequal power relations between Slavic settlers, imperial administrators, and Kazakh nomadic pastoralists. The main reason that I do not consider Slavic peasant emigration to the Kazakh Steppe in this period is because of the tremendous importance of trade in livestock between Russian moneyed elite in the metropole and Kazakh nomadic pastoralists. This economic linkage largely bypassed Slavic peasant settlers. Although there were lofty dreams of turning the Kazakh Steppe into a breadbasket on the backs of Slavic peasant labor, this was far from a unanimous goal. Most settled peasant farms on the Kazakh Steppe in the late nineteenth centuries were barely providing subsistence-level daily bread. Make no mistake, there were conflicts over land, oftentimes violent, and local authorities frequently sided with Slavic peasants to receive the best hectares for their meager crops. So too was there a

circulation of racial and civilizational discourse among politicians that cast Kazakh nomadic pastoralists as "backward" and "uncultured." But there were also plenty of alternative voices in the centers of power who lauded Kazakh ingenuity in raising enormous herds of livestock in such a precarious climate. Kazakh livestock was more valuable to the Russian Empire than Slavic peasant agriculture, and the tsar had a vested interest in maintaining this trade relationship. One of the key distinguishing features of colonialism and settler colonialism is the distinction between difference and sameness: colonial powers assert their dominance through their differentiation and separation from the indigenous population, whereas settler colonialists assume their sovereignty based on a "register of sameness."[8] Tsarist officials needed for Kazakh nomadic livestock herds to *coexist* alongside Slavic peasant settlement. Their presence on the steppe was to maintain differences in populations for the benefit of the metropole. This ambivalent dynamic remained more or less in place across the revolutionary divide until Joseph Stalin's Great Break in 1928.

The second, brief but catastrophic, phase of this Slavic agriculturalist-Kazakh pastoralist schematic that I propose occurs during the forced sedentarization and collectivization drives of 1928-1932. This is the subject of the beginning of my second chapter. I draw mainly on the insights of Niccolo Piancola and his work on Stalinist spatial hierarchies. Through a careful reconstruction of human and animal population transfers, Piancola argues that during the disastrous periods of collectivization, most of Kazakh livestock was funneled to the industrial cities of European Russia. Nearly two million Kazakhs died because of the resultant famine, and livestock populations, as I showed in the opening anecdote of the dissertation, were reduced by 90% of their pre-Revolutionary numbers. It was also during Stalin's Great Break that nomadism as a mode of production was deemed unilaterally unproductive and a holdover from pre-feudal economic

[8] Lorenzo Veracini, *Settler Colonialism: A Theoretical Overview* (Palgrave Macmillan, 2010), 5.

systems. In this sense, Moscow and Leningrad extracted what it deemed as the most valuable resource from the Kazakh Steppe—meat—and created a system of collective farms in an attempt to eradicate nomadic pastoralism. I concur with Pianola's argument that this moment of collectivization and forced sedentarization should be understood as establishing a colonial relationship of extraction and exploitation based (at least in part) on the colonial logic of the vilification of differences of Kazakh nomadic pastoralists.

The third phase of my history of steppe encounters extends to the end of Joseph Stalin's tenure and is characterized by the Soviet state's ambivalence concerning the place of agricultural and livestock production in Kazakhstan. This period, as in the first chapter of my dissertation, cannot be clearly defined as "colonial" or "settler colonial," but instead demonstrates various attempts to integrate the two modes of production, agriculture and pastoralism, under the umbrella of Soviet collective farms. The nascent collective farm system in the Kazakh SSR in the 1930s struggled enormously with a dramatic reduction in human and animal labor. Although there were grand designs for agricultural expansion, there was simply not enough labor or state capacity to realize such ambitions. As a result of yet another population upheaval during the Great Patriotic War, I highlight historian Stephen Rindler's work on the "renaissance of nomadism" in Kazakhstan that propped up an anemic food production sector. In the immediate postwar period, when the heyday of wartime nomadism receded, Stalin's Great Plan for the Transformation of Nature unified T. D. Lysenko and V. R. Vil'iams' theories of Soviet Darwinism in agriculture to implement a holistic system of crop production and animal husbandry. Soviet agronomical science was to refashion the Kazakh Steppe—at least in theory, if not in results—as a space that built upon the labors of Kazakh nomadic pastoralists but updated this mode of animal husbandry to include a stable, cultivated forage base.

In the final chapter of this dissertation, I argue that Nikita Khrushchev's Virgin Lands Campaigns, of the Slavic-agricultural and Kazakh-pastoral encounters under review, is most appropriately understood as an expression of settler colonialism. (Of course, this is not without caveats.) In order to realize the now decades-old fantasies of turning the Kazakh Steppe into a breadbasket, Khrushchev embarked on a massive mobilization campaign in which millions of Slavic settlers colonized the steppe in the name of Soviet agriculture. An entire scientific apparatus, cities, and infrastructures were built to accommodate the settlers and their agricultural aims. In terms of animal husbandry, the "second" Virgin Lands Campaign, as I will explain, refers to the transition from an extensive pastoral system to industrial livestock-agriculture in which a majority of livestock forages are cultivated through human labor. The biological components of the steppe—its chernozem soils, its feathergrass, its Kazakh cattle—were fundamentally altered during the Virgin Lands Campaigns. Importantly, the logic justifying these campaigns points to important edges of setter colonialism on the Kazakh Steppe. First, the Kazakhs on collective farms on the eve of the campaigns were not viewed as existentially different from the Slavic settlers heralding from cities in the western parts of the Soviet Union. Kazakh nomadic pastoralism, in the minds of Soviet officials, did not exist as it had before the advent of Soviet power. Even the "renaissance for nomadism" was not considered a reversion to previous modes of production. In this sense, the "sameness" of the settlers and the indigenous Kazakh population was already established before dramatic population shifts occurred. Second, this was a high-modern settler colonial project, that brought along with it tremendous state investments in science, technology, transportation infrastructure, housing, education, healthcare, and cultural amenities. In a sense, these high-modernist, state-building components serve to cover over the tragic loss of traditional Kazakh nomadic pastoralism and the steppe that supported this lifeway.

In the wake of the Virgin Lands Campaigns, there was a world-leading center for cereals research on the Kazakh Steppe, a brilliant capital city replete with institutions of higher education, banking, and communications. There is also tremendous soil erosion, a near complete erasure of indigenous Kazakh cattle, and a dependence on grain cultivation that privileges large landholdings and capital investments in transnational agrochemical companies. The point of this dissertation is not to determine good or bad, colonialism or brotherly assistance, crop production or pastoralism, but instead to show how logics of sameness and difference about people and the environments they inhabit have changed the very material foundations of the relationships between humans, non-humans, and more-than-humans.

Steppe Epistemologies and Their Absence[9]

The chapters of this dissertation are organized around what I call "steppe epistemologies"—coherent ways of understanding the relationships between soils, plants, animals, and humans that guided land use policies and agricultural practices. However, the progression reveals a more complex story than simple epistemological succession. The first two periods—the late imperial and Stalinist eras—represent competing scientific approaches to steppe environments, each with distinct theoretical foundations and practical implications. The third period—the Khrushchev era—represents something qualitatively different: the abandonment of ecological thinking altogether in favor of economic and political imperatives.

This progression demonstrates that epistemologies mattered precisely because their absence or subordination had profound material consequences. The late imperial period's

[9] Special thanks to Darya Tsymbalyuk and Olga Mun for implanting the phrase “steppe epistemologies” into my brain.

Dokuchaevian epistemology, grounded in holistic soil science, provided conceptual space for both agricultural expansion and the persistence of nomadic pastoralism. Stalin's dialectical-materialist agrobiology approach emphasized the interdependence of the biological foundations of soils, plants, animals, and human labor, offering a framework—however flawed in practice—for understanding agriculture as an integrated biological and social system. Khrushchev's approach abandoned such ecological frameworks entirely, treating the steppe as an empty space to be filled with industrial agricultural infrastructure according to the demands of Cold War competition and urban consumption.

Paradoxically, Khrushchev's anti-epistemological approach coincided with the greatest proliferation of scientific research dedicated to and produced from institutions on the Kazakh Steppe itself. Hundreds of scientific brigades, dozens of new research institutes, and thousands of specialists conducted the most detailed and comprehensive studies of the steppe in Kazakhstan ever undertaken. Yet this explosion of scientific activity occurred *after* fundamental policy decisions had been made on entirely different grounds. The research served to legitimate and optimize transformations already set in motion rather than to guide decision-making processes. This temporal and institutional disconnect between knowledge production and policy formation proved decisive in enabling the most destructive and irreversible environmental changes.

Chapter 1 examines the emergence of what I call "Dokuchaev's steppe epistemology" during the late imperial and early Soviet periods (1891-1928). Vasily Dokuchaev's pioneering work on soil science created a new way of understanding the steppe as an integrated ecosystem of biological and geological processes. His concept of natural-historical zones provided the scientific foundation for viewing the Kazakh Steppe as fundamentally similar to the agricultural regions of European Russia and Ukraine, despite significant differences in climate, hydrology, and land use.

This epistemological framework enabled the first wave of Slavic agricultural settlement to the European Steppes while also creating space for the persistence of nomadic pastoralism, as both were understood to contribute to the development of the region's renowned chernozem soils.

Chapter 2 traces the development of "Stalinist steppe epistemology" (1928-1953), grounded in dialectical-materialist interpretations of biology and soil science. Following the catastrophic collapse of livestock herds during collectivization, Soviet scientists like Trofim Lysenko and Vasily Vil'iams developed new theories of agricultural production that emphasized the mutual interdependence of the mutable, biological foundations of soils, plants, and animals within socialist farming systems. In particular, Vil'iams' *travopol'e* system represented a holistic approach to steppe agriculture that, while never fully implemented due to labor and resource constraints, established important precedents for understanding agricultural production as an integrated biological and social process. This Stalinist steppe epistemology was at once holistic, interconnected, and yet presumed to be endlessly productive.

Chapter 3 shows how Nikita Khrushchev's abandonment of any kind of ecological epistemology—motivated by economic urgency, domestic consumption demands, and Cold War competition—enabled the final destruction of the steppe biosphere. Despite generating unprecedented scientific research on steppe environments, Khrushchev embarked on his Virgin Lands Campaign according to a capitalist economic logic that, at least at first, sidelined ecological relationships. Fields of native perennial grasses that rooted the chernozem in place was overturned by plows and replaced with huge monocultures of spring wheat and corn. Small, hardy Kazakh cattle were crossed with fatter, beefier breeds from faraway lands and grazed on whatever was unfit for cultivation. Red Steppe Cattle from Ukraine came to dominate the bovine population of the steppe, turning underripe corn or turnips in cow yards into liters of dairy products in new

milking barns. Socialist planning fundamentally changed the biological composition of the steppe and *the relationships between the constituent parts*, and thus, destroyed the material foundations of nomadic life.

I conclude with a discussion of the environmental and social consequences of this transformation, tracing how the industrial agricultural system established during the Virgin Lands Campaign generated new forms of ecological crisis—from soil erosion to zoonotic disease—that demanded increasingly intensive technological interventions. Even when Soviet planners recognized these problems and developed ecological approaches like Alexander Baraev's system for dryland agriculture, the economic and political commitments established during the Khrushchev era proved impossible to reverse.

This dissertation argues that Nikita Khrushchev's Virgin Lands Campaign was the death knell for Kazakh nomadic pastoralism on the steppe. Khrushchev did not embark on the Virgin Lands Campaign as a targeted attack on the Kazakh nation or culture. I found scant evidence of Khrushchev referring to a particularly backward Kazakh way of farming or livestock raising; if anything he criticized the remains of "backward" Slavic peasant agricultural techniques on the steppe (and elsewhere across the Union). For Khrushchev, the Virgin Lands Campaign was a particularly *Soviet* project. It was the socialist transformation of the steppe: people from many different countries joined forces with local Kazakhs and use modern mechanical agricultural equipment to produce abundance for the entire Soviet Union on gigantic state-owned farms. Through their collective human labor, the natural productive forces were transformed. Unwittingly, or at least not in an attempt to create or destroy a nation, Khrushchev succeeded in changing the productive forces of nature in what remained of a nomadic pastoral system after the devastation of collectivization. Khrushchev had created the Soviet Steppe: an economic-geographic feature

characterized by grain monocultures, dairy cattle, soil erosion, bovine tuberculosis, multiethnic laboring populations, scientific-research institutions, agricultural industries, and cities to support these plant, animal, and human communities.

I argue that the "Sovietization" of the Kazakh Steppe was a process of colonization not only because large Slavic populations migrated to the steppe and altered the ethnic composition of the region, or because behaviors and habits of everyday life deemed relics of feudalism or worse, barbarianism were forcefully imposed. All of these things happened at different times and to various extents throughout the chronology of my dissertation. Undergirding these colonial impulses was an additional logic: the relationship between the indigenous population and the natural productive forces of their territory was irrational and unproductive. The logic was, ironically, capitalist. (The means were socialist though, as I will show.) The chernozem steppe soils could be manipulated by socialist science to produce bountiful grain for domestic consumption and, crucially, export on the global market for the hard currency that Moscow desperately needed. The point of intervention for Soviet colonization was not the cultural superstructure, and attempts to break up the social structure of the aul were only partially successful. Khrushchev and others vehemently defended the Virgin Lands Campaign against accusations of a deja-vu of Tsarist-era Slavic peasant settler colonialism by claiming that the economic relationships between the center and the settlers were different: *tselinniki* were voluntarily leaving their homes to assist production in another region not for higher wages, but for "brotherly assistance." And under socialism, the products of this brotherly assistance were equitably distributed throughout the Soviet Union. However, I argue in this dissertation that the Soviet colonization of the steppe occurred because leaders in Moscow deliberately and

fundamentally altered the natural means of production, to use Marx's terms: steppe soils, plant communities, and livestock herds.

Importantly, this transformation was not the inevitable result of scientific progress or modernization. Rather, it resulted from specific decisions about how to relate scientific knowledge to political power, and particularly from the subordination of ecological understanding to economic and geopolitical imperatives. The history of the transformation of the Kazakh Steppe offers important insights into the ways that epistemic frameworks—and their absence—shape material interventions in ecological systems.

Chapter 1: The Epistemology of the Steppe: Soil Science, Settler Colonialism, and Bovines on the Kazakh Steppe, 1891-1928

In 1891, the Ministry of State Domains under Tsar Nicholas II charged Vasily Dokuchaev to formulate a team of researchers to study the belt of grasslands that stretches from what is now southeastern Ukraine, curving around the mountainous enclaves of the northern Caucasus, and spreading into the southern regions of Russia to straddle both sides of the Volga. An especially dry year caused fields of grain to shrivel up on their stalks, resulting in a dramatic reduction in reserves in the state's coffers. The affected area was twice the size of France. A famine quickly ensued in which 13 million people received some form of government assistance for survival.[10] *Our Steppes, Then and Now* was the culmination of Dokuchaev and his team's field experiments in Poltava Province, in contemporary Ukraine. Although imperial explorers had written about the flora and fauna of this treeless, fertile region for over a century, Dokuchaev's work was significant in its synthetic and explanatory power that built off nearly two decades of research on the soils of Russia.[11]

The first section of this chapter begins by reading Dokuchaev's prolific writings across his career to reconstruct his ontology and epistemology of the steppe. The scientist continued to engage with the natural and human geographies of the steppe for the remainder of his life. In particular, I highlight his holistic definition of the soil, and its repeated formulation as a "window" into the biological and energetic lives aboveground. Then I turn to his later writings that became

[10] James Y. Simms, Jr. "The Crop Failure of 1891: Soil Exhaustion, Technological Backwardness, and Russia's 'Agrarian Crisis,'" *Slavic Review* 41, no. 2 (1982): 237.
[11] For more on Dokuchaev and the 1891 famine, see David Moon, "The Environmental History of the Russian Steppe: Vasilii Dokuchaev and the Harvest Failure of 1891," *Transactions of the Royal Historical Society* 15 (2005): 149-174. See also David Moon, *The Plough that Broke the Steppes: Agriculture and Environment on Russia's Grasslands* (Oxford University Press, 2014).

instrumental to the burgeoning school of Russian geography at the turn of the century. Dokuchaev, with the assistance of complex expedition teams of botanists, foresters, agronomists, climatologists and others, divided the Russian Empire (and later the world) into natural-historical zones. From this research, he articulated the agricultural zones of the empire, and wrote extensively about marrying the appropriate agricultural techniques to a given zone. The way Dokuchaev conceived of the steppe—the details he foregrounded, those he omitted, the directions of causality he conjectured, and the comparisons he drew—had lasting significance within Russian and Soviet scientific and political imaginations. The students he trained were some of the first to hold posts within scientific academies in the nascent Soviet Union.

As Dokuchaev and his team were carrying out their experiments further west in Ukraine, tens of thousands of Slavic settlers emigrated to grasslands on the eastern peripheries of the Russian Empire on the Kazakh Steppe. In the decades after the emancipation of the serfs in 1861, peasants faced insurmountable rent payments to their former lords on poor soils that were worsening by the year. Individual peasants and their families, called *samovol'tsy*, fled illegally to the Kazakh Steppe in search of a new life far away from their economic woes. By 1889, the number of peasants migrants was so great that the Tsar and his advisors enacted the Steppe Statute to facilitate their relocations. Thus began the first wave of mass Slavic peasant migration to the Kazakh Steppe in which, over the course of the next two decades, nearly two million peasants would uproot and start a new agricultural adventure. Statesmen in Saint Petersburg, meanwhile, debated the meaning of this "colonization" and the proper use of steppe lands.

Again, Dokuchaev's *Our Steppes* and his subsequent publications were not written about the Kazakh Steppe. Dokuchaev's scientific work, and its uptake in political circles, conceptually linked the European (i.e., southeastern Ukrainian and southern Russian) and Kazakh Steppes. (See

map below.) Liberals and socialists alike commented on the need to defend "our steppes" from encroaching easterly enemies, be they Chinese, Mongol, or a closer Kazakh nomadic threat. Meanwhile, European and Russian intellectuals from across the political spectrum turned to the natural sciences to inform their social theory. Karl Marx is perhaps the best-known nineteenth-century thinker that incorporated natural science, and the burgeoning discipline of soil science in particular, into his political economy. Marx based much of his analysis of the agricultural robbery that occurred in the English and Irish countrysides on Justus von Liebig's pioneering discovery of the mineral basis of plant nutrition. It was from this understanding of the chemical constitution of soils that Marx articulated his theory of metabolic rift, now very much in vogue among contemporary scholars of the Anthropocene.[12] But few have explored how Marx's writings on soil fertility were taken up in Russian socialist intellectual contexts. Vladimir Lenin, after all the leader of the world's first incarnation of Marx's political economy, was also influenced by Dokuchaev's understandings of the soil, just as he was Leibig's. Mieke Erley has shown how other late-nineteenth century Russian intellectuals engaged with Marx's metabolic rift, not just as a metaphor for political economy, but as the material foundation of capitalist and colonial exploitation occurring in Europe.[13] I argue that political leaders and members of the Russian intelligentsia understood the "soiling" of political economy not through Liebig's notion of chemical exchange, but through Dokuchaev's prolific scholarship. Statesmen enacted policies to facilitate Slavic peasant emigration to the Kazakh Steppe that were predicated of a vision of the steppe as a repository of *chernozem* soils—the hallmark of Russian agriculture.

[12] To name just a few, see Kohei Saito, John Bellamy Foster.
[13] Mieka Erley, *On Russian Soil: Myth and Materiality*, especially Chapter 2, "Matter: Models of Soil and Society".

The second section of this chapter moves from the realm of imaginaries and ideologies to material practices. It details the changes to Kazakh nomadic pastoralism that resulted from the massive influx of Slavic peasants to the steppe after the famine of 1891. At the center of this analysis is the sudden increase in cattle in Kazakh herds in response to the encroachment of newcomers. The presence of larger numbers of cattle on the steppe influenced grazing patterns of natural pastures, and to a lesser extent the cultivation of hay in the lower Irtysh region. In this section, I trace the ebbs and flows of nomadic pastoralism as a mode of production throughout this cataclysmic period. The state control of human bodies across the steppe—whether tacitly condoned, expressly promoted, or explicitly forbidden—did indeed alter the ways Kazakhs cared for their animals. This sudden increase in humans set in motion transformations in the non-human animal life, plant life, and soil structure on the steppe. But there was a limit to human agricultural ingenuity under such unfamiliar and extreme climactic conditions. Nomads continued to raise impressive herds of livestock by migrating seasonally across long distances to feed on natural grasses, as they had for millennia prior, but their livelihoods became increasingly dependent on grain from their Slavic neighbors. [14] All the while, scientists, intellectuals, and politicians in the metropole debated the suitability of grain agriculture and nomadic pastoral livestock raising on the steppe.[15] These conversations would remain unresolved across the revolutionary divide up until Joseph Stalin's Great Break in 1928. Nomadic pastoralism would weather settler colonialism, a revolution in political regime, civil war, and attacks on the cultural expressions of Kazakh society.

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[14] Scholars estimate that nomadic pastoralism replaced agriculture somewhere between 1500-1000 BCE on the Kazakh Steppe. Catherine Guirkinger and Gani Aldashev, "Clans and Ploughs: Traditional Institutions and Production Decisions of Kazakhs under Russian Colonial Settlement," *The Journal of Economic History* 76, no. 1 (2016): 87.

[15] Peter Holquist, "'In Accord with the State's Interests and the People's Wishes': The Technocratic Ideology of Imperial Russia's Resettlement Administration," *Slavic Review* 69, no. 1 (2010): 153. Specifically, Holquist cites George Yaney's *The Urge to Mobilize*: *The Agrarian Reforms in Russia, 1861-1930*: "These agents of the Ministry of Agriculture conceived of themselves as '*specialists*: that is, their *formal* roles derived solely from their practical knowledge of applied sciences.'" (Emphasis in original.)

I argue that Kazakh nomadism survived because indigenous Kazakh cattle still grazed on *Stipa* and *tipchak* (*Festúca valesiáca*) that held rich chernozem soils in place. The steppe of Dokuchaev's rendering remained intact.

Vasilii Dokuchaev's Steppe Epistemology

At the time of Dokuchaev's expeditions, Russian science was undergoing a renaissance since the coronation of the reformist Tsar Alexaner I in 1855. A new generation of Russian scientists entered the *intelligentsia* class, most from poorer backgrounds of sons (and a few prominent daughters) of smaller state bureaucrats. This new generation of scientists coming of age after the 1860s were more revolutionary and internationalist than their conservative elders before them. Many of these scientists spent some time abroad for at least part of their training.[16] Importantly for this story, the revolutionary generation of the 1860s cemented natural science into the intelligentsia's research agenda.[17] For example, the Russian Geographic Society was borrowed from the German tradition and infused with the Russian notion of a *kruzhok*, or an intimate learning circle. Furthermore, as the scientific intelligentsia became increasingly professionalized, so too were its research agendas tied to the growth of the state. Over the course of his career, Dokuchaev's expeditions were commissioned first by the Free Economic Society—independent of the tsar—then the Forestry Department, and then the Ministry of State Domains.[18] Indeed, historian Olga

[16] Dokuchaev is an important exception to this trend. There is little evidence that he spent time abroad or knew any foreign languages. David Moon characterizes him as an "autodidact." David Moon, *The Plough the Broke the Steppes*, 53.
[17] Michael D. Gordin and Karl Hall, "Introduction: Intelligentsia Science Inside and Outside Russia," in *Intelligentsia Science: The Russian Century,* Michael D. Gordin, Karl Hall, and Alexei Kojevnikov, eds., *Osiris* 23 (2008): 5. See also Isaiah Berlin, *Russian Thinkers*.
[18] Moon, *The Plough That Broke the Steppe*, 53.

Elina argues that agricultural sciences in particular were born from the initiatives of local governments and learned societies, and not the prestigious Academy of Sciences.[19]

Vasily Dokuchaev was born in a small village in Smolensk Guberniia to the south and west of Moscow. His first education was spiritual; soon after he arrived in Saint Petersburg to attend seminary, he transferred to university to study the natural sciences. He made a name for himself with his early work on ravines and riverbanks, but his research interests quickly shifted thereafter to soils and soil genesis. Unlike many of his contemporaries who received scientific training in other parts of Europe, especially Germany, Dokuchaev remained in Russia and never learned another language. These features of his biography would be highlighted again and again in the Stalinist period to underscore the homegrown nature of soil science.

Dokuchaev wrote prolifically: in addition to his detailed scientific reports, he penned agricultural manuals for local farmers, wrote newspaper editorials to proliferate his ideas, lectures to deliver to local university students, and policy papers for local *zemstvo* bodies all the way to the Tsar himself. Indeed, the Academy of Sciences of the Soviet Union released an eight-volume collection of Dokuchaev's published writings and private correspondences in 1953. He was not a recluse scholastic pouring over dusty tomes or mixing potions at his lab bench; Dokuchaev collaborated with an impressive array of scientists and farmers, and intended for his research to be disseminated to practitioners in the field. Today, he is regarded the world over as the founder of modern soil science as a discipline and enjoyed high regard during his active years in the field. In the late nineteenth century, Dokuchaev nor his peers would have considered themselves solely soil scientists, or the more precise pedologist (*pochvoved*). Their investigations carried over into

[19] Olga Elina, "Between Local Practices and Global Knowledge: Public Initiatives in the Development of Agricultural Science in Russia in the late 19th Century and early 20th Century," *Centaurus* 26 (2014): 305-329.

botany, climatology, geology, agronomy, and helped professionalize the nascent field of geography within the Russian Empire. Indeed, if we take this more expansive view of Dokuchaev's intellectual contributions to natural sciences broadly speaking, we can begin to appreciate the purchase and staying power his writings had in the decades after his death.

Following the lead of critical soil scholars, I read Dokuchaev's oeuvre to recreate the epistemology and ontology of soil that he operationalized during his lifetime--to lay out his theorization of soil. Interdisciplinary scholar Becca Marchesi has shown that Justus von Liebig's chemical model of soil was revolutionary in mid-nineteenth century Europe, not because of his practical recommendations for agriculture, but for the paradigm shift that his chemical model engendered. Marchesi explains that "the chemical theory of organic growth enacted a powerful parallel conceptual transformation, framing a commensurability between the world's diverse soils that could accommodate a singular management strategy across diverse landscapes."[20] While Dokuchaev was aware of Liebig's research and did not dispute the importance of inorganic nitrogen and potassium to organic growth, Dokuchaev's concept of soil was much more holistic and relational. Dokuchaev's "epistemology of soil" had tremendous purchase among his contemporaries and, as I will show, inheritors of his Russian chernozem well into the twentieth century. In particular, I will highlight his composite definition of soil, the function of soil in his worldview, and the natural-historical zones with which he used to combine and delineate landmasses.

Dokuchaev is considered today the founder of modern soil science because he was the first to synthesize the definition of soil that is still in use. Writing in --, Dokuchaev explained that soil

[20] Becca Marchesi, "Justus von Liebig Makes the World: Soil Properties and Social Change in the Nineteenth Century," *Environmental Humanities* 12, no. 1 (2020): 207.

is the composite of parent rock, plants and animals, alive and decaying, microorganisms, and water—all animated by solar energy—over time. Natural philosophers before him had identified different parts of this definition, but Dokuchaev was the first to synthesize the components into an elegant package. An oft-repeated quote of Dokuchaev in soil science and geography texts of the twentieth century was that soils were a "mirror" to what is above earth's surface:

> Soils and the earth [*pochvy i grunty*] are a mirror, a bright and quite truthful reflection, so to speak, [and are] a direct result of the cumulative, very close, centuries-old interaction between water, air, soil, on the one hand, [and] plant and animal organisms and the age of the country, on the other hand…These [are] responsive and ever active soil-formers.[21]

Whereas Liebig had reduced plant growth to a few inert elements, for Dokuchaev, the geological, biological, microbiological, hydrological all worked in concert to sustain life on earth. Dokuchaev insisted that soils are parent rock, earthworms, plant roots, animal feces, decaying leaves, rainwater, and millions of unseen bacteria and fungi. It is the interface between the geological and biological realms; soils reflect the living and decaying plant and animal life. In this way, a scientist or farmer could learn from the soil about the possibilities for life for plants, animals, and the humans that depend on them. Although some aspects would be misconstrued or strategically elided, the centrality of the holism of soil and the interactions between the constituent components would have a great effect on both natural sciences and land policy for the coming decades.

In 1883, Dokuchaev published his *Russian Chernozem*, detailing the pedogenisis, chemical structure, mechanical properties, and the biological richness of these dark soils beyond the taiga line. Chernozem is characterized by its high levels of organic matter that enables an optimal equilibrium between water retention and drainage. Many scholars have commented as an aside that Dokuchaev often referred to chernozem as the "tsar of soils," but have stopped short of

[21] As quoted in L. S. Berg, *Istoriia russkikh geograficheskikh okrytii* (USSR Academy of Sciences Publishing, 1962), 215.

interrogating the assumptions embedded in this moniker. Chernozem was the center of Dokuchaev's career because it is especially well-suited for agriculture. Peasants could repeatedly sow on chernozem soils with little need for added fertilizers. The depth of tilling and sowing was not terribly crucial. For Dokuchaev (and indeed most soil scientists at the time), soils were relevant insofar as they enabled agricultural cultivation. The centrality of chernozem soils would continue to preoccupy Dokuchaev for the remainer of his professional life, even as his research interests took on a more geographical, cartographic, bent.

Toward the end of his career, Dokuchaev mapped out his theory of natural-historic soil zones that circled the globe. He synthesized over two decades of observations and extrapolated his findings into a coherent, globalizing theory of what we would consider today as earth's ecosystems. Writing in 1898, Dokuchaev conjectured:

> And since all these elements - water, earth, fire (heat and light), air, as well as the plant and animal worlds, due to the astronomical position, shape and rotation of our planet around its axis, carry sharp and indelible features of the law of world zoning in their general character, it is not only quite clear, but also completely inevitable, that in the geographical distribution of these centuries-old soil-formers both in latitude and longitude, constant, strictly natural changes should be observed, [and] especially sharply expressed from north to south, in the nature of the countries of polar, temperate, equatorial, and others.[22]

There were similarities in soil composition, plant and animal life, and climate that were distributed across the planet in belts or zones due to earth's rotation, tilt, and revolution around the sun. He noted similar characteristics between the steppes of Eurasia, the prairies of North America, and the pampas to their south. And the reason that the steppes, prairies, and pampas could be considered in the same analytic frame was the unchanging astronomical order of the solar system. In his "Report on the Value of Land In General and in the Caucasus in Particular. Soils, Horizontal and

[22] Berg, *Istoriia,* 215. See also, Vasilii Dokuchaev, *Sochineniia* v. 6 (USSR Academy of Sciences Publishing), 375-376.

Vertical Zones," Dokuchaev enumerates five zones: polar or tundra zone, forest or taiga zone, chernozem, aerial or loess zone, and tropical.[23] In one of his last published works, Dokuchaev and his team released a 1: 2,250,000 "Soil Map of Europe" detailing the distribution of these zones (less the tropical zone) across the continent.

Importantly, it is from these natural-historical zones that Dokuchaev articulated the agricultural zones of Russia. The defining characteristics of his natural-historical zones created the corresponding conditions for land use in a given region. Dokuchaev assumed the soil type as the starting point for this classification and differentiation. It is worth quoting at length his writings on agricultural zones, because they speak most saliently to the imbrication of the natural sciences and agriculture on the Russian steppes. Dokuchaev's chernozem *agricultural* zone was an ontological understanding of the steppe that recognized its stark differences from much of the rest of the Russian Empire. Most importantly for my purposes, Dokuchaev's chernozem agricultural zone epistemologically defined the steppe as a co-production of humans, non-humans, and their respective labors, and connected it spatially to geographies across the world.

To begin, Dokuchaev explained that "the natural-historical zones in general and especially in [their] agricultural and land valuation [*tsenochnomu*] character can and should be united into five large agricultural kingdoms [*tsarstv*], arranged in the same order, from north to south."[24] The most significant zone for Russia, of course, was the typical chernozem and chernozem-chestnut zones—not the taiga or tundra—which occupied the bulk of Tsarist Russia's landholdings. In addition, unlike the others, the chernozem zone was defined by its soil type, as opposed to tree cover or permafrost. Dokuchaev explained that this chernozem zone stretched across Western and

[23] Dokuchaev, *Sochineniia* v. 6, 382-387.
[24] Dokuchaev, *Sochineniia* v. 6, 313.

especially Eastern Europe, through Hungary, Romania, northern Bulgaria, all of southern Russia and a significant part of the steppes of Siberia. It also included the prairies of the northern United States. This kingdom, Dokuchaev explained, is a "separate, integral, one can say closed, and extremely peculiar world, with its own extremely thick [*tuchnymi*], always more or less dark soils, its more or less sharp continental climate, its original feather grass shrubbery [*kovyl'no-kustarnikovoi*] of grass growth, its typical fauna, which (groundhogs, gophers, hares and others) strive to get away from the steppe winds, heat and waterlessness in the earth." As in Dokuchaev's definition of soil, this chernozem agricultural zone was a composite of flora, fauna, soils, hydrology, and solar radiation.

Humans and their labor played a constitutive part in Dokuchaev's understanding of the chernozem agricultural zone. He explained that "this country [Russia], since time immemorial [*ot veka*], the very Lord God intended for agriculture and animal husbandry [*skotovodstvo*]," and thus, through these human practices, the qualities and characteristics of the chernozem zone came into being. Dokuchaev hypothesized that what little remained of the virgin [*devstvennaia*] steppe that remained indicated that the steppe had developed "thanks to the eternal pasturage of livestock, and maybe in connection with the unique life of steppe soils and groundwater, developed on the surface a compacted horizon (a so-called crust), which, even more so than chernozem dust, allows neither water nor air to pass through." He continued: "And therefore, no matter how many nutrients there are in the most fat black soil, they will remain dead capital, completely inaccessible to either wild or cultivated vegetation." For Dokuchaev, grazing livestock on steppe grasses had developed the rich humus layer characteristic of the chernozem. Russian agriculturalists had yet to unleash the agricultural potential of these steppe lands that centuries of nomadic pastoralists had enriched.

Indeed, Dokuchaev blamed poor agronomical techniques for the failures in cultivation on the steppe, and less so climactic or other natural factors. Poor farming practices created a "disturbed and inept culture of soil physics." Through his research, Dokuchaev hoped that "the owners of the best lands in the world" can escape this "extremely shameful" condition of "our steppe chernozem agriculture…This is the most important reason, one might say, for the amazing crop failures of the once richest granary in Europe." To overcome this national shame, Dokuchaev insisted that agriculture and livestock raising should be "strictly timed to local soils and groundwater, to local weather, with its brown, dry winds, fog and snowless[ness], to local oxen, wild donkeys [*kulan*], sheep, etc., to local steppe grasses and shrubs." The humans of the steppe—farmers, livestock herders, and scientists alike—could only be successful in their endeavors if they took into account the totality of this unique environment.

Furthermore, Dokuchaev contended that Western European agronomy was wholly unsuited for these chernozem conditions in southern Russia. He explained that "the whole edifice of agricultural art was built on the mineralization of soil, on its fertilizers by all possible means and paths," slyly referencing Liebig's singular focus on the mineral basis of plant life. Dokuchaev insisted that the crop rotations and soil turnover protocols developed by German, French, and English agronomists were in applicable to the Russian chernozem region, because they were developed in regions with "rocky and podzol [soils], poor nutrition, but richly irrigated lands." For this reason, Dokuchaev, in word and deed, called upon a Russian agronomical science that could address the particularities of the chernozem belt to be able to transform the rich horizon that livestock herders had created into agricultural abundance for the Slavic newcomers.

In their chapter "Mapping Soil, Losing Ground?" authors Juliette Kon Kam King and Cèline Granjou point out that "soil maps are far from being mere tools or resources for representing

an outside world that is already 'out there,' waiting to be measured and mapped; instead, soil maps materialize the struggles for the imposition of value-laden views of what soils are, who soil experts are, and what knowing and governing soils means."[25] The combination of Dokuchaev's 1883 *Russian Chernozem*, his soil map of Europe, and writings on natural-historic and agricultural zones all repeatedly affirm what a black earth soil is, how it is to be understood and evaluated, where it is distributed geographically, and how those seemingly disparate locations are related to one another. Chernozem—the stuff of growing food—was to be found in the Lower Volga region, to the east of Odessa, across the top two-thirds of the Steppe Krai, and also the newly-incorporated western United States and provinces of Canada. Despite considerable differences in precipitation, temperature variation, plant cover, and groundwater, Dokuchaev foregrounded the preeminence of chernozem as the basis for his agricultural zones. Humans and their labors were central features of Dokuchaev's chernozem agricultural zone. Nomadic pastoralists and their livestock had created a storehouse of rich humus over the centuries; it was trapped in a thick crust on the surface of the earth that agriculturalists—with the help of scientists like Dokuchaev—would release in the form of higher grain yields.

"Correct Colonization" on the Kazakh Steppe

Meanwhile, as Dokuchaev and his teams were sampling and measuring on the southern steppes of Russia and Ukraine, politicians in the metropole were quickly papering together policies that would facilitate Slavic peasant migration to the Kazakh Steppe further east. Peasant

[25] Juliette Kon Kam King and Cèline Granjou, "Mapping Soil, Losing Ground?: Politics of Soil Mapping," in Juan Francisco Salazar, et. al., *Thinking with Soils: Material Politics and Social Theory* (New York: Bloomsbury Academic, 2020), 39.

colonization of the European Steppe had all but concluded when they and the Tsarist administration alike looked to "empty" lands where nomads and their livestock still roamed at large. Willard Sunderland details in his exceptional history of the Russian colonization of the European Steppes the centuries-long process of colonization on the southern borders of the Russian empire. Waves of Cossacks, German and Polish exiles, and Slavic peasants gradually removed livestock pastures from various Mongol and Turkic nomadic groups. The final phase of this process occurred in the late nineteenth century during what he calls "correct colonization," an imperial standard that meant "an orderly, scientized, systematic process in which peasant migrants left with appropriate resources and reasonable expectations, went just where they were told, moved in just the right numbers, settled on just the right amount of land, and did their obedient best to improve their livelihood and advance 'the state's interests.'"[26] Colonization to the European steppes primarily meant peasants moving from areas of high rent and low fertility for hopes of a better life. Because of nearly two centuries of gradual displacement of nomadic communities, the Russian state had the administrative capacity to oversee colonization on the European steppes to a much greater degree than further east on the Kazakh one. "Available" lands were much more abundant further east, but the military and state resources to maintain a monopoly on power were not.

But there are important differences in the way colonization unfolded on the European Steppes and the processes on the Kazakh Steppe. Historians today and politicians of the time both understand Slavic peasant migration to the European Steppes as a form of settler colonialism. Alexander Morrison, writing of Slavic peasant migration to Siberia (closer to the Kazakh Steppe), argues that "in the nineteenth century, Imperial Russia developed ideologies and practices of settler

[26] Willard Sunderland, *Taming the Wild Field: Colonization and Empire on the Russian Steppe* (Cornell University Press, 2006), 183.

colonialism which bore a clear family resemblance to those of other European states and peoples."[27] Morisson himself admits that while there were so few indigenous peoples in Siberia and the Far East, the same was not true for Central Asia and the steppes.

Dokuchaev's ideas were taken up by numerous intellectuals and politicians beyond the realm of natural sciences. They were often partial or bent to fit the political orientation of the writer. For example, V. S. Solov'ev penned his "Enemy from the East [*Vrag c vostoka*]" article warning of the dangers of the *sukhovei* blowing from an "eastern enemy, more frightening than the earlier Mongol devastators [*razoriteli*] and the future Indian and Tibetan enlighteners." He decried the current state of peasant agriculture, which "slowly exhausts our soil, including chernozem" and contended that the only protection against such "enemies" was to "fundamentally and systematically transform" agriculture. He quoted extensively from Dokuchaev's *Our Steppes* to demonstrate that the "fatal and progressing insecurity of our agriculture, i.e. not only [our] welfare, but the very existence of Russia" was at stake in failing to address the encroaching eastern steppes. The steppes of Cossacks, Kalmyks, Buryats, and others had already been incorporated into "our Russia," but further to east in Central Asia, the steppes were a dangerous body anathema to Russianness.

Animosity, Amity, and Adaptations During the First Slavic Settling of the Steppe, 1891-1917

The first Russian Imperial forays into what is now Kazakhstan began in the 18th century, and for nearly one hundred and fifty years, state interest in the region remained limited to military

[27] Alexander Morrison, "Russian Settler Colonialism," in *The Routledge Handbook of the History of Settler Colonialism*, edited by Edward Cavanaugh and Lorenzo Veracini (New York: Routledge, 2017), 313.

expansion. Settlement on the Kazakh Steppe mostly consisted of small Cossack garrisons and trade outposts. In the 18th and early 19th century, the territory of Kazakhstan was controlled largely by three hordes vying for control of the best pastures to graze their animals. These hordes were greatly weakened between 1730s and 1830s due to infighting regarding encroaching khans and Imperial Russian soldiers. They became under direct Russian administration with the Mikhail Speranksy's 1822 *inorodtsy* statute that brought the Kazakh Steppe and parts of Siberia under imperial rule.[28] This was a tribute system with relative local autonomy in judicial and land matters. While this statute provided the basis for increased military and commercial presence in the region, it wasn't until the late 19th century with massive Slavic peasant migration did imperial edicts signal colonial ambitions beyond military control.[29]

Pushed by famine in 1891-92 and a dearth of available land, peasants from the Volga and left bank regions of Ukraine were pulled by the promise of "free" agricultural lands. State policy actively encouraged emigration, and local imperial officials on the steppe eased the transition for the migrants. I locate the earliest transformations of animal husbandry on the Kazakh steppe during this period of mass Slavic peasant migration to the steppe. A sudden influx in humans, in this case, marks transformation of Kazakh nomadic pastoralism because of the changes to plant and animal life that accompanied their arrival. In the encounters between peasant agriculturalists and nomadic pastoralists—at times adversarial, acquiescent, and mutually beneficial—the Kazakhs' relationship to land, animals, and the stewardship thereof, changed in profound and lasting ways. These changes occurred long before it explicitly became official Soviet state policy to undermine nomadic pastoralism as a way of life.

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[28] Alun Thomas, *Nomads and Soviet Rule: Central Asia Under Lenin and Stalin* (New York: I. B. Tauris, 2018), 7.
[29] History recounted in Michaela Pohl, "The Virgin Lands Between Memory and Forgetting: People and Transformation in the Soviet Union, 1954-1960" (Ph.D. diss., Indiana University, 1999), 6-13.

Beginning in 1891 and accelerating during early twentieth century with the Stolypin reforms, a multiethnic coterie of Slavic peasants emigrated from the central and western heartland of the Russian Empire to the Kazakh Steppe. Historian Nursan Alimbai identities two distinct periods of Slavic peasant migration to the steppe: between 1891 and the first half of 1906, and the remaining months of 1906 until the regime change in 1917. The first phase of peasant migration began with the simultaneous lift in the ban of emigration in 1891 and a failed harvest in the central regions of Russia. From 1896 to 1916, the number of people inhabiting the steppe increased by more than two million, with three-quarters being Slavic settlers.[30] Heralding from the European parts of the Empire, these settlers brought with them seeds, plows, and a predilection for cultivating spring wheat. Many were shocked by the new environment: overwhelmed by the number of flies, gnats, and mosquitoes, and bewildered by the lack of trees for building materials. *Sukhovei* or *burany* (dry, easterly winds in Russian and Kazakh, respectively) and extremes in temperatures made the sparse landscape even less hospitable to the newcomers. Some Slavic would-be settlers, upon seeing the bleak conditions, returned to their homeland further north. For those who stayed, agricultural production on the steppe was modest at best in the decades before the Bolshevik Revolution.

Far from being a timeless livelihood cut off from changes in the surrounding world, nomadic pastoralism on the Kazakh steppe continually adapted to the economic realities it faced with the influx of Slavic peasant migration. Most directly, peasants created new farms on the very pastures that Kazakhs grazed their animals in migration. Conflicts emerged over access to land

[30] Cameron, *The Hungry Steppe,* 40.

and the limited water resources that strained under the sudden population boom. As a result, some nomads shortened or altered their migration routes to avoid confrontation with the new settlers.

Increased contact also provided further opportunities for trade and exchange, conflict notwithstanding. Importantly for my story, it is during this period of interaction with Slavic settlers that Kazakh nomads altered the composition of their herds to accommodate the preferences of the newcomers. Cattle are better suited to shorter migrations than camels or horses, and with longer migration routes closed off because of Slavic settlement, keeping a greater proportion of cattle in Kazakh herds made their livelihoods more viable.[31] In the Akmolinsk guberniya, Russian statisticians totaled 148,822 cattle in the region in 1880; by 1917, their numbers increased nearly tenfold to an astonishing 1.3 million.[32] Kazakhs kept few cattle for their own sustenance, but primarily raised them for trade in Russian markets. By 1908, the steppe provinces and other regions to the south and east exported to the Russian Empire 400,000 head of livestock, 6 million hides and skins, and nearly 6,000 tons of meat. [33] One study of the burgeoning Kazakh cattle trade reveals that in 1861 the Western Siberian guberniya alone imported 3.3 million rubles of cattle products (presumably meat and hides) from the Steppe krai; by 1914, the trade nearly doubled to 5.5 million rubles.[34] As Sarah Cameron remarks, if Ukraine was the breadbasket of the Russian Empire, Kazakhstan was its meat locker.

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[31] Cameron, 37.

[32] *Sbornik statisticheskikh svedenii o dvizhenii naseleniya, skota, I urozhaev po KSSR s 1880 po 1922* (Orenburg: 1925), 1-51. Although some Slavic settlers eventually accumulated the resources to raise livestock, most newcomers engaged in grain cultivation. While not all the cattle represented in these statistics were Kazakh owned, the vast majority were.

[33] Cameron, 38.

[34] Saule Mamytova, et. al. "The History of the Cattle Industry in the Steppe Region (late 19th-early 20th century)," *Bylye Gody* 17, no. 2 (2022): 778.

Not only did the absolute numbers of cattle increase, but the animals themselves were adapted to the tastes of their purchasers. One pre-revolutionary bureaucrat noted that, "Kirgiz [Kazakh] cattle, although smaller, are preferred by the peasants by the taste of the meat."[35] Peasant demand accelerated breeding programs begun by wealthier Kazakh bais. Particularly industrious Kazakhs started breeding Astrakhan cattle for market, deigning them "purebred cattle" (*saranau siyr* in Kazakh; *porodnyi skot* in Russian).[36] Semi-nomadic Kazakh herders along the Irtysh River also began for the first time constructing stables for wintering (*zimovok za zagonom*).[37] In one account from 1879, a Russian observer noted that Cossacks would buy 2 year-old cows and bulls from the Kazakhs for 2-4 rubles per head, graze them on Cossack pastures for another two to three years, and then sell them back to Kazakhs on their way to market in Russia and Yenisei Guberniya. Mamytova and colleagues conclude that Kazakh and Russian settler contact on the steppe profoundly changed the practices of Kazakh animal husbandry long before it became official state policy under the Soviet Union.

Nomadic and semi-nomadic Kazakh pastoralists also greatly expanded hay cultivation in the steppe regions as a result of contact with Slavic newcomers. In the southern regions of Kazakhstan, near contemporary Almaty, Kazakhs had practiced some form of agricultural cultivation since at least the 18th century. These lands were in more temperate regions with better access to water than those on the steppe, and so a low-maintenance, subsidiary practice of agriculture developed. Contact with and migration of Russian military men, Cossacks, and Uighurs inspired these early but not insignificant forays into agriculture. Millet was the crop of choice, but

[35] Quoted in Mamytova, "The History of the Cattle Industry," 781.
[36] Mamytova, 781.
[37] Ibid.

they also grew barley, oats, wheat, rice, corn, buckwheat, and hemp.[38] As Slavic peasant migration expanded onto the steppe in the late 19th century, so too did Kazakh haymaking, now into Turgai and Akmolinsk Oblasts. Most Kazakh agriculturalists were *dzhatki*, or those members of an aul that had been impoverished by *dzhut* and turned to haymaking as a way to hold onto land that Slavic and Cossack settlers were gobbling up.[39] Practices of haymaking and stabling animals in winter greatly expanded due to Slavic encroachment on the steppe, but for a vast majority Kazakhs, their livelihoods depended on driving their animals seasonally across the land in search of greener pastures.

With grain harvests perennially volatile in the Russian heartland, especially during the famine of 1891-92, an influx of calories from meat was a welcomed addition to the empire's food supply. What Kazakhs received as part of this cattle trade was wheat. Indeed, the Kazakh diet shifted notably to include more grains and less meat and dairy products by the end of the nineteenth century. Sarah Cameron notes that it is probable that Kazakhs consumed fewer calories overall as a result. This shift in diet further enmeshed Kazakh nomads with the Slavic settlers and created dependencies that would prove catastrophic decades later during collectivization.[40] What's more, Russian imperial and Soviet bureaucrats grossly underestimated the amount of grain Kazakhs consumed and relied on stereotypes of Kazakhs flush with livestock. This ignorance proved fatal for the Kazakhs during the years of state allocation of food resources.

Slavic peasant emigration to the Kazakh Steppe after the famine of 1891 significantly altered the composition of nomadic pastoral herds. Increasing trade between settlers and nomads,

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38 Ziyabek Y. Kabuldinov, et. al., "The Development of Haymaking and Agriculture among the Kazakhs in the XVIII – early XX centuries, *Bylye Gody* 18, no. 4 (2023): 1658.
39 Kabuldinov, "The Development of Haymaking," 1655.
40 See discussion of Niccolò Piancola "Stalinist Spatial Hierarchies" below.

in addition to greater access to markets in Western Siberia, encouraged Kazakh pastoralists to keep a greater proportion of cattle in their herds than ever before. Nomadic and semi-nomadic pastoralists kept cattle in their herds almost entirely for beef. What little dairy production occurred on the steppe was by the labor of Slavic peasant immigrants.[41] As such, heifers in Kazakh herds had smaller udders with relatively lower milk output. They were used to surviving long periods in the winter months with little food and so were judicious in their milk production.

Tsarist observers and Soviet livestock scientists described the breed composition of cattle in Kazakh herds as either Kazakh (*kazakhskii skot*) or of Kalmyk (Astrakhan) breed. The Kalmyk breed was officially recognized as a discrete breed of cattle as early as 1896 when they were shown at the Moscow Exhibition for Purebred Livestock. Kazakh cattle, however, were not recognized as an official breed.

Figure 1: Kalmyk bull "Alyoshka" shown by breeder at 1896 Purebred Livestock Exhibition in Moscow.

[41] Nomadism itself is not well-suited to dairy production because of a lack of storage and transportation for the milk. Whatever milk was kept was fermented to preserve it. Slavic emigrants kept dairy cows for household consumption. In rare cases, a village would collectively raise dairy cows for commercial butter making.

Kazakh cattle were smaller animals that were well adapted to migrating long distances, grazing on natural steppe grasslands, and surviving the severe continental climate. With so few trees and shrubs on the steppe to hide from the blistering sun, Kazakh cattle had grown dark, thick fur for insulation to regulate their body temperatures. The size of the herd was closely controlled based on the available pastures.[42] When Kazakh cattle began to be intentionally "improved" after the conclusion of collectivization in the early 1930s, a Soviet breeder in the Caucasus remarked that Kazakh cattle were some of the least studied animals, and so with the introduction of state stud books in the Soviet Union, there was so little information with which to form the breed standard. There were red, auburn, grey, and brown Kazakh cattle, and mottled animals in between. Heifers did not reach maximum weight until seven or eight years.[43]

Since the beginning of Bolshevik incursions into Kazakhstan, cattle herds in the republic shrank and swelled in response to state violence. Between the Central Asian Revolt of 1916 and the consolidation of Bolshevik power at the conclusion of the Civil War in 1921, the number of cattle in Kazakhstan was cut in half to 2.6 million. During the period of national delimitation and the relatively stable NEP years, the Kazakh cattle herd rose to 6.5 million, or two and a half times its 1921 size.[44]

Although the first state breeding farms (*rassadniki*) were organized in Kazakhstan in 1919, changing any breed characteristics during the 1920s was of less concern than simply providing

[42] Mukhamet Shayakhmetov, *The Silent Steppe*: *The Story of a Kazakh Nomad Under Stalin* (Stacey International, 2006), 52.
[43] V. I Gorbelik, *Kazakhskii skot i ego standardizatsiia* (Zaural'e Publishing, 2000), 15-16.
[44] Zubriianov, *Ot kochevogo k intensivnomy* (Kainar, 1982), 28.

local farms with enough studs to perpetuate the population. The vast majority of animals were held by nomadic Kazakhs and migrated seasonally across the Central Asian plain.

In many respects, the incursion of Slavic settlers on the steppe presaged what was to unfold during the Virgin Lands Campaign a half-century later. Settlers enclosed indigenous communal pastures, thereby altering many of the features of Kazakh nomadic pastoralism such as the scope of migration, herd composition, breeding lines and, to a lesser extent, the use of hayfields. Russian observers of the *intelligentsia*, meanwhile, vacillated between criticism and praise for the Kazakh system of land management. Although Slavic settlement precipitated significant changes to nomadic pastoralism, it persisted as a practice well into the twentieth century because the energetic metabolism of the steppe ecosystem remained in balance.

Long before Dokuchaev's landmark study on the genesis of chernozem soils, Russian naturalists and estate owners alike grounded their visions of agricultural improvements on the soil, and in particular, the depth of plowing. In M. A. Glukhikh's history of ideas about working the soil in Russia, he shows that even as early as Tsar Alexei Mikhailovich in the 17th century, musings about Russian agriculture centered around deep or shallowing plowing.[45] Russian and European agriculturalists exchanged theoretical premises and empirical reports of the benefits of deep versus shallow tilling throughout the 18th and 19th centuries. Proponents of deep plowing contended that it allowed the soil to best retain moisture and allow for a rich humus to develop, but there was certainly not a unanimous opinion. At the Fourth Congress of Landowners held in Odessa in 1879, a resolution was passed that fully endorsed deep plowing, because it "is, unconditionally, the first

[45] M. A. Glukhikh, et. al. *T. S. Mal'tsev. Idei I nauchnie issledovaniia.* (Zaural'e Publishing, 2000), 8-9.

and most reliable measure for protecting sowings in our southern steppe farms against drought."[46] But in the decade that followed, irregular harvests called into question this advice. After the drought and subsequent famine of 1891, the issue of the depth of plowing once again dominated scientific inquiry.

Lenin long had his eye on northern Kazakhstan for helping to solve Russia's grain problem. He saw "a huge empty mass of fertile land" which could be used as "the economic basis for a great expansion of agriculture and an increase in production not only deeply, but broadly." In the first days after the October Revolution, he encouraged residents from Petrograd to relocate to the steppes and establish a new agricultural commune to help the peasants turn around their lives. In order to do this, Lenin built a rail line from Petropavlovsk to Kokshetau, calling it a "shock food provisioner [*udarnaia prodovol'stvennaia*]."[47]

Soviet State Consolidation and Early Bolshevik Nationality Policy

The Bolshevik Revolution and early Soviet state consolidation in Kazakhstan did very little to change the practices of nomadic pastoralism. There were plenty of ideological debates surrounding nationality, atoning for tsarist colonialism, economic regionalization and Marxist historical development, but in terms of changing labor practices, not much shifted. A far more significant consequence of the Soviet consolidation of power in Kazakhstan was the dramatic reduction in livestock herds as a result of war and famine.

[46] Glukhikh, *T. S. Mal'tsev,* 11-12. Glukhikh does note, however, that the economically prosperous farms of "German colonists" (Mennonites) used only shallow tilling, and even "booker sowings"—a combined method of moldboard tilling with simultaneous sowings. The maximum depth of plowing was 12-13 cm.
[47] Tulepbaev, *D. A. Kunaev—vydaiushchiisia gosudarstvennyi i politicheskii deiatel'* (Nurly Alem, 2006), 135.

In the wake of World War I and the dissolution of multinational empires, European representatives to the Paris Peace Conference debated the criteria for administrative-territorial units. Many of the European powers were laden with overseas colonies, and settled on the idea that for continental Europe, nations should largely conform to the ethnographic composition of the population within its borders. Meanwhile, early Bolshevik leaders imbued this ethno-territorial paradigm with a Marxist understanding of history and political economy. The economic paradigm, instead, argued that territorial boundaries should be drawn on the basis of local productive forces, i.e. raw materials, machinery, and labor power.[48] By organizing constitutive states along the lines of productive forces, it would be easier for Bolshevik leaders to guide its multiethnic populations through the Marxist stages of economic development en route to communism. In the process, the new Soviet state could solidify its legitimacy by undoing the ills of Tsarist Russia's colonial legacy. The economic paradigm for multiethnic territorial administration as put forth by the early Bolsheviks could, in fact, be evidence of their anticolonial program.

In the fizzling campaigns of the Civil War years, the incumbent Bolshevik leaders took to radical measures to address the large Slavic minority that had recently emigrated to the north of Kazakhstan. At an August 1920 meeting in Moscow on the topic of the formation of the Kazakh Autonomiia, delegates from neighboring Siberia insisted that Akmolinsk and Semipalatinsk Oblasts be given to Siberia (and the RSFSR) because the large Russian populations in these oblasts would only strengthen "national discord and disagreement" if "artificially attached" to Kirgiziia (Kazakh Autonomiia).[49] Authorities in Moscow squelched this proposal and demonstrated the Bolsheviks' explicitly decolonial stance by expelling illegal Slavic settlers in the north of

[48] Francine Hirsch, *Empire of Nations: Ethnographic Knowledge & The Making of the Soviet Union* (Cornell University Press, 2005), 64-65.
[49] Sultan Akimbekov, *Kazakhi mezhdu revoliutsiye i golodom* (Almaty: Institute of Asian Research, 2021), 255.

Kazakhstan who had arrived during the late 19th century. The two northern oblasts were retained for the Kazakh ASSR.[50] (Sarah Cameron notes that this 1920 policy of land redistribution only served to deepen the economic crisis on the steppe because there were far fewer people to sell grain to local markets. Confirming the Siberian leaders' suspicions, but for different reasons, this only furthered ethnic antagonism between the Slavic settlers that remained and Kazakh nomads.[51]) What's more, during the early 1920s, further immigration to the Kazakh Steppe was closed to Slavic peasants. In this environment, central authorities could pursue the policy of *korenizatsiia*, or promoting local elites of the titular nationality into the bureaucracy of Soviet governance in their native language. Indigenous cadres could ripen on the steppe under the guidance of Bolshevik tutelage and spread their new political consciousness to the traveling *auly*.

Ultimately, historian Francine Hirsch concludes that the proposals of Narkomnats (People's Commissariat of Nationalities) to divide administrative territories based on ethnographic commonalities won out against the economic proposals of the state planning commission (Gosplan).[52] Mirlan Bektursunov demonstrates that national/cultural distinctions between the Kazakhs and Kirgiz nomadic populations only became salient when Moscow mediators embarked on the policy of national territorial delimitation in 1924 and the prospect of divided *economic* regions became a reality.[53] Importantly, Niccola Pianciola reminds us that, "at no point in this debate, largely carried out in Moscow, was the end of nomadism invoked as a measure to be implemented soon. Nor was it seen as functional for the economic development of Soviet Central

[50] Terry D. Martin, *Affirmative Action Empire: Ethnicity and the Soviet State, 1923-1938* (Cornell University Press, 2001), 15.
[51] Cameron, 51.
[52] Hirsch, 97.
[53] Mirlan Bektursunov, "'Two Parts—One Whole?' Kazakh-Kyrgyz Relations in the Making of Soviet Kyrgyzstan, 1917-1924," *Central Asian Survey* 42, no. 1 (2023): 119.

Asia."[54] Bolshevik power and the Soviet State had arrived, and Kazakhstan had even consolidated as an Autonomous Republic by 1924, but the primary economic engine of the territory remained nearly entirely based on nomadic pastoral animal husbandry.

During the 1920s and the New Economic Policy of the early Soviet Union, the economic dimensions of nationality policy remained an ambiguous contradiction for various figures in Soviet power structures, especially those in non-Russian republics.[55] Many leading Russian and Kazakh figures recognized that nomadic pastoralism was the most economically productive use of land situated in such harsh climactic zones. Pastoralism as an economic practice was hardly questioned during these early years. Sergei Shvetsov, economist and ethnographer with the Kaznarkomzem (Kazakh People's Committee of Land Use), adamantly defended nomadic pastoralism, and livestock raising broadly speaking, in Kazakhstan. In 1926 he published his *The Kazakh Economy in Its Natural-Historical and Everyday Conditions* in which he argued that "the contemporary Kazakh economy should be seen as the most adaptable to the surrounding nature, as the most productive under the current conditions."[56] At most the party should focus its efforts on making pastoralism more productive, primarily by improving wintering (*zimovka*) conditions with stables and forage reserves. Proposals to transition the steppe to an agricultural zone for grain production were repeatedly shot down as being incompatible with the natural environmental conditions of the steppe.

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[54] Niccolò Pianciola, "Stalinist Spatial Hierarchies: Placing the Kazakhs and Kyrgyz in Soviet Economic Regionalization," *Central Asian Survey* 36, no. 1 (2017): 76.
[55] Benjamin Loring, for example, argues that economic dependence, a key feature of Soviet internal colonization in Central Asia, served to solidify and strengthen national identity among non-Russian ethnic groups. Benjamin Loring, "'Colonizers with Party Cards': Soviet Internal Colonialism in Central Asia, 1917-39," *Kritika* 15, no. 1 (2014): 77-102.
[56] As quoted in Cameron, 60.

The economic contribution of Kazakh herdsmen to Tsarist Russian and Soviet food production cannot be understated. Even after the devastating losses of 1916 and the incumbent Civil War, Kazakh herdsmen were still the largest meat producer in the nascent Soviet Union. When, during war communism, peasant markets were abandoned and the early Soviet state plummeted into famine, the Kazakh livestock sector was all the more important to state food provisioning.

Cultural Attacks on Nomadic Pastoralism

The Kazakh *aul*, often translated as village, but is a term that has no corollary in settled agricultural systems, still predominated as the organizing unit across an area roughly the size of continental Europe. Early farms in the Kazakh ASSR established shortly after national delimitation were on the TOZ (*tovarishchestvo po sovmestnoi obrabotke zemli*, or association of joint cultivation of land) model, not kolkhoz (collective farm). This meant that individuals owned their tools but shared their use with others in the farm. Profits were distributed based on the farm's production as a whole unit. An *aul* at the time of the early Soviet Union was a group of five to fifteen households that managed livestock collectively and moved as a unit in search of pastures and water sources. The *aul* was led a by a *bai*, or elder, that owned the most livestock within the *aul*, and often rented out their livestock to less prosperous members of the group.

And yet, Soviet authorities viewed the economic activity of nomadism as a sign of cultural backwardness. They pointed to the apparent material poverty of nomadic clans. After all, the Bolshevik Revolution aimed at raising society's *kulturnost'* (culturedness) in habits of daily life (*byt*) through class warfare and party guidance. To the Bolsheviks, nomadism as an economic

activity engendered patriarchal and patrimonial social relations, illiteracy, unhygienic practices, and relative material poverty—remnants of a pre-feudal stage of development. Thus, the Kazakh economy centered around nomadic pastoral livestock raising was seldom questioned during the NEP period, but the cultural relations emanating from this economic activity were determined to be anathema to the New Soviet Man the Bolsheviks were creating.

In terms of the social dynamics of the aul, nomadic pastoralism was simultaneously praised for its communal labor arrangements and disdained for its seeming "class divisions" between wealthier *bais* and poorer herdsmen. Many argued within the Kaznarkomzem that the *aul* itself was already more communist than Russian peasant villages. Indeed, scholar Evgenii Shemiot-Polochanskii contended that the class differentiation within the Kazakh aul as a result of increased contact with Slavic settlers in the late 19th century was, in fact, the "degradation" of Kazakh households who were forced to become sedentary after colonists settled on nomadic pastures.[57] Even still, leading party officials viewed the Kazakh aul in terms of Marxist teleology. Although Marx hardly mentioned nomadic pastoral societies in his writings, Soviet authorities slotted the Kazakh aul as a pre-feudal organization—before the advent of agricultural land tenure systems—and therefore in greater need of ideological guidance to progress to communism. Although the Bolsheviks initiated a program of red yurts, or traveling Communist Party agitators, to help indoctrinate Kazakh nomads, many herders had never even heard of Lenin or Marx.[58]

Foremost among these "enlightenment" initiatives of the communist party was Filip Goloshchekin's "Sovietization of the Aul" campaign begun in 1926. When Filip Goloshchekin

[57] Cameron, 61.
[58] For women and the Red Yurt Campaign, and the discrepancy between the aspirational and actualized red yurts, see Rebekah Ramsay, "Nomadic Hearths of Soviet Culture: 'Women's Red Yurt' Campaigns in Soviet Kazakhstan, 1925-1935," *Europe-Asia Studies* 73, no. 10 (2021): 1937-1961.

descended the steps of his train pulling into Kyzl-Orda station in 1924, he, like many European Russian and Ukrainian visitors before him, was bewildered by the desolate countryside of the eastern Kazakh Steppe. Goloshchekin, himself a foreboding figure of Old Bolshevik ilk, took the helm of the Communist Party in the new Kazakh Autonomous Socialist Soviet Republic. He quickly ascertained that the October Revolution that had expropriated noble estates in the Russian heartland and redistributed lands to the peasantry had hardly touched the traditional grazelands of Kazakh pastoralists.

The focus of Goloshchekin's ire was the Kazakh *aul.* Soviet ideology had done little to penetrate the social and economic functioning of the *aul* by the time of Goloshchekin's arrival as Communist Party chief. Goloshchekin had three major tasks as party chief: to halt the policies of the national (Kazakh) society by supporting the dictatorship of the poor in the lower rungs of the state apparatus; to reduce the impact of national deviationists within the communist party who needed to wait for further economic differentiation; and to break the social ties of the aul by redistributing the property and livestock of the aul, and instituting agricultural and water reforms.[59] In a letter to Stalin later that year, Goloshchekin asserted that in the Kazakh aul "the saving key of transformations was found—[in] the restructuring of cultural-educational work." This included sending

> A literate and cultured Kazakh to the village, to influence the life of the steppe dweller [*step'niak*], to teach him to use a spoon, fork, radiators for wintering, to wear clean undergarments, in a word, a *Kulturtraeger*.[60]

[59] L. C. Akhmetova and V. K. Grigor'ev, *Pervye Litsa Kazakhstana v Stalinskuiu Epokhu* (Uchebnoe posobie, 2010), 17.
[60] Akhmetova, 28.

In his speech to the third plenum of the Kazakh Krai committee, Goloshchekin laid out his vision for the "Sovietization of the Aul":

> The socialist aul—it is a settled aul with a village population, with European styles of homes, and with construction equipment of the communal *sel'khozinventar'ia* and livestock. Animal husbandry [will be]—a kind of production farm. It will be based on forage reserves, on sown grasses, on concentrated feed. Livestock rearing [will be] combined with agriculture.
>
> Questions of the use of huge natural pasture riches and its improvement will be thrown out as "bai-like" holdovers from the past.[61]

Goloshchekin's statements reveal two important conceptual perspectives of nomadic pastoralism in the mid-1920s. The first is that Goloshchekin's rationale for his "Sovietization of the Aul" campaign was primarily cultural. He attacks Kazakh animal husbandry not on the grounds of its economic inefficiencies, but on its distance from "European style" farms. His emphasis on cultivated forages (a prescient remark) and the linkage of livestock raising and agriculture is put forth not because it is a more economically sound model of production given the environmental conditions of the region, but because it is explicitly counter to the "bai-like" practices of grazing on natural pastures. Grasslands were understood in terms of class struggle. Goloshchekin framed animal husbandry based on extensive grazing systems as an impediment to developing class consciousness among Kazakh nomads. Thus, the impetus for the "Sovietization of the Aul" campaign was primarily cultural and ideological, as opposed to the later collectivization and forced sedentarization drive of the early 1930s, which targeted the economic foundations of Kazakh society.

[61] Turar Ryskulov, *T. R. Ryskulov: Sobranie sochinenii v trekh tomakh*, v. 3 ("Qazaqstan," 1998), 314.

The scale of agriculture on the Kazakh Steppe on the eve of collectivization is best captured by statistics on the quantity of farm equipment in the region. A Soviet-era historian calculated that in 1926-27, for every 100 *desiatin* of land, there were 6.3 plows, 5.15 harrows, 0.44 seeders, 0.7 mowers, 2.55 reapers, and 1.32 grain separators (Triceur).[62] To put it another way, there was one plow for every 43 acres of cultivated land. Such a low density of farming implements on the steppe indicates that nearly all agricultural labor was conducted by humans bending over hoes or wielding sickles for subsistence. Materially speaking, the Bolshevik Revolution had yet to arrive to the Kazakh Steppe, even for those engaged in agricultural production.

[62] A. Tursinbaev, "Socialist Transformation in Agriculture in Kazakhstan," *Sel'skoe khoziastvo Kazakhstana* 11 (1957): 7. A *desiatina* is equal to 1.09 hectares. Of course, draft animals were the locomotion for these farm implements. One horse- (or ox-) drawn plow turned over 17 hectares of land, or 43 acres.

Chapter 2: Stalinist Steppe Epistemologies, 1928-1953

The second phase in the evolution of the system of animal husbandry in Kazakhstan is what I call "sedentary pastoralism," a fifteen-year period that roughly maps onto the years of Joseph Stalin's tenure, 1928 to 1953. Sedentary pastoralism began with the enclosure of nomadic pastures to create collective farms, and the violent expropriation of animals from Kazakh hands. The Soviet state imposed territorial boundaries on free-range pastures and eliminated much of the human and animal life that traversed the plains, meadows, and valleys. But soon after the shock of collectivization, authorities in Almaty and Moscow warned that Kazakh livestock herds—once the wealth of the Russian and Soviet food system—were on the brink of collapse. Purebred animals were imported from Uruguay and England to "improve" what few Kazakh cattle remained. The new collective farm administration created enormous *kolkhozy* in Kazakhstan but had neither the labor power nor administrative capacity to successfully implement a livestock system based on cultivated forages. Pastoralism, often extending beyond the bounds of individual collective farms and into lands held by the state (*goszemfond*), was the only way to replenish the depleted stock given such limited labor capacity. Although the devastation to humans and animals alike during the collectivization and forced sedentarization campaigns of the early 1930s cannot be understated, the interruption to pastoralism was only temporary.

In the first year of the collectivization of peasant lands, between January 1929 and January 1930, the total number of livestock in the Soviet Union dropped from 217.3 million to 189.1 million. In the second half of 1930, a further 25 million animals were lost. While much of the historiography of collectivization centers around grain requisitions, the devastation to Soviet

livestock herds are an underappreciated aspect.[63] In Kazakhstan, the Soviet Union's most important livestock base, the losses were even more catastrophic. Sarah Cameron has documented in her landmark study of the collectivization and forced sedentarization in Kazakhstan that a combination of state livestock requisitions, forcible grain procurements, emigration, malnutrition and disease reduced Kazakh livestock herds to an astonishing 10% of their pre-Revolutionary numbers. More than 1.5 million humans died—a quarter of the republic's population.[64] Kazakh cattle numbers would not return to their pre-collectivization levels until the first years of Nikita Khrushchev's Virgin Lands Campaign nearly a quarter-century later.[65]

This chapter begins with the mass death event of collectivization that began in 1928. It asks the deceptively simple question of how animal populations recovered from the edge of collapse. I show that the particular form that recovery took was guided by a Soviet-Marxist understanding of the biological world. These ideas about what plants, animals, and soils are and how they interact with one another informed land use policies on the Kazakh Steppe. I re-evaluate the tremendous influence of agronomists Trofim Lysenko and Vil'iams to highlight a moment in Soviet agricultural philosophy that was actually quite ecologically minded—despite their refutations of the natural limits to soil fertility. Ultimately, however, the materialization of these discursive constructs ran up against the harsh realities of the post-World War II Soviet countryside. There were simply too few humans in the Kazakh countryside to labor in fields, too few machines to amplify human labor power, and too many hungry humans in the cities.

[63] Niccolò Pianciola, "Sacrificing the Qazaqs: The Stalinist Hierarchy of Consumption and the Great Famine of 1931-33 in Kazakhstan," *Journal of Central Asian History* 1 (2022): 241.
[64] Sarah Cameron, *The Hungry Steppe*, 3, 5.
[65] This is the subject of Chapter 3 of my dissertation.

The Collectivization Crisis (1928-1933)

In a dramatic turnaround, Joseph Stalin pursued the policy of collectivizing "peasant lands" throughout the Soviet Union to fulfill the industrial imperatives of a planned economy. During the NEP years of the 1920s, the Soviet state followed more moderate policies for individual peasants to sell the fruits of their labor (after state taxes) at peasant markets to the burgeoning proletariat in in cities and towns. But after poor harvests in 1927, Joseph Stalin resented the power of more prosperous peasants to withhold grain from state stores. He determined that dramatic measures needed to be taken in order to finance his ambitious upcoming Five-Year Plan for industrial development. As historian Oscar Sánchez-Sibony has shown, the Soviet Union also desperately needed hard currency acquired through the international grain trade.[66] And so, while earlier Soviet economists and Marxist-Leninist theorists staunchly opposed the violence and exploitation inherent in the initial primitive accumulation of capital in Western European and American systems, Stalin resorted to land expropriation and coercion to secure the needed funds for industrialization under state socialism.[67]

When the policy of collectivization was carried out in regions without longstanding traditions of sedentary agriculture (like in areas of nomadic pastoralism, reindeer herding, or fishing), its economic rationale became more contrived.[68] Early Soviet conceptualizations of

[66] See Oscar Sánchez-Sibony, *Red Globalization: The Political Economy of Soviet Foreign Relations in the 1950s and 60s* (New York: Cambridge University Press, 2014).
[67] See Wendy Z. Goldman, "Blood on the Red Banner: Primitive Accumulation in the World's First Socialist State," *International Review of Social History* 67, no. 2 (2022): 211-229.
[68] Sarah Cameron notes that these "alien social groups" posed a particular problem in the Bolshevik social worldview. "If the primary resource to be extracted from the peasantry was grain, then it was less clear what these regions [i.e., Kazakhstan], parts of which were characterized by severe cold, poor soils, or arid conditions, might produce." Cameron, 46.

nationality understood economic activities as indexing nationality, and thus, the Kazakhs were Kazakhs because they engaged in nomadic pastoralism as their primary economic function. In extracting agricultural surpluses through forcibly collectivizing peasant lands, the state had to tacitly admit that nomadic pastoralism had no place in this economic system. The answer was to forcibly sedentarize the Kazakh nomads. Sedentarization wasn't so much the expressed goal of Soviet policy makers, but a logical outcome of creating a system of collective, and later state, farms. Collectivization and sedentarization in Kazakhstan was both an economic and national project[69]—with devastating consequences for both. The changes in Kazakh animal husbandry that occurred during these years were consequences of economic, national, and environmental forces.

Collectivization in Kazakhstan was preceded by two years of state violence and forcible requisitions. Goloshchekin's "Sovietization of the Aul" campaign launched in 1926 to modernize the cultural expressions of Kazakh life were not bearing fruit. In 1927-28, there were a series of droughts and *dzhuts* on the steppe that deepened tensions between the state and nomads.[70] In the fall of 1928, the official campaign to confiscate livestock began to target stock holders whose "social or economic influence hindered the Sovietization of the aul' and who relied on a 'semifeudal, patriarchal, or clan relationship to perpetuate their rule.'"[71] To Soviet officials, these stockholders were bais, roughly equivalent to the imagined class of kulaks in settled agricultural regions. Bais were understood to be wealthier livestock owners who economically exploited less prosperous members of the aul. The 1928 de-baization campaign was only partially successful,

[69] Sarah Cameron explains that "the fate of the practice [nomadic pastoralism] under Soviet rule was at once an economic question (was nomadism the most efficient use of the steppe's landscape?) and a national question (should nomadism, a defining element of Kazakh identity, be promoted as a part of Kazakh 'national culture'?)." Cameron, 11. The national dimensions of collectivization in other parts of the Soviet Union that also faced devastating famine, namely Ukraine and the Northern Caucasus, are distinct.
[70] Cameron, 84.
[71] Quoted in Cameron, 89.

though: 696 bais were expropriated of 144,474 head of livestock, or only 64% of the projected plan for livestock confiscations.[72] Goloshchekin's campaign marked an epistemological turning point for inculcating Soviet consciousness in the Kazakh countryside. Instead of targeting "civilizational" markers of hygiene and literacy, Goloshchekin began to attack the material foundations of the nomadic way of life—the non-human components of human social structures.

The massive collectivization drive of TOZ lands began in the winter of 1929-30. By March 1930, 40% of all households in Kazakhstan had been forcibly transferred to *kolkhozy*. Collectivization coincided with a campaign to sedentarize the nomadic population. The two policies were under the auspices of different ministerial jurisdictions, often leading to confusion and mixed results. Generally speaking, the project of planned sedentarization coordinated republican and All-Union People's Commissariats of Agriculture, Health, and Enlightenment, but in the midst of economic crisis and little to no data, the sedentarization campaign floundered.[73] Cameron contends that sedentarization was achieved as a result of repatriating refugee nomads on newly formed collective farms, not any predetermined policy.

Grain and livestock requisitions began immediately upon the formation of collective farms to fulfill Stalin's Five-year Plan. Grain requisitioning hit the nomadic and semi-nomadic regions especially hard. Writing in 1930, Turar Ryskulov pleaded that because of the onerous quotas for grain deliveries in much of the Steppe Krai and Turkestan, Kazakh livestock herds were on the verge of collapse. He explained that "nomads need[ed] to immediately sell their personal livestock and purchase grain at very high prices from the agricultural population [in the northern and south-

[72] Cameron, 94.
[73] Cameron, 102.

eastern regions]," to survive.[74] This is an example of what Pianciola calls "Stalinist spatial hierarchies" during the collectivization famine. Pianciola argues that the decision to separate the Kazakh ASSR from the rest of Central Asia in terms of economic planning had dire consequences for Kazakh nomadic pastoralists. Although all nomadic populations were targeted during collectivization across the Soviet Union, Kazakhs suffered disproportionately because of the economic regionalization policies that Moscow rapidly drew up with the First Five-Year Plan.[75]

In the summer of 1930, the Politburo of the Soviet Union announced the requisition of one-third of Kazakh livestock to be sent to the main industrial centers of the RSFSR, especially Moscow and Leningrad.[76] During 1931, half of all meat and livestock imported into the RSFSR came from Kazakhstan. Pianciola concludes that "it is safe to assume that, in 1931, between 33% and 40% of the meat eaten by Muscovites came from Kazakhstan."[77] The two cities received more than 80% of the Kazakh meat produced by the state in 1931. Tamas Omarbekov calculated that in 1931, up to 92% of the livestock procured in Kazakhstan was slated for export.[78]

The decision of July 1930 by Stalin and Mikoian must be understood in the context of Stalinist spatial hierarchies. Pianciola argues that forced procurements were "an ad-hoc measure

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[74] Ryskulov, tom 3, 299. Pianciola underscores that "An interdependency had developed between the peasants' agricultural (mainly grain) production and the herdsmen's livestock production. This interdependence was characterized by the herdsmen's subsistence depending far more on the peasants' grain production than the other way around, as is the general rule in the history of economic interactions between mobile pastoralists and peasants." Pianciola, "Sacrificing the Qazaqs," 234. But to be clear, Slavic peasants in Kazakhstan also suffered tremendously during collectivization.

[75] Pianciola, "Stalinist Spatial Hierarchies," 84. The nomadic population of the Kyrgyz ASSR was included in the Central Asian economic region, whose task it was to mainly produce cotton and other technical crops for manufacturing centers in Moscow and the Urals. Gain requisitions were much lower in the Central Asian economic region. While hunger and violence were certainly present during collectivization in the Kyrgyz ASSR, Pianciola shows that the devastation to the Kazakh nomads was far more extensive.

[76] Pianciola, "Stalinist Spatial Hierarchies," 84.

[77] Pianciola, "Sacrificing the Qazaqs," 248. By contrast, during the NEP period, Kazakhstan was a much less important meat supplier for the capitals. In 1924-1925, only 18% of the cattle that arrived in Leningrad came from Kazakhstan and the North Caucasus. (There is not separate date for Kazakhstan only.)

[78] Ibid., 250.

aimed at solving a problem caused by their reckless collectivization policies and the necessity to feed the population of Soviet 'elite cities.'"[79] There was a dire need in Moscow and Leningrad for the flesh of Kazakh animals. This material transfer of livestock undermines historiographical arguments that Soviet sedentarization and collectivization of the Kazakh nomads was primarily an expression of modernization. Pianciola borrows from Elena Osokina's "hierarchy of consumption," to describe the effects of foodstuff rationing beginning in December 1928: "to preserve acceptable levels of consumption among industrial and white-collar workers, at the expense of the non-urban population."[80] There was also a geographical hierarchy as collectivization hit. Tsarist Russia and the Soviet Union can crudely be divided into grain producing areas and grain consuming areas, with the industrial centers around Moscow and Leningrad importing the most grain. In July 1930, a secret Politburo resolution emphasized increasing livestock procurements from nomadic regions. *Souizmiaso* ("[Soviet] Union Meat") was the ministerial body charged with procuring livestock from farms and coordinating slaughterhouses and meat packing facilities across the Soviet Union. The Politburo decision authorized Soiuzmiaso to bring 475,000 head of cattle to Moscow and Leningrad from across the union from July to late September—and 100,000 (or 21%) was to be requisitioned from Kazakhstan. Furthermore, according to the 1930-1931 livestock procurement plan, Kazakhstan was slated to provide meat in the form of 493,500 tons of live weight animals. This was 18.4% of requisitions for the entire Soviet Union, or one and a half times the share of Kazakhstan's livestock as a proportion of Soviet livestock.[81] Pianciola hypothesizes that cattle were most likely the choice animals for requisitioning from Kazakhstan because beef was the most widely consumed meat in

[79] Pianciola, "Sacrificing the Qazaqs," 228.
[80] Elena Osokina, *Ierarkhiia potrebleniia. O zhizni liudei v usloviiakh stalinskogo snabzheniia, 1928-1935* (Moscow: Izdatel'stvo MGOU, 1993). As quoted in Pianciola, "Sacrificing the Qazaqs," 236.
[81] Pianciola, "Sacrificing the Qazaqs," 243.

the Soviet Union, and that the oxen that remained on farms could serve as draft animals. He calculates that livestock requisitions for Kazakhstan in 1930-1931 amounted to one-quarter (24.5%) of the entire animal population of the republic, but according to his calculations, the actual number was probably closer to one-third due to the inaccuracy of average weight data. Again, Pianciola chalks the inflated livestock quotas up to the belief in Moscow of an abundance of livestock in Kazakhstan over and above what official statistics reported.

Creation of large, unmanageable state farms with the repatriation of Kazakhs: May 29, 1931, the kraikom decreed the formation of huge animal rearing *arteli*. There was to be a shift from small kolkhozes on the TOZ model, with normally about 25-30 families, to 516 large kolkhozes with 500-600 families each, in order to make the 'commercialization of production' easier. In practice, the decision concentrated 1.5 million people (a fourth of the population) in these enormous animal raising kolkhozes.[82] To help realize the productivity of such large enterprises, the state did invest in farm machinery in the republic, albeit in grossly insufficient amounts. If in 1930 there were only 848 tractors in the entire republic, in 1934, 137 new MTSs were created to provide the new collective farms with 6,551 tractors.[83] Even still, this was a tiny fraction of the machines needed for the socialist transformation of the material-technical basis of agriculture.

Collectivization and forced sedentarization devastated both the human and animal population of Kazakhstan. Catastrophe was the starting point for breeding the Soviet Kazakh herd, although there is no evidence that this was on Stalin or any of the orchestrators of collectivization's minds. Not only were the gross number of animals only 90% of what it had been in 1928, the

[82] Niccolò Pianciola and Susan Finnel, "Famine in the Steppe: The Collectivization of Agriculture and the Kazak Herdsman, 1928-1934" *Cahiers du Monde Russe* 45, no. 1/2 (2004): 163.
[83] A. Tursinbaev, "Socialist Transformation in Agriculture in Kazakhstan," *Sel'skoe khoziastvo Kazakhstana* 11 (1957): 7.

careful balance of age and sex within a herd was completely destroyed. The state hastily created new kolkhozes to settle Kazakhs, often on lands that were unsuitable for livestock rearing at the time of settlement, far from transportation lines, and absent any water source. The surviving animals were rife with disease, emaciated, and often yoked with plows as draft animals to fulfill the more pressing needs of grain production. Although grain requisitions were eased in 1933, the orientation for Kazakh economic production in the countryside throughout the 1930s remained grain production.

Restocking the Soviet Kazakh Herd

The state pursued two strategies to repopulate the devastated Kazakh cattle herds. First, at the urging of Turar Ryskulov, the state allowed Kazakhs to keep more animals for individual use. The state also imported improved and purebred studs from outside the republic. Ryskulov, a famed Kazakh statesman during the first decades of Soviet rule, was outspoken against the devastation of collectivization and forced sedentarization policies in the countryside. In a September 1932 report to Joseph Stalin, Ryskulov decried that even after the publication in 1930 of Stalin's "Dizzy with Success" article in *Pravda* to reign in the worst excesses of collectivization, livestock numbers in Kazakhstan continued to plummet. Between February 1931 and February 1932, the cattle population decreased by 40% in the republic, while only by 10% in the USSR as a whole. To save Kazakh livestock from complete destruction, Ryskulov recommended that Kazakhs be allowed to own and care for their own animals.[84] Stalin heeded Ryskulov's warnings and at the

[84] Ryskulov, *Turar Ryskulov, Sobranie sochinenie,* v. 3, 305. Observing from the Poludenskii district of Karaganda Oblast in 1935, Alexander Chaianov confirmed the success of Ryskulov's recommendations. If in 1932 there was roughly an equal ratio of cattle for individual and collective use in the district, by 1934 there were 2.25 cattle for personal use per every head of cattle for state use. For Chaianov, the differences in rearing practices between

17th Party Congress in February 1934 declared that the problems in the livestock sector were as immediate as solving the grain issue that catapulted the Soviet Union on the path of collectivization.[85]

But the beginnings of repopulation occurred even before collective farms had been solidified. Between 1928 and 1932, 802 purebred Hereford bulls (beef breeds) were imported to Kazakhstan, or 65% of the total number of Herefords imported to the USSR, mostly from Uruguay and, to a lesser extent, from England.[86] They were sent to farms in Kustanai, Akmolinsk, Karaganda, Semipalatinsk, Western Kazakhstan, and Aktiubinsk Oblasts—all steppe regions—and crossed with local Kazakh and Kalmyk cattle.[87] This influx of foreign stock at the moment of local devastation marked the refurbishment of Kazakh cattle. Between 1934 and 1939, another 16,000 purebred or improved males were imported to Kazakhstan.

Importing livestock was meant to improve the quantity and quality of Kazakh cattle herds. The principles for this qualitative transformation were rooted in dialectical materialism that placed especial importance on the environmental conditions of the animal's life. For example, Soviet livestock breeders readily admitted that Urugay and England had very different climates from that on the Kazakh Steppe, but thought that by crossing with local cattle that were adapted to the

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personal calves and calves owned by the collective were clear: "We know that collective farmers transfer a newborn calf to a warm place, and these MTFs [Machine-Tractor Farms] have not yet taken care of the creation of warm delivery rooms…Such a completely intolerant situation is explained by the poor technical equipment and complete organizational laxity" of these MTFs. *Osnovnye voprosy organizatsii kolkhoznogo zhivotnovodstva v Kazakhstane. Opyt analiza raboty kolkhozno-tovarnykh ferm Poludenskogo raiona Karagandinskoi oblasti* (Kazakhstanskoe Kraevoe Publishing, 1935), 19.

[85] I. V. Stalin, *Otchetnyi doklad XVII s"ezdu partii o rabote TsK VKP(b)*, https://www.marxists.org/russkij/stalin/t13/t13_46.htm.

[86] P. M. Pozdniakova, *Miasnoe skotovodstvo Kazakhstana.* (Alma-Ata: Kazakh State Publishing, 1959), 8. The Herefords in Uruguay, of course, had originally come from England.

[87] In addition, nearly 50,000 horses, cows, sheep and goats were purchased from Xinjiang, and another 70,000 would be bought at seasonal markets in Alma-Ata and Eastern Kazakhstan province from Chinese traders. Cameron, *The Hungry Steppe*, 166-167. Although she does not mention anything about what kinds of horses, cows, sheep and goats were imported, I assume that they were similar in form to the animals that had populated the republic before collectivization.

environment, they could breed beefier animals. Selectioners were careful not to produce crossbreeds that were still too heavy and not mobile enough to graze on the "sparseness and low productivity of pastures." At the concluding session of the animal husbandry section of VASKhNIL held in 1937 in Alma-Ata, specialists discussed that the ideal balance of the adaptations of local cattle to the environment and the meat productivity of Herefords occurred in the second and third generations of crossbreeding. The session decided that a new breed of Soviet beef and beef-dairy cattle would be created along these lines.[88] As shown in the table below, most of the imported cattle during the 1930s were dairy or dairy-beef breeds (Simmental, Swiss, and Red Steppe cattle).

Table 1: The number of planned, improved breeds of cattle imported to Kazakhstan from 1934-1939[89]:

Breed	**Number of Bulls**	**Number of Young Cattle (*molodniaka*)[90]**
Simmental	2,830	452
Swiss	2,874	647
Red Steppe	4,503	326
Hereford	600	—
Holland	204	121
Kalmyk	2,562	2,099
Total	13,573	2,099

If in 1934, only 9.2% of heifers were crossed with improved breeds of cattle, by 1937, 86.5% of all heifers in Kazakhstan were bred with bulls from improved breeds imported in the

[88] A. E. Elemanova and P. M. Pozdniakova, eds., *Miasnoe skotovodstvo Kazakhstana* (Kazakhskoe gosudarstvennoe izdatel'stvo, 1959), 50.
[89] Table from V. F. Zubrianov, *Ot kochevogo do intensivnogo*, 38.
[90] *Molodniaka* could refer to an animal past weaning up until 24 months. There were more specific terms for animals based on their age in both Russian and Kazakh languages, but for statistical purposes, only *molodniaka* was used.

years during and immediately following collectivization. In Karaganda Oblast, kolkhozniki raised Red German (*sic.,* Red Steppe) cattle crossed with what had remained of the Kazakh cattle after collectivization: 31% of the studs supplied by the Poludenskii Machine Tractor Farm in 1934 were the Red Steppe breed.[91] To put in more bluntly, the enormous heritage of indigenous Kazakh beef cattle was reduced to 10% of its original numbers and then bred with animals imported from abroad better suited to produce dairy.

To feed this influx of animals now fixed on collective farms, there was a modest increase in the amount of sown forages, indicating at least some effort to further improve these larger, less mobile animals. The volume of sowing of cultivated forages from 1928 to 1940 increased threefold to 494.6 thousand hectares (nearly 7.5% of all sown lands).[92] But this was not nearly enough to enact the ambitious state goals for livestock production. Animals continued to rely on grazing and roughage.

World War II and the "Renaissance for Nomadism" in Kazakhstan

World War II marked another rupture in practices of animal husbandry on the steppe. Stephen Kindler has likened this era as a "renaissance for nomadism" in Kazakhstan. Due to the influx of evacuated livestock from the frontlines and another shock to the labor pool, Kazakh livestock workers resorted to nomadic pastoralism to keep their herds alive. Joseph Stalin recognized their efforts by awarding them his namesake prize. As historians have argued for other parts of the Soviet Union, citizens' participation in the war effort became more important than

[91]. *Osnovnye voprosy organizatsii kolkhoznogo zhivotnovodstva v Kazakhstane. Opyt analiza raboty kolkhozno-tovarnykh ferm Poludenskogo raiona Karagandinskoi oblasti* (Kazakhskogo kraevoe Publishing, 1935).
[92] T. V. Balakaev, *Kolkhoznoe krest'ianstvo Kazakhstana v gody VOV 1941-1945* (Nauka Publishing Kaz SSR, 1971), 49.

class identification in the postwar era for demonstrating their Soviet identities. In this section, I take Kindler's argument one step further and contend that by rewarding nomads for their contribution to the Soviet war effort, a Soviet-Kazakh identity began to take shape rooted in the materiality of the steppe. Just as Kazakhs were recruited to the Red Army to defend the Soviet Union against fascism, so too were nomads called to provision their countrymen with beef.

The agricultural sector of the Soviet economy, while by no means unique, suffered tremendously during the war. Favorable weather conditions during the war years buffered otherwise devastating losses of human and non-human labor power and machines. Deep inside Soviet territory, Kazakhstan's agricultural production systems bent and flexed to adjust to changing conditions closer to the front. The Commissariat of Defense (NKO) mobilized nearly 1.2 million people in Kazakhstan for military service, of which 450,000, or 24%, were ethnically Kazakh (far below the proportion in Kazakhstan as a whole).[93] At the time, nearly all of the Kazakh population lived in villages, so Red Army recruits were drawn largely from the countryside. In the early years of the war, when the Soviet army suffered repeated defeats, Kazakhs were reluctantly called to the front to fight. But as the war progressed and the Red Army regained territory, authorities in Moscow generally reserved Kazakh battalions to labor units behind the front lines. Military service was at once a means for titular ethnicities to prove their loyalty to the Soviet project and a reinforcement of the clear hierarchy of Soviet nationalities within the Union with ethnic Russians above Central Asians, Caucasians, Tatars, and other minorities.[94] Even so, a loss of 1.2 million able-bodied men from the republic during the war years disrupted the labor cycle in the countryside still reeling from the catastrophic famine a decade prior.

[93] Roberto J. Carmack, *Kazakhstan in World War II: Mobilization and Ethnicity in the Soviet Empire* (Lawrence, KS: University of Kansas Press, 2019), 12, 18.
[94] Carmack, *Kazakhstan in World War II*, 155.

At the same time as this out-migration of Red Army soldiers, Kazakhstan also "welcomed" hundreds of thousands of special settlers (*spetspereselentsy*) during the war. Nearly a half million Soviet Germans from the Volga region and North Caucasus were deported to Kazakhstan in 1941 alone.[95] Some of these settlers were feared for their potential collaboration with the enemy or accused of ardent nationalism that jeopardized the country during war. They were artists and intellectuals, factory managers and skilled scientists, sent to a fledgling system of labor camps across the southern steppe (the Gulag system in Karaganda Oblast being the largest).[96] The majority of special settlers were sent to rural regions of the country.[97] As historian Balakaev computed, although 38% of workers left Kazakhstan to the front between 1940 and 1943, because of in-migration from special settlers, the size of the labor force actually increased by 7% during that same period.[98] Once again, humans were on the move *en masse* across the republic.

No less dramatic during the war was the evacuation of livestock from contested regions in Ukraine and Russia deep into Soviet territory. Indeed, this movement of animals catalyzed by wartime exigencies had unintended consequences for the Soviet project of sedentarization begun a decade prior. Already in July of 1941, the Central Committee in Kazakhstan wrote to their counterparts in Moscow that the republic could take on 2 million head of livestock from the western parts of the country (but, as Balakaev notes, this was hastily written and did not account for the available foraging resources). In the autumn of 1941, 133,062 animals were driven through Western Kazakhstan to prepare for wintering. The main recipients of evacuated livestock were Western Kazakhstan, Aktiubinsk, and Gurevsk Oblasts—animals were transported by rail to – and

[95] Pohl, "The Virgin Lands Between Memory and Forgetting," 27.
[96] See Kate Brown, "Gridded Lives: Why Kazakhstan and Montana Are Nearly the Same Place," *American Historical Review* 106, no. 1 (2001): 17-48.
[97] Balakaev, 95.
[98] Balakaev, 99.

driven south by foot into Kazakhstan. When the evacuated herdsmen and their animals arrived in Kazakhstan, local farmers gave up their wooden lean-tos and returned to their yurts to accommodate the arrivals. Indigenous Kazakh and Kalmyk cattle, acclimatized to the harsh winter conditions in western Kazakhstan, were set out to pasture for the season, while evacuated animals from the front lines were housed in whatever farm structures could be found and fed on whatever insurance forages the local farmers had stored.[99] Evacuated livestock were prioritized on Kazakh farms. For the native herds, pastoralism as a feeding regime was the only feasible economic option to accommodate such a large influx of "European" animals. Locals assumed that Ukrainian and Russian cattle would be poorly suited to the environment of Kazakhstan and couldn't possibly survive year-round in Kazakh pastures. Wartime exigencies allowed for pastoralism to return to Kazakhstan and affirmed a schema of animal husbandry that aligns the individual animal, feeding regime, and labor system to the surrounding environment.

It wasn't just the oblasts receiving evacuated livestock that returned to pastoralism; because of a sharp decrease in cultivated hay and labor power, farms across the republic reverted to exclusively grazing their livestock, in what Robert Kindler calls "a true renaissance for Kazakhstan's nomadism."[100] The war restructured sowing schedules in agricultural areas across the country. In the south, the sown area for sugar beets increased three-fold between 1940 and 1942 and was accompanied by increases in acreage for fiber crops like cotton, rubber, false flax (рыжик), and castor oil.[101] This meant that what little grain that was grown in the region before the war was converted to technical and fiber crops (*bakhchevie kul'tury*). In the grain growing regions, planting schedules shifted to sowing winter grains in autumn, to be harvested in the

[99] Balakaev, 134-141.
[100] Robert Kindler, *Stalin's Nomads: Power and Famine in Kazakhstan* (University of Pittsburg Press, 2018), 235.
[101] Balakaev, 115.

following autumn. Sowing spring wheat after the last hard freeze in April would have required draft animals that had been well-nourished over the winter months—a luxury that the republic could not afford. Stalin sent a telegram to Kazakh authorities directing them to oversee the shipment of oxen and horses to the front lines, yoking aging cattle to plows that remained on Kazakh farms.[102] In other cases, collective farmers were left to till, harrow, sow, weed, harvest, thresh, and bail by hand. Thus, without the labor necessary to provision animals indoors in winter, farms returned to grazing their entire herds for as long as possible. By the end of the war, the number of animals held year-round constituted half of all the livestock in Kazakhstan. And the results were impressive: losses of cattle on winter pastures were only 1.2% during war years,[103] in comparison with rates up to 20% during the 1920s.[104]

Soviet leaders took note of Kazakhstan's wartime adaptations. Kazakh livestock herders were awarded the Red Banner of the State Defense Committee in 1942 for their "ingenuity" in animal husbandry.[105] Kazakh herdsmen had used their knowledge of traditional migration routes to adeptly plot out the best pastures for their animals. Zhumumbai Shaiakhmetov, at the fourth congress of the Communist Party of Kazakhstan, was quick to point out, however, that grazing livestock in Kazakhstan was not "a simple return to pre-revolutionary practices of nomadic animal husbandry, but fundamental changes were made in the matter."[106] What exactly those "fundamental (*printsipal'nie*) changes" were is harder to see.

Roberto Carmack convincingly shows how Kazakhs' wartime experiences, especially in the Red Army, served to further incorporate the Kazakh nationality into a Soviet identity. I see

[102] Balakaev, 121.
[103] Balakaev, 162.
[104] *Narodnoe khoziastvo Kazakhstana* 1 (1928): 64.
[105] Balakaev, 167.
[106] Balakaev, 164.

Stalin's recognition of Kazakh nomadic pastoralists contribution to the war effort in a similar vein. In a sense, Stalin conceptually linked Kazakh nomads' knowledge of the steppe to the triumphant Soviet victory over fascism. The Kazakh epistemology of the steppe was integrated discursively into the Soviet nation.

Postwar Struggles

Kindler's "renaissance for nomadism" during the war should not overshadow the tremendous difficulties that remained in the countryside after the fighting ceased. The rural population of the Soviet Union decreased by 11.4 million people as a result of the war; many killed or injured from fighting itself, while other fled villages to find work and food in industry in the cities. The number of able-bodied workers in the countryside decreased by 32.5%, and able-bodied men by 60%.[107] Even in the years between 1949 and 1953, the number of laboring workers on kolkhozes in the USSR (less the western oblasts) decreased by a whopping 3.3 million people. At war's end, the population of Kazakhstan numbered 5.8 million people. Despite massive migration to the cities during the war years, when the urban population grew by 30%, in 1945 there were still 3.6 million people living in aul-villages.[108] The war transformed the countryside's human demographics in ways that limited state plans to increase plant and livestock populations.

To address the labor crisis on collective farms, the Kazakh Central Committee passed a decree in 1946, "On measures to liquidate violations of agricultural artel charters on kolkhozes."

[107] K. K. Abdrakhmanova, "Povsednevnaia zhizn' krest'ianstva Kazakhstana: realii I problemy (bytnost', pitanie, defitsit," in *Krest'ianstvo Kazakhstana v Poslevoennoe desiatiletie*, 145-146.
[108] M. Kozybaeva, "Socio-economic and demographic characteristics of the peasantry in Kazakhstan in the postwar period (1945-1954)," in *Krest'ianstvo Kazakhstana v poslevoennoe desiatiletie: sotsial'naia transformatsiia I povsednevnost'* (Almaty: IP "Madiiar", 2022), 64.

More than 610,000 hectares of communal lands were returned to kolkhozes, 249,000 head of livestock, and more than 13 million rubles. More than 50,000 kolkhozniki were relieved of their duties in farm administration and servicing to work in production brigades and livestock farms.[109] Hundreds of thousands of hectares of kolkhoz lands had been illegal parceled out to individuals and enterprises beyond the farm. Certainly, these early efforts to return land and livestock to collective farms were laudable, but the human labor required to work the land was still gravely lacking.

Somehow, in the same year, Soviet farms were to execute a resolution passed "on the expansion of sown fields and the increase in grain yields," which called for expanding sown acreage by 10 million hectares across the Soviet Union.[110] But in the first postwar five-year plan (1946-1950), there was a dramatic decrease in wheat yields—only 4-6 centners per hectare, comparable to grain yields in 1913. In the Northern-Kazakhstan Oblast, grain yields fell threefold, from an average of 11.9 centners per hectare in 1938-1943, to just 4.1 centners in 1946.

The next year, the Central Committee in Moscow went back on its ambitious plans to create gigantic state farms of monocultures when it directed sovkhozes across the Soviet Union to diversify their enterprises. The basis for a state farm should be its primary crop (or animal product), but subsidiary activities on the farm should be expanded to complement the primary product. This diversification, called "complex enterprise development" (*kompleksnie razvitie khoziastva*), would be better able to make use of natural conditions of the farm (i.e., keep nitrogen in the soil), and thus would provide enough food to meet the needs of the surrounding areas. But these structural changes failed to make a dent in production. If in 1940 state deliveries of meat from state farms in

[109] Kozybaeva, 68. See also Tsentral'nyi Gosudarstvennyi Archiv Respubliki Kazakhstana (Hereafter, TsGARK), 1481/1/267.
[110] Kozybaeva, 66.

Kazakhstan were 303,270 kg, by 1948, they were reduced to 156,290 kg. Milk deliveries decreased from 537,326 liters in 1940 to 288,512 liters in 1948.[111] What's more, a disproportionate number of female cows were slaughtered for meat because the need was so great, thereby inhibiting the natural regeneration of the herd in the immediate postwar years.[112]

Adding further pressure to farms was the sudden influx of hundreds of thousands of special settlers. Pohl. Material poverty. Didn't have clothes and shoes to work the fields. According to data presented to the Kokshetau Oblast executive committee, of the 15,526 kolkhoz families in the oblast (totaling 183,547 people), more than two-thirds (10,879 families or 40,169 people) needed state assistance for their daily bread.[113]

To add insult to wartime injuries, a disastrous famine struck in 1947, in which an estimated 900,000 to 2 million people died from malnourishment across the Soviet Union. Prices were reduced for grain procurements, the village labor force was greatly depleted, millions of animals died, fields were ruined, and the worst drought since the 1890s all combined to decimate the agricultural sector of the economy.[114]

Stalin's Steppe Epistemology

The 1947 famine and the general sluggish postwar recovery in agriculture necessitated a paradigm shift in agricultural production. While the Soviet Union emerged victorious after the

[111] TsGARK 1481/31/243/8. "The State and Development of Livestock on Sovkhozes of the Ministry of Sovkhozes of the Kazakh SSR 1940-1948."
[112] TsGARK 1481/31/243/5.
[113] Kozybaeva, 73.
[114] For more on the 1946-47 famine, see Edward G. Bellinger and Nikolai M. Dronin, "Chapter 6: The Postwar Recovery Period (1945-1954) in *Climate Dependence and Food Problems in Russia, 1900-1990: The Interaction of Climate and Agricultural Policy and Their Effect on Food Problems* (Central European Press, 2005): 155-170.

Great Patriotic War, Stalin was still paranoid about internal enemies and foreign saboteurs and returned to many of the same scare tactics that dominated the 1930s. He was particularly concerned about foreign influence in the sciences and sought to personally guide the ideologically correct interpretations in various scientific institutions across the country. In many ways, the ideas of a Soviet-style Marxism in the sciences, or the "creative" blending of Soviet productivism with Marxist dialectical materialism, were not new, but had been developed throughout the previous decade in various arenas. What was new in the postwar era was Stalin's elevation of these scientific ideas to the upper-most echelon of dogma. Historians of Stalinist-era science identify two landmark events that cemented Soviet-style Marxism as the only ideologically correct science: the "Situation in Biological Sciences" Meeting at the All-Union Lenin Academy of Agricultural Sciences (VASKhNIL) in the summer of 1948 and Stalin's unveiling of his Plan for the Great Transformation of Nature later that autumn. Historiographical appraisals of these events generally settle on the conclusion that they are examples of Stalin's total grip on scientific production and mark the postwar era as the end of genuine Soviet scientific inquiry.[115] Loren Graham enumerates Lysenko's bogus methods as including "unsystematic data collection, almost no control groups, irregular weather conditions, nastiness in drawing conclusions, readiness to discount contradictory evidence on the grounds of peasant recalcitrance, impure plant varieties, and small samples."[116] If these practices were the defining features of Stalinist life sciences, so it is assumed, then surely the content of their works do not need to be taken seriously by contemporary historians.

[115] See Loren Graham, *Science in Russia and the Soviet Union: A Short History* (Cambridge University Press, 1993), 123.
[116] Graham, *Science in Russia and the Soviet Union,* 125.

While I do not discount the myriad negative consequences of Stalin's total control of scientific production—including repression and death[117]—I do not think the conversations at the Biological Sciences meeting or the proclamation of Stalin's Great Plan can be written off simply because the science was bad. Reading these texts in combination with Lysenko and Vil'iams' other writings, a vision of a holistic agricultural science emerges that while, yes, was based in Soviet Marxism, also had roots in a selective understanding of Dokuchaev's holistic model of the soil. Vil'iams' *travopol'e* system formulated an *epistemology* of the steppe that recognized the interdependence of soils, plants, animals, and humans within the parameters of a Soviet productivist framework. This need not be a contradiction in terms. Similarly, livestock breeders in Kazakhstan, following Lysenko's guidance, continued to carefully select and breed animals that were most adapted to the climactic conditions of the steppe and the feeding capacities of the surrounding farms. This ideological stronghold on the sciences, as I will show, served to *prevent* state plans to plow up the Kazakh Steppe.

The Situation in Biological Science

Natural sciences and their practitioners had been able to maintain their autonomy for nearly three decades of Soviet rule before political ideology choked scientific freedom. Most historians consider the August 1948 meeting of the All-Union Lenin Academy of Agricultural Sciences (VASKhNIL) to be the end of scientific plurality with Joseph Stalin's personal endorsement of Soviet Darwinism and the wiles of agronomist Trofim Lysenko. While a monolithic Soviet dialectical-material line in science undoubtedly struck out other forms of enquiry by 1948, the

[117] Nikolai Vavilov is just one example of many. The pioneering plant breeder died in a labor camp in 1941.

question remains, what figure did this singular Marxist-Leninist Party line draw? In the section below, I briefly sketch the Soviet dialectical-materialist epistemology that was articulated within the Soviet life science community at the VASKhNIL meeting on the Situation in the Biological Sciences. In doing so, I attempt to understand the concepts and mechanisms of change on the terms set by the historical actors themselves.

The 1948 Biological Sciences Meeting is the moment when all genetics research in the Soviet Union was officially rejected as a matter of state policy. This fact is repeated again in again in histories of Lysenko, Lysenkoism, and postwar Stalinist science in general.[118] In its place, so the histories go, was a crude neo-Lamarckian understanding of biology based on the heritability of acquired characteristics. These commentaries foreground Trofim Lysenko's experiments on the vernalization of wheat or his dubious crossbreeding of different species—debunked, erroneous, or otherwise falsified results. Underpinning this hypothesis-turned-dogma was a deep respect for the inextricability of organic life from its surroundings. As Academician N.G. Belenky explained in his speech entitled "Soviet Darwinism," Lysenko holds that "every particle of the body that is capable of absorbing nourishment, of growing and multiplying, in other words, which possesses the fundamental properties of life, also possesses the property of heredity." Heredity does not reside in some "specific hereditary substance" outside of or independent of this organic whole.[119] In this formulation, the whole of a cell, and the conditions in which it functioned, determined the productive and reproductive life of the organism. Belenky continued: "the sex and vegetative reproductory [*sic.*] cells which are formed in the changing body of a living organism are, like all

[118] To list just some of the works on Stalinist science, see: Ethan Pollock, *Stalin and the Soviet Science Wars* (Princeton University Press, 2006), N. L. Krementsov, *Stalinist Science* (Princeton University Press, 1997).
[119] *The Situation in Biological Science. Proceedings of the Lenin Academy of Agricultural Sciences of the USSR. Session: July 31-August 7, 1948. Verbatim Report* (Moscow: Foreign Language Publishing House, 1949), 88.

other parts of the body, connected with the entire organism by the process of metabolism." The energy flows of metabolism created an interdependence within the different parts of an organism that did not privilege one condition of life over the others.

In practical terms, this meant that natural productivity depended not just on the right combination of genes in the animals or plants under discussion, but that zootechnicians, agronomists, botanists, veterinarians, and farm workers must be attentive to every component of the organism, at every stage of life, for males and females, from what it ate to the resultant waste. Belenky did not deny the benefits of "enriching" the best of native breeds of livestock with genes of high productivity, but he argued that during the war years when feeding and stabling conditions were unfavorable, improved genetic material was a moot point. All animals suffered. In addition, under this genetic theory, it was only necessary to test the reproductive males for their health, while ignoring the selection of females, and de-emphasizing the conditions in which the young are raised.[120] In the minds of the participants at the Meeting of Biological Sciences, gene theory for explaining biological life isolated and privileged single variables for manipulation while neglecting the metabolic interconnections enervating the constitutive parts. Belenky argued that Soviet biological sciences needed to be guided by Lysenko's premise that "the organism and the environment it inhabits [is] as an integral whole."

The rejection of gene theory in at the meeting and the embrace of the energetic and metabolic processes of life had specific implications for the state of Soviet soil science and agronomy. Academician V. P. Bushinsky, in his speech delivered at the meeting, called this the

[120] *The Situation in Biological Sciences,* 91.

"biological trend in soil science" that Vasily Vil'iams (discussed below) and Vladimir Vernadsky, the famed Soviet polymath, have recently developed. Bushinsky explained that

> Being a natural body, the soil is at the same time the bearer of fertility. The soil is the chief means of production, the soil is a product of labor, and this is the most important. But the soil must not be regarded only as an 'inert,' lifeless substance of the biosphere, like rocks, subsoils, and various chemical compounds. Unlike dead rocks, the soil is a 'bioinert body,' and is the product of the interconnection of life and environment.
>
> As a result of the development of biological and biochemical processes, the upper parts of every soil-forming rock, under the influence of the joint action of higher and lower organisms, acquires new characteristics and properties. Such upper parts, or levels, formerly the 'inert' parts of the biosphere, are gradually transformed into soil, into 'bioinert bodies'.[121]

In this remarkable passage, Bushinsky carefully reworks Dokuchaev's complex definition of the soil as an interaction between parent rock, living and decaying biological life, and climatological formations. In Bushinsky's formulation, the part of the soil that is the "product of the interconnection of life and environment," can change the "inert" components of soil, i.e. parent rock and the impact of climate, or at least minimize their impact on soil fertility. "Our task now," Bushinsky continued, "is to study not the static state of the soil, the soil as it is, but the dynamic environment that is created under the influence of the development of cultivated plants…our path must lead us to the transformation of the soil." In this new conception of soil, the biological components of soil—the changeable parts—are privileged. And biological change, according to Bushinsky, occurs through labor. He explained that "developing [Vil'iams'] theory, we are of the opinion that the cultivation of the soil is a process that takes place under the strong influence of man's production and economic activity. The soil is the product of human labor; consequently, soil can be made." Through labor and Soviet dialectical-materialist science, "in the course of a few years," Soviet farms can "convert the soil of the northern non-Black Earth zone…into a highly

[121] *The Situation in Biological Sciences*, 152.

fertile soil." In this Soviet scientific community, a theory of change emerged that yoked biology and socialist labor.

Bushinsky justified his "bionert" theory of soil transformation by framing it as a natural progression in Russian and Soviet life sciences. Indeed, many of the participants at the Meeting of the Biological Sciences legitimized their theories not by amplifying their novelty or epistemic break from established scientific norms, but by tracing the lineage of their ideas through the decades. Speakers heralded nineteenth-century botanists Kliment Timiryazev and Ivan Michurin, and the father of Russian physiology, I. M. Sechenov. Most often, especially concerning questions of science and agriculture, speakers rattled off a "Dokuchaev-Kostychev-Vil'iams" or "Dokuchaev-Kostychev-Timiriazev-Michurin-Vil'iams-Lysenko" heritage. But, as I have shown in the previous chapter, Bushinsky's privileging of living and decaying plant and animal life to the process of soil formation is a selective reading of Dokuchaev's more agnostic definition. The genius of Dokuchaev's theory of soil was that organic and inorganic, living and decaying, changing and unchangeable, energy and form, were all necessary components. A. V. Krylov spoke at the meeting as the Director of the Dokuchaev Institute of Agriculture of the Central Black-Earth Belt. He championed the research of his institute as "developing the ideas of Dokuchaev and Kostychev [which have] formulated a law which actually prevails in nature—the law of the equivalency or irreplaceability of the factors of agricultural production."[122] Again, Krylov grounds the legitimacy of his institute's research agenda in the pioneering work of nineteenth-century Russian natural scientists such, explaining that "what was taken as the foundation [for contemporary investigations] was an all-around study of the natural-historical conditions of steppe agriculture in all their connections and manifestations" as Dokuchaev had promoted. From this, a "method of

[122] Ibid., 385.

all-round action on nature with a view to refashioning it in the direction needed by man" had developed under Soviet socialism. In its late-Stalinist incarnation, Dokuchaev's epistemology of the steppe was much more malleable than its original manifestation at the turn of the century.

When the conversation at the meeting turned from theoretical debates about genetics to the practical applications in agriculture, V. R. Vil'iams' *travopol'e* system was heralded as the embodiment of Soviet dialectical materialism in the biological sciences.[123] The *travopol'e* system was more than just a system of pasture and crop rotations; it was a system which considers the "environmental conditions for all the organisms with which agriculture has to deal." Speaker Vodkov, expounding on Vil'iams' system, explained that this Soviet agrobiological system must "ensure the best conditions of life on that territory for all organisms—plants, animals and microorganisms. We must establish such an interaction of agricultural organisms as will least hinder their interaction and allow for the utmost support and stimulus to growth of one branch of husbandry by another."[124] Vil'iams' *travopol'e* system, thus, was a clear continuation (and selective remembering) of Dokuchaev's agricultural recommendations based on a holistic understanding of soil.

A few months later, in October 1948, Joseph Stalin synthesized and channeled the debates from the Meeting of the Biological Sciences into his "Great Plan for the Transformation of Nature" unveiled on the front page of *Pravda.* If the VASKhNIL meeting had incontrovertibly rooted Vil'iams' *travopol'e* system in the Soviet dialectical-materialist theory of agrobiology, Stalin's Great Plan for the Transformation of Nature spelled out its practical application. The ostensible his Great Plan was to curtail what was perceived to be an ever-expanding steppe into more

[123] I will explain below in my discussion of Stalin's "Great Plan for the Transformation of Nature" more of Vil'iams' *travopol'e* system.
[124] *The Situation in Biological Sciences,* 186.

temperate and forested regions. This was the first declaration in a series of a far-reaching state plans that morphed and grew into a suite of programmatic laws throughout the remaining years of Stalin's life. Historian Stephen Brain has aptly noted the Great Plan's Promethean ecological ethos, unfounded scientific premises, and costly environmental consequences of what ended up being a short-lived experiment in Soviet forestry.[125] Denis B. Shaw has explicated the role of Soviet geographers in designing and implementing the plan.[126] The agricultural implications of Stalin's Great Plan for the Transformation of Nature have been less appreciated by environmental historians. The purpose of shelter belts—the hallmark of Stalin's plan and the focus of Brain's study—was, after all, to protect agricultural fields from damaging winds.

The second, and arguably more consequential, arm of the plan to transform nature was to implement agronomist V. R. Vil'iams' *travopol'naia sistema,* or grass field system. Marc Elie approaches the *travopol'e* system from the perspective of erosion studies within soil science. He argues that Vil'iams and T. D. Lysenko's *travopol'e* system "promoted a ridiculously simplified theoretical model [of soil structure] and deduced ineffective methods to combat drought and erosion."[127] The folly of *travopol'e,* for Elie, was that it presented an erroneous insistence on soil clodding, recommended deep plowing, and was endorsed for nearly all areas of the country no matter the climactic or soil conditions. *Travopol'e* became dogma within agronomical sciences and held back the development of Soviet soil science research, which would come to haunt the Soviet Union during the Virgin Lands Campaign. While I agree in part with Elie's criticisms, he

[125] See Stephen Brain, "The Great Stalin Plan for the Transformation of Nature," *Environmental History* 15, no. 4 (2010): 670-700; Brain, *Song of the Forest: Russian Forestry and Stalinist Environmentalism, 1905-1953* (Pittsburgh: University of Pittsburg Press, 2011).
[126] Jonathan D. Oldfield and Denis B. Shaw, "A Russian Geographical Tradition? The Contested Canon of Russian and Soviet Geography, 1884-1953," *Journal of Historical Geography* 49 (2015): 75-84.
[127] Marc Elie, "The Soviet Dust Bowl and the Canadian Erosion Experience in the New Lands of Kazakhstan, 1950s-1960s" *Global Environment* 8, no. 2 (2015), 269.

discounts the contribution of Vil'iams' system to Soviet agriculture broadly speaking, and to the development of livestock production in Kazakhstan in particular.

The dogma of the *travopol'e* system rendered an imaginary of the steppe as an interdependent ecosystem whose productive capacity could be continuously increased. In the introduction to his 1939 textbook *Soil Science: Agriculture with a Basis of Soil Science*, Vil'iams explained that "at the base of socialist agricultural production lie the laws of progressive development." But progressive development was only possible when labor was directed "simultaneously toward the whole of [agricultural production's] elaborate complex, comprising one organic whole, inextricable and interconnected. Action on one of the elements or production inevitably entails the necessity of action also on all the rest."[128] For Vil'iams, Soviet agriculture was not simply maximizing the production of the single commercial crop, but the careful management of the plants that preceded and followed the commercial crop, the soils that nourished them, and the livestock that both restored the soils and consumed part of the plant matter. Each of these components could be manipulated through socialist labor to increase production, but an appreciation of their mutual dependence was essential for growth.

The centerpiece of the *travopol'e* system was, unsurprisingly, soil; the entire premise of Vil'iams' system was to increase soil fertility. Vil'iams bemoaned kolkhoz practices of continuous cultivation that exhaust the soil, and organic matter is lost when fields are left as bare fallow. Even with the collectivization of peasant agriculture in the 1930s, a field would be sown in autumn with rye, for example, harvested the following spring, and then let to lie fallow (with the topsoil exposed) until the nutrients recovered. Pastures for grazing livestock typically were located on the

[128] V. R. Vil'iams, *Pochvovedenie: Zemledelie s osnovami pochvovedeniia* (Selkhozgiz, 1939), 3.

poorest quality land unsuitable for crop cultivation. Vil'iams *travopol'e* system had two arms: one rotation system for field crop production, and one for rotating pastures for livestock. Soil nutrients would be replenished by rotating field crops with years of perennial grasses, mixtures of annual grasses, and forage tubers, melons, sugar beets, and sunflowers. Perennial grasses should predominate the rotation. Aside from the season in which the commercial field crop was cultivated, the rest of the growing season and the growing seasons for the next six to eight years (depending on the particular rotation schedule) would be for the benefit of livestock.

Animals played many key roles in Vil'iams' *travopol'e* agrobiological system. He conceived of livestock production and crop production as parts of the same whole: "Productive animal husbandry is equally as significant as crop cultivation [*rastenivodstvo*]…and without an equally great development [of animal husbandry] the organization of the whole of agricultural production is impossible."[129] Socialist livestock production was to be developed on the basis of socialist agriculture: the bulk of the *travopol'e* system's gross product was aimed at cultivating livestock forages, whether in the form of field crops or sown pastures. Livestock were also central to the *travopol'e* system in the form of their manure: animals were at once "working machines" and the products of agricultural production. Vil'iams explained that animal husbandry's "primary material serves on only for the attainment of the final product, but alongside this at the same time it serves also as a source of energy" for other living organisms, referring to nutrition for microbes in the soil.[130] During rotations of perennial grasses for grazing, livestock would naturally distribute fertilizer in the form of manure and urine throughout the field with little use of human labor. At times in the rotation when livestock were not actively feeding on the grasses, Vil'iams provided

[129] Vil'iams, *Lugovoi sevooborot v travopol'noi sisteme zemledeliia*.
[130] Vil'iams, *Pochvovedenie*, 15.

specific protocols for applying manure depending on the age of the manure and the depths at which it was intermixed with the soil. (He imagined that this process could be mechanized in the future.) Seen in this light, the *travopol'e* system was a method for cultivating higher quality livestock forages, and in the process, nutrients would be returned to the soil for field crop cultivation.

A critical error in Vil'iams' system is the depth to which the soil should be overturned and seeds should be planted. Vil'iams maintained that deep plowing was the only way to ensure proper plant nutrition for root growth. This insistence on deep plowing is reminiscent of late 19th century agronomists who asserted the supremacy of heavy iron plows that could penetrate the chernozem. (Peasants relied on a *sokha*, or wooden hand plow that only scratched the surface.)[131] As I will show in the next chapter, by the time Nikita Khrushchev embarked on his Virgin Lands Campaign, Vil'iams' *travopol'e* system was out of fashion because it was failing to increase yields and even led to crop failures in some places. I hypothesize that this had more to do with the depth of plowing and the amount of soil that was turned over rather than the particular rotations of perennial grasses, as would be argued.

Stalin's Great Plan for the Transformation of Nature, including Vil'iams' *travopol'e* system, takes on additional significance when viewed with the 1949 promulgation of his Three-Year Plan for Increasing Livestock Production.[132] The goal of the legislation was, obviously, to increase the size of the herd across the Soviet Union. Importing animals from abroad was out of the question in the tense (and lean) early Cold War years, so the law centered on measures to improve the natural regeneration of the herd. Animal feed was the basis for the recovery of the Soviet herd, and state and collective farms were tasked with improving the fodder base for

[131] See discussion of advantages of the peasant *sokha* in James Y. Simms, Jr., "The Crop Failure of 1891."
[132] "Trekhletnii Plan Razvitiia obshchestvennogo kolkhoznogo I sovkhoznogo productivnogo zhivotnovodstva 1949-1951 gg." *Pravda,* April 19, 1949.

livestock. Improving animal feed also improves the reproductive capacity of the animals, their disease resistance and meat-to-fat ratios, and allows any national breeding program to take hold. In the Three-Year Plan, Stalin raised quotas for beef and dairy production, and projected cattle numbers to nearly double between 1948 and 1951.

The most dire concern for the reproduction (and thus production) of Soviet livestock addressed in Stalin's Three-Year Plan was the gross imbalance of heifers to bulls in herds across the country. In Kazakhstan, although by 1948 cattle numbers on state farms exceeded their pre-war levels, the number of reproductive females was actually lower than it was in 1940. Heifers were culled prematurely for meat at the rate of 15.4% in 1948, from a high of 21.1% in 1943.[133] (A decade earlier in Karaganda, by comparison, Chaianov decried that 10% of heifers were slaughtered every year, which "is not and cannot be the goal [for] stabilizing the reproductive female part of the herd."[134])

The reason for such high culling rates of reproductive females, and thus the slow growth rate in herd size and its low overall productivity, was the abysmal state of plant and human inputs (forage production and labor resources). Pregnant heifers rely more on green forages than non-reproductive animals (grazing in the summer months and eating hay or ensilaged fodder during the winter). Ideally, they are kept indoors while pregnant, calving, and nursing, and so also require greater labor resources from farm workers. In the postwar period when available labor in the countryside was in crisis and forage production was sharply reduced, it made more economic sense to keep a greater proportion of castrated bulls in the herd. In other words, culling heifers early so as to not have to provision them through repeated calvings was of economic necessity.

[133] TsGARK 1481/31/243/2.
[134] *Osnovnye voprosy organizatsii kolkhoznogo zhivotnovodstva v Kazakhstane*, 18.

To increase the number of heifers, and increase livestock productivity overall, Stalin targeted was improving livestock feed through the *travopol'e* system. He insisted that feeding regimes should correspond to the breeds and products of livestock. Areas with existing widespread field crop cultivation, as conventional wisdom confirmed, should be used for raising dairy cattle. On the other hand, if a farm had extensive natural pasture resources, it should focus primarily on beef production. Stalin upbraided kolkhozes that, although spread across vast natural pastures, continued to raise dairy cattle at the expense of beef production. The *travopol'e* rotation system was to be widely implemented in the southern steppe regions of the USSR to improve haymaking, grazing pastures, silage, and other green forages.

Travopol'e in Practice

The transition from theory to practice, however, was harder to achieve. Leaders in Kazakhstan also attempted to adopt the Vil'iams method but were confronted with the realities of pasture rotations within the limits of a farm's borders. The crux of the problem was fixing the animals in space. The abundant steppe grasslands in northern Kazakhstan were inaccessible during winter months when snow, ice, heavy winds, and perilously cold temperatures endangered (human and non-human) animal life. The climate was simply too harsh for animals, and especially cattle, to graze year-round on the same northern pastures. As Kazakhs had understood for generations, livestock needed to be moved from the steppes of northern Kazakhstan to meadows and milder climes of the southern and eastern regions. The *travopol'e* system, per se, did not impede livestock production so much as the forcing herds and their stewards to stay in one (albeit large) geographic area for grazing. If the authorities wanted collective herders to remain in one place, they needed a

concomitant increase in accessible fodder production to compensate for the reduction in accessible pastures, which they did not do.

Records from Akmola Oblast speak to the difficulties of raising livestock entirely on natural pastures on the Kazakh Steppe without the ability to migrate when conditions proved too hostile. In winter, herdsmen would drive their livestock to winter pastures for grazing. Horses and sheep are generally hardier (and more persistent) animals and can forage unassisted in winter for necessary food. Cows, however, rely more on harvested grasses in the winter months in the forms of hay, silage, and straw. Thus, winter pastures had to be supplemented with the requisite amounts of harvested forages to provision the cattle, and to a lesser extent the horses and sheep in the flock. Over-wintering also required barns and stables on location for the animals (again, mostly for cows, but in severe weather, for the horses and sheep as well). Shepherds, cowherds, and horsemen also needed shelter from the elements on winter pastures, which often took laborers far away from village settlements.

Wintering campaigns for livestock on the steppe were just as integral to farm life as planting time in the spring and harvesting season in the fall. In fact, regional communist party officials organized review commissions every year to assess collective farms' preparedness for wintering; 63 such commissions were created in Akmola Oblast for the 1946-1947 wintering campaign. The commissions found after reviewing the 407 kolkhozes and 13 sovkhozes of the oblast that a full 112 kolkhozes and 5 sovkhozes were unprepared for the upcoming winter due to insufficient animal feed.[135] In a more detailed report delivered in November on the preparedness of state farms in Akmola Oblast for that winter, only 70.8% of the plan for tons of hay in storage

[135] Gosudarstvennyi Archiv Akmolinskoi Oblasti (Hereafter, GAAO) 1/1/909/221.

had been fulfilled (although this was up from 57.0% of the plan in the previous year).[136] The report cites a breakdown in labor organization to mow the hayfields. By November, hard freezes could make any last-ditch efforts at harvesting impossible, and the forages are less nutritious the further into autumn they remain in the ground. Plans for ensilaging, a method of fermenting grasses that makes them both more nutritious and palatable than hay, were completely abandoned across all sovkhozes in the oblast. Five years later, by October 10, 1951, the plans for hay production in Akmola Oblast were only 63% fulfilled, for straw 48%, and for silage, 53%.[137] Not much had improved.

One of the biggest impediments to forage provisioning was a lack of machinery. Much of the harvesting was still done by horses, oxen, or cattle. In one 1951 report, it was noted that the nearest silo for many kolkhozes is over 100 km away. Hay must be pressed and baled in order to be transported, and while the local Machine Tractor Station (MTS) had 22 hay pressers in operation, a lack of cording meant that the hay wasn't being baled.[138] In 1950, there were only 31,200 tractors in the republic—practically unchanged since the outset of WWII.[139]

To overcome shortages in harvested forages, farms had a few options. They could transfer animals to better-provisioned farms, as was the case in 1946 with the underperforming Balkashin and Barakul' state farms, which transferred 250 head of cattle to Tersakan sovkhoz. The oblast's executive committee anticipated the deficits on the struggling farms and oversaw the transfers. Other strategies to make up the feed deficit included grazing all horses, sheep, and non-productive

[136] GAAO 1/1/770/92 "On the preparedness of sovkhozes of the Akmola Oblast for the wintering of 1946-1947."
[137] GAAO 1/1/1318/14.
[138] GAAO 1/1/1318/40.
[139] A. Tursinbaev, "Socialist Transformation in Agriculture in Kazakhstan," *Sel'skoe khoziastvo Kazakhstana* 11 (1957): 7.

(гулевой)[140] cattle; gathering less nutritious by-products like straw and the chaff of grain; using stalks; or, as a last resort, sending animals prematurely to slaughter, especially heifers.[141] In other cases, collective and state farms traded animals and fodder to make ends meet without the local executive committee's sanction. This befuddled authorities who, from their vantage point, needed to know about shortcomings in order to judiciously allocate resources. Otherwise, even farms with available surpluses would be shortchanged and would have to buy back forage later in winter.[142] In a state police report, at the collective farm "Banner of the Internationale" in the Molotov Region and at the Baskul collective farm in Shortandy Region, the chairmen gave a "whitewashed" report in their forage balance by including unharvested grasses in their totals.[143] In 1949 alone at the Red Flag kolkhoz in Akmola Region, 300 sheep, 10 horses, 10 oxen, and 57 head of cattle perished from lack of harvested forages. Much to the disappointment of Major Ernazarov, the author of the report, few punishments were doled out.

Wintering on the steppe in the postwar years was also complicated by a lack of housing structures on remote pastures, for the animals and their keepers. Animals would perish as temperatures frequently dipped below 35 degrees Celsius. Traditional Kazakh yurts (юрт in Russian; үй in Kazakh) were still used widely on the steppe long after forced sedentarization and collectivization.[144] Felted wool panels are stretched across a wooden frame to provide structure and protection from the elements. They can quickly be assembled and disassembled as the animals graze their way through pasture. Building materials for more permanent dwellings—like wood and bricks, not to mention modern steel or cement—were in such short supply for the simple reason

[140] I think this refers to draft animals. Castrated bulls, but also not used for meat deliveries.
[141] GAAO 1/1/770/94.
[142] GAAO 1/1/1174/87.
[143] GAAO 1/1/1174/84.
[144] Later in the 1960s, Khrushchev will pilot a program for yurts made of synthetic materials.

that there aren't many trees on the steppe. In fact, for kolkhozes across the republic, a full 69% were located in places where there were not enough trees for building materials to meet farms' housing needs for humans or animals; lumber had to be imported.[145] In 1946, as the renaissance in nomadic pastoralism waned, only 35% of calves and 23% of cattle (excluding calves and draft animals) on kolkhozes had a structure for housing.[146] One report noted that more residential buildings couldn't be constructed on state farms because, with the exception of the Balkalshin breeding sovkhoz (*rassadnik*), the nearest sovkhoz to a lumberyard was 160 km.[147] Yurts, therefore, made ideal housing for livestock herders, and district leaders called for their production to increase well after forced sedentarization and collectivization.[148]

Construction for barns and residential buildings was hamstrung by a dearth of construction materials. At the start of the 1951 construction season, one report noted that there were not enough funds to allow construction specialists site visits on farms, and so the specialists drafted construction plans which did not "show any kind of technical support to kolkhozes [and] completely miss[ed] the accounting of the supply of local building materials." As a result, neither the oblast's agricultural construction department nor the executive committee knew how much local building materials (air bricks (саман), straw, brushwood (хворост), reeds (камыш), stone, and others) were actually available, and also what needed to be procured from other areas, like nails, glass, steel, and others.[149] Some kolkhozes, like the Stakhanovite kolkhoz in the Molotov District, were so desperate for building materials that they traded with a neighboring kolkhoz a

[145] TsGARK 1481/31/169/75. Five-Year Plan for the Development of Animal Husbandry on Kolkhozes, 1946-1950.
[146] TsGARK 1481/31/169/51.
[147] GAAO 1/1/909/165. "Short economic survey of sovkhozes in the oblast."
[148] GAAO 1/1/909/55. "Explanatory note on the issue of the condition of grazing livestock on kolkhozes of the oblast."
[149] GAAO 1/1/1317/4. "On the state of the preparation for the construction season of 1951 on kolkhozes of the oblast."

cow and a calf for sheet metal and coal.[150] As collective farm amalgamation was underway in 1951, larger, more centralized farms and administrative centers needed to be built. To meet the construction demands, 665 kolkhozniki worked at a lumberyard over 1,000 km away in Sverdlovsk Oblast to procure wood for new farm buildings.[151]

Many fingers were pointed to expose the blame for failed winterings. Reports repeatedly chastised farm and party leadership for not properly organizing the labor necessary to harvest, bail, and transport hay to the outposts, or for "various 'objective' reasons of economic problems."[152] But further in these same wintering reports reveal a more concrete and immediate problem: nearly half of the labor force did not show up to work because they lacked warm clothes. In a 1946 report to the Secretary of the Central Committee in Kazakhstan Shaiakhmetov, the Akmola Oblast party head flagged the "mass occurrences" of absenteeism due to lack of warm clothing, which created "an exceptional difficulty in conducting the wintering of livestock."[153] The director of the sovkhoz trust and the head of the livestock department of the oblast's party committee got more specific in their survey. "Learning that the main mass of workers on the sovkhoz are special settlers (спецпереселенцы)," they explained, and heralded from warmer regions of the country, the workers did not have proper clothes to labor in such harsh conditions. Nearly half did not show up to work because they lacked warm clothes. The sovkhoz trust director requested 1500 felt boots, and 500 coats, shirts, and pants to outfit farm workers.[154] Leadership could only accomplish so much when labor supply was in tatters.

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[150] GAAO 1/1/909/44.
[151] GAAO 1/1/1317/6. "On the completed work in the oblast of the settlement and deployment of construction in the amalgamation of kolkhozes."
[152] GAAO 1/1/909/208.
[153] GAAO 1/1/770/137. "On the results of the preparation and carrying out of the wintering of livestock on kolkhozes and sovkhozes of Akmola Oblast."
[154] GAAO 1/1/909/166. "Short economic survey of sovkhozes in the oblast."

From his perch atop the Communist Party of Kazakhstan, Zhumabai Shaiakhmetov located the failures of the implementation of the *travopol'e* system in the Ministry of Agriculture in Moscow. One example he gave was the continual shortchanging the republic in the necessary sowing plans. In 1951, the republic set the sowing of perennial grasses at 550,000 hectares, but the Ministry of Agriculture in Moscow only approved 360,000. For the projected Five-Year Plan, the harvest of perennial grasses should reach 2,250,000 ha, but the Min AG USSR only noted just half of that.[155] Even if farms had the human, animal, and mechanical labor capacity to implement the *travopol'e* system, the Agricultural Ministry itself was hindering its realization.

Nine months after Stalin revealed his Great Plan, of the 6,731 collective farms in the republic, 4,213 had already begun some form of the *travopol'e* system. The rest of the report enumerates the various stages of implementation on kolkhozes, the recipes of grass mixtures for pastures, crop rotations, and criticisms of "the level of qualified parts of the agronomical network…[which] as a result, in a number of areas, the very placement of crops according to the transition plans is not established correctly."[156] In a 1952 resolution of livestock professionals from across the republic, the committee noted that although the number of animals increased from 1948 to 1952 by 32.9%, the preparation of forages only increased by 5.9%. There were more animals, but they were underfed. The meeting recommended doubling down on the implementation of the *travopol'e* system on both sovkhozes and kolkhozes. In the case of Kazakhstan, this meant to "decisively expand the sowing of perennial and annual grasses, fodder tubers and ensilaging crops, to widely cultivate [*osvoenie*] new forage crops (Sudan grass, sorghum, green foxtail [Setaria viridis], foxtail millet [Setaria italica]), to correctly reclaim and fully utilize the huge seasonal

[155] Zhumabai Shaiakhmetov, *Dokumenty i materialy* (LEM Publishing House, 2021), 241.
[156] TsGARK 1481/1/365/2-3. Meeting of the regionalization of the types and mixtures of perennial grasses for forage meadow-pasture crop rotations on the kolkhozes of Kazakh SSR for 1949.

pastures, fundamentally improve meadows and pasture resources by way of implementing irrigation measures and sowing annual grasses." [157] While the *travopol'e* system was not fully realized on state and collective farms, it was the first unified attempt in the Soviet Union to increase livestock production by improving what animals ate. It also established the importance of the interdependence between soils, plants, and livestock on the steppe for agricultural production.

Breeding the Soviet Kazakh Herd

While farms were helplessly trying to implement the *travopol'e* system, the state reorganized the Kazakh breeding program along the lines of the newly formed collective and, to a lesser extent, state farms. Indigenous Kazakh cattle had been crossed throughout the 1930s with imported purebred Hereford animals in an attempt to create a hybrid type that could render large quantities of meat under the specific environmental conditions of the Kazakh steppe. The result was the first all-beef breed developed in the Soviet Union, the Kazakh White-Headed cattle (*kazakhskaia belogolodnaia poroda*). The assumptions undergirding the breeding plans reveal the form the new Kazakh animals were to take.

Soviet veterinarians, on the premise of Soviet-Marxism, did not consider Kazakh cattle, however, to be bred (*porodnyi* or *zavodskii*) animals. To begin, a breed of domesticated animal was the result of a combination of human labor and natural-climactic conditions. Human labor was, of course, understood as occurring alongside a growth in material culture in connection with social-economic conditions. The productivity of the breed indexed the social-cultural development of the humans who kept them. Thus, Soviet livestock breeders understood the relatively poor dairy

[157] TsGARK 1481/31/370/476.

production of Kazakh cattle as a reflection of the low level of the material culture, economic conditions, and labor inputs of Kazakh nomadic pastoralists. As one academic put it, it wasn't until the advent of Soviet power—with railways, developed industry, and large cities—was there the infrastructure or demand for commercial dairy production.[158]

The other half of the equation for breed development was the influence of natural-climactic conditions. On the steppe, these factors further hindered the evolution of the Kazakh breed. Extremes in temperatures, periodic droughts, minimal precipitation, and the dreadful *dzhut* resulted in all-too-frequent malnourishment and even mass livestock deaths—the "unavoidable companion [*sputnik*] to nomadic animal husbandry."[159] Although by the late 19th century some Kazakhs practiced a semi-nomadic lifestyle and began to use hay as winter fodder, this was not a widespread practice. "As is well known," D. N. Pak remarked, "natural pastures and climate, comprising the foundation for the conditions for life [for cattle], change very slowly." The development of Kazakh cattle as a coherent breed was beholden to forces beyond control of humans at the nomadic pastoral stage of material development.[160] Not only did the Kazakh nomadic pastoralists lack the material conditions to develop dairy cattle, but because of the meager food resources during much of the year, "animals with that type of metabolism cannot store on the body nutrients in the form of fat." In the first days and weeks following calving, Kazakh heifers gave rich milk (4.1% milkfat or higher), vital to their young's initial development. However, their milk quickly lost its heft because of the variability in available pastures. Thus, because of the low

[158] D. N. Pak, *Porodoobrazovanie I evoliutsiia krupnogo rogatogo skota (na primere alatauskoi porody I ee iskhodnykh)* (Almaty: Kazakh State Agricultural Literature Publishing, 1962), 3.
[159] Pak, *Porodoobrazovanie*, 11.
[160] Pak, *Porodoobrazovanie*, 8.

material culture of nomadic pastoralists and the austere climate on the steppe, Kazakh cattle developed over the centuries primarily as animals for meat.

The "renaissance of nomadism" during the Second World War also had profound changes for the breeding agendas in Kazakhstan. Because of a sudden shortage of labor on collective farms, and the evacuation of livestock from the front lines in Ukraine and southern Russia, the breeding priorities of Kazakh herdsmen and agronomists shifted sharply to beef production. If in the 1930s, planners had hoped to rebuild the Soviet Kazakh herd by crossing dairy breeds with indigenous cattle, during the 1940s, breeding plans favored cattle raised for their meat. On the eve of the war the two most predominant breeds were Hereford (37% of the total number of cattle) and Kazakh (40%)—both beef breeds. Despite being imported in far greater numbers into the republic in the 1930s, Simmental and Red Steppe cattle represented only 11% and 6% of cattle breeds, respectively. Kazakh cattle were assimilated into herds of various beef and dairy breeds, and by 1948, they represented only 6.45% of cattle breeds. In 1948, 61% of purebred or improved cattle were. (Simmental and Red Steppe cattle remained a modest proportion of cattle breeds in 1948, numbering 13% and 11%, respectively.)[161]

At the time of Stalin's death in 1953, the Kazakh livestock breeding program nearly managed to fully repopulate cattle herds in the republic after the catastrophe of collectivization. But the scrawny, mangey indigenous Kazakh cattle that had developed over centuries of adaptations to their local environments and the humans that kept them had all but disappeared. In its stead was a Soviet Kazakh animal—the Kazakh White-Headed breed—registered in the state

[161] Tsentral'nyi gosudarstvennyi archiv respubliki Kazakhstana. TsGARK. 1481/31/243/27. Again, "Kazakh" cattle were not considered a breed listed in the State Stud Book (*gosudarstvennaia plemennaia kniga*).

stud book (*gosplemkniga*) for the first time in 1950.[162] The Soviet Kazakh herd—at once highly productive and adapted to its local environment—retained the characteristics that ensured its continued survival on the steppe and supplemented its body with more meat and milk to feed their now sedentarized Kazakh keepers.

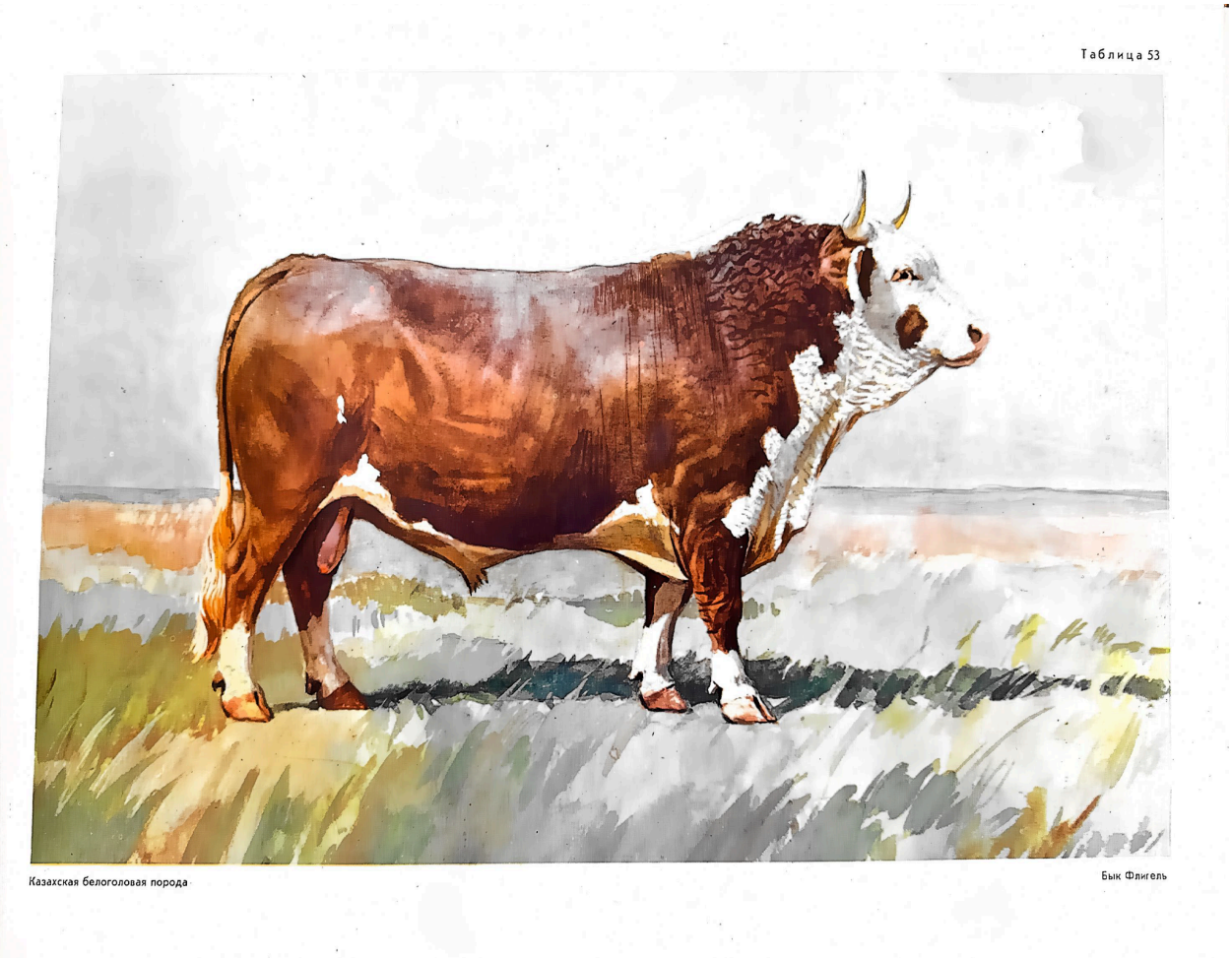

Fig 2: Kazakh White-Headed bull. *Porody krupnykh rogatykh skot*. (Moscow: USSR Ministry of Agriculture, 1961), 53.

[162] The purpose of the *gosplemkniga*, as one report notes, was: "State stud books summarize the achievements of research institutions, breeding farms and sovkhozes in breeding and improving breeds of agricultural animals, identify the most valuable highly productive animals of various breeds. The materials of state stud books provide direction for the breeding work and further improvement of the economically useful qualities of breeding lines, families, and the breed as a whole, [and] analyze the genealogical structure of the breed." TsGARK 1481/31/1273/161.

Conclusion

The fits and starts of Stalinist-era livestock production in Kazakhstan were guided, at least in theory, by a Soviet-Marxist understanding of the life sciences. While many historians reject this period in Soviet history as a freezing of scientific knowledge production, I contend that agronomists like Lysenko and Vil'iams articulated a holistic, interdependent steppe epistemology that saw soils, plants, animals, and humans as integral parts to a productive agricultural system. The application of these principles was limited at best. But it is important to highlight historical paths not taken and to resurrect rather sustainable agroecological principles from the archival record. The Stalinist period also puts into stark relief the changes that Nikita Khrushchev would make to steppe biology based on a complete reversal of Stalinist steppe epistemology.

Chapter 3: Nikita Khrushchev's Transformation of the Steppe, Or the Virgin Lands Campaigns

On February 23, 1954, Nikita Khrushchev stood before the Central Committee of the Communist Party and announced his plan to plow up 13 million hectares of virgin and fallow lands across the Soviet Union, with 6.3 million hectares designated for Kazakhstan alone. The scale of his proposal was breathtaking: in less than two years, the Soviet Union would cultivate an area larger than the entire arable land of France. Yet for all its ambition, Khrushchev's Virgin Lands Campaign represented a fundamental departure from the scientific approaches to steppe environments that had characterized both the late imperial and early Soviet periods. Where Vasily Dokuchaev had spent decades studying the holistic relationships between soils, plants, climate, and human activity, and where Stalin's agricultural scientists had developed elaborate theories about the dialectical relationships between biological and social systems, Khrushchev made his momentous decision about the fate of the Kazakh Steppe without any coherent epistemological framework for understanding steppe ecology.

This chapter examines what I call the "abandonment of steppe epistemology" under Khrushchev—the systematic subordination of ecological knowledge to economic and political imperatives that operated on fundamentally different temporal and spatial scales than environmental processes. Unlike his predecessors, who grounded their interventions in competing but nonetheless sophisticated theories about soil formation, plant succession, and human-environment relationships, Khrushchev approached the steppe primarily as an economic resource to be mobilized in service of Cold War competition and domestic consumption demands. His "environmental imaginary" of the Kazakh Steppe was not ecological but economic: he saw vast expanses of underutilized chernozem soils that could be transformed into grain production

facilities to solve the Soviet Union's chronic food shortages and demonstrate socialist superiority over capitalist agriculture.

The consequences of this anti-epistemological approach were profound. By treating the steppe as an empty space to be filled with industrial agricultural infrastructure rather than as a complex ecosystem with its own biological and social dynamics, Khrushchev's Virgin Lands Campaign accomplished what neither imperial settlement nor Stalinist collectivization had achieved: the final destruction of the ecological foundations that had sustained nomadic pastoralism for centuries. The native grasslands that held the thin soils in place were plowed under and replaced with annual grain crops. The indigenous livestock breeds that had evolved over millennia of adaptation to steppe conditions were systematically replaced with imported animals selected for high productivity under industrial conditions. The seasonal migration patterns that had distributed grazing pressure across vast landscapes were eliminated in favor of concentrated feedlot operations dependent on cultivated forages.

Paradoxically, this abandonment of ecological epistemology coincided with the greatest proliferation of scientific research in steppe history. As the first plows broke ground in the spring of 1954, hundreds of scientific brigades fanned out across northern Kazakhstan to conduct the most comprehensive study of steppe environments ever undertaken. Soil scientists mapped geological formations, botanists catalogued plant communities, climatologists analyzed precipitation patterns, and agronomists tested cultivation techniques. New research institutes were established, including what would become the All-Union Research Institute of Grain Husbandry under the direction of Alexander Baraev. Thousands of specialists published detailed reports on every aspect of steppe ecology and agriculture.

Yet this explosion of scientific activity occurred *after* the fundamental policy decisions had been made on entirely different grounds. The research served to legitimate and optimize transformations already set in motion rather than to guide decision-making processes. Scientists found themselves in the peculiar position of studying environments that were being rapidly and irreversibly altered by policies they had no role in formulating. When their findings suggested problems with extensive cultivation—soil erosion, declining yields, ecological disruption—their warnings were dismissed or ignored by political leaders committed to demonstrating the success of the Virgin Lands Campaign.

This temporal and institutional disconnect between knowledge production and policy formation proved decisive in enabling the most destructive environmental changes in steppe history. The absence of ecological epistemology at the level of policymaking meant that there was no conceptual framework for understanding or limiting environmental damage. Where Dokuchaev's holistic approach had at least recognized the interdependence of soils, plants, and climate, and where Stalin's dialectical materialism had acknowledged the relationships between biological and social systems, Khrushchev's approach had no such conceptual resources for thinking about ecological limits or unintended consequences.

The chapter proceeds in three parts. The first section examines Khrushchev's decision-making process, showing how economic urgency, Cold War competition, and urban consumption demands shaped his understanding of the steppe as an underutilized economic resource. The second section traces the massive mobilization of humans, machines, and scientific expertise that transformed the material composition of the steppe between 1954 and 1964. The third section analyzes what Dinmukhamed Kunaev called the "second Virgin Lands Campaign"—the

transformation of livestock production from extensive pastoral systems to intensive industrial operations dependent on cultivated forages.

Throughout, I argue that the Virgin Lands Campaign represented not simply another phase in the modernization of Soviet agriculture, but a qualitatively different approach to human-environment relationships that abandoned the ecological thinking that had characterized earlier periods. The campaign's most lasting legacy was not its grain production—which proved disappointingly variable—but its transformation of the metabolic relationships that had connected human communities to steppe environments for centuries. By severing these connections and replacing them with industrial agricultural systems dependent on external inputs and global markets, Khrushchev accomplished what neither imperial conquest nor socialist revolution had achieved: the final destruction of nomadic pastoralism as both an economic system and a way of knowing and inhabiting the more-than-human world.

Part I: The Humans of the (first) Virgin Lands Campaign

When Joseph Stalin died in March of 1953, he left the party handcuffed by suspicion of its enemies, both inside and out of the Soviet Union. Agricultural policy was not the first order of business after the leader's death. The inner circle surrounding Stalin, including Georgii Malenkov, Vyacheslav Molotov, Nikita Khrushchev, and Lavrentii Beria all vied for power by demonstrably declaring their dedication to the legacy of the deceased *vozhd*, all the while carefully distancing themselves from Stalin's most terrible acts. Some were more successful than others in constructing a benign narrative. Lavrentii Beria, the head of the infamous NKVD since 1938, was the first to be removed from the list of contenders to replace Stalin as head of party and state. Ostensibly

Beria's list of crimes upon arrest in June of 1953 was related to threats to the Soviet Union from without: treason, terrorism, and counter-revolutionary activity. Historian Martin McCauley highlights that other members of the Politburo saw Beria as holding up domestic policy changes in the Soviet countryside to expand agricultural production.[163] With Beria gone, the Central Committee could then turn to domestic reforms. A standoff ensued between Malenkov and Khrushchev for the fate of the countryside after Stalin. As detailed in the previous chapter, immediate postwar economic growth was sluggish at best, and the agricultural sector languished due to a lack of labor, technological inputs, and state investment. By many metrics, agricultural production across the Soviet Union was below pre-Revolutionary levels at the time of Stalin's death.[164]

McCauley provides the best chronicle of the internal debates in the power vacuum after Stalin's death surrounding agricultural policy. Malenkov maintained that increasing crop yields on the existing sown area—intensive agricultural production—was the most effective way to fuel the population. Chemical and mineral inputs, increased mechanization, and the marrying of science and agriculture would necessarily increase the productivity of the land and total agricultural output. He also favored investment in light industry and consumer goods as opposed to the Stalinist course of armament manufacturing. Malenkov even went so far as to boldly declare at the August 1953 meeting of the USSR Supreme Soviet that the grain problem in the country was solved.[165]

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[163] Martin McCauley, *Khrushchev and the Development of Soviet Agriculture: The Virgin Lands Program, 1953-1964*, (London: The MacMillan Press, 1976), 44.
[164] In terms of head of livestock, the only increases from pre-Revolutionary years were in goats and, to a lesser extent, pigs: https://soviethistory.msu.edu/1954-2/virgin-lands-campaign/virgin-lands-campaign-texts/khrushchev-criticizes-agriculture-under-stalin/.
[165] McCauley, *Khrushchev and the Development of Soviet Agriculture,* 46.

Khrushchev vehemently disagreed and used Malenkov's miscalculations to stake his claim as Stalin's successor.

Khrushchev's Absent Steppe Epistemology

Khrushchev's early speeches demonstrate that while he had tremendous hope for the Kazakh SSR, he had very little understanding of the environmental, economic and social setting in which he based his campaign. These speeches demonstrate Khrushchev's earnest faith in Soviet agriculture, and meat production specifically, as a vehicle to postwar abundance, but take for granted the land and livelihoods of what came before. I borrow here from William Cronon's study on the American prairie frontier in which state leaders developed "a logic of the frontier" that included a "wild oscillation" between its supposed emptiness and its potential for abundance.[166] Khrushchev didn't mention Kazakhstan in much detail in his 1954 address to the Central Committee, except for charging the republic with cultivating 6 million hectares of grain. Instead, Khrushchev relied on platitudes and oversimplifications to make his case. He lauded "what enormous land resources the republic has," so vast that "Kazakhstan can give grain [*davat' khleb*] not [any] less than Ukraine, [and] meat and wool many times greater than Ukraine."[167] Khrushchev saw expansive tracts of the same chernozem soils that turned Ukraine into the Soviet Union's breadbasket on the northern steppes of Kazakhstan, and assumed the same agricultural potential was stored in these soils further east. The steppes in Ukraine and the steppes in the Kazakh SSR

[166] W. Cronon, "Landscapes of abundance and scarcity," in C. Milner, et. al., eds., *The Oxford History of the American West* (Oxford: Oxford University Press, 1994), 603-637. As quoted in Jennifer Keating, *On Arid Ground: Political Ecologies of Empire in Russian Central Asia* (Oxford: Oxford University Press, 2022), 21-22.
[167] N. S. Khrushchev, *O dal'neishem uvelichenii proizvodstva zerna v strane i ob osvoenii tselinnykh i zalezhnykh zemel': doklad na plenume Tsentral'nogo Komiteta KPSS 23 fevralia 1954 g.* (State Publishing House of Political Literature, 1954), 50-51.

were undifferentiated in terms of the potential for wheat cultivation. Vasily Dokuchaev's natural zones persisted and created a fiction of interchangeability that erased meaningful differences in climate and soil histories. After all, Khrushchev had personally witnessed the fecundity of the chernozems of the forest-steppe region growing up in the village of Kalinovka in Kursk Oblast. As head of the Communist Party in Ukraine from 1937 to 1949[168], Khrushchev had access to detailed grain production statistics across the republic and, accusations of intransigent peasant labor and world war notwithstanding, appreciated the tremendous contribution of the Ukrainian Steppe to Soviet food production. For Khrushchev, the only reason the Kazakh Republic had not achieved the agricultural successes of Ukraine was because of poor party leadership in the republic.

Khrushchev had never visited Kazakhstan before he announced his plan to dramatically restructure the biology, economy, and sociology of the steppe. In fact, his first visit to Kazakhstan was in late May-early June 1954, after thousands of plows had already broken ground.[169] He delivered his notes from his trip to the Presidium as an update on the progress of his campaign. The only details he provided of his impressions of the foreign landscape was that the "unbelievable expanse of virgin lands--…[was] completely flat…[one] couldn't see the end of the border." He relayed to his colleagues that the land was, "as a rule, good, [and] the majority of which was suitable for cultivation." These are hardly resounding endorsements of the bounty of this enormous capital investment. Nor do they seem to be observations of someone so proud of his closeness to peasant agricultural know-how.

[168] There were a few months in 1947 when Stalin demoted Khrushchev and replaced him with Lazar Kaganovich, but this decision was reversed, and Khrushchev was again reinstated as Chairman of the Communist Party of Ukraine.

[169] He delivered a report to the Presidium of the Central Committee on June 5, 1954, after a "recent trip to Kazakhstan," so I am assuming he went sometime in late May or early June. N. S. Khrushchev, "A Few Notes about the Trip to Kazakhstan," in *Stroitel'stvo Kommunizma,* 296.

A similar attitude can be seen in an exchange with Dinmukhamed Kunaev on a train ride back to Aktiubinsk from Almaty with Khrushchev. Sitting in the car, watching the horizontal rectangles of grain and sky through the window, Khrushchev asked "How many kilometers have we gone in Kazakhstan?" Kunaev reported that "from Petropavlovsk to Almaty it's 1800 kilometers. From Almaty to Aktiubinsk it's another 2300 kilometers. So, it's more than 4000. And to the border with Russia, it's another 8 to 10 hours." Khrushchev chuckled and retorted, "I need to study the history of Kazakhstan better. Probably, a great people lived here, otherwise they wouldn't have occupied such a large territory."[170] Such ignorance of Kazakhstan, and assumptions that the Kazakh Steppe is just like the ones in his native Kalinovka and Ukraine, permitted Khrushchev to plow up pastures and carry out whatever "harebrained scheme" he could imagine. His was an orientalizing view that saw complex relationships of soils, plants, animals, and humans as a blank slate that could be maximally tapped for untold production. The virgin lands of Kazakhstan could be slotted in to bring to fruition Khrushchev's imaginary of socialist agricultural abundance.

Khrushchev's Visions of Socialist Agricultural Abundance

In September 1953 in his first address as Chairman of the Central Committee to the Presidium, Khrushchev outlined his agricultural platform in his "On Measures for the Further Development of Soviet Agriculture." The foundation of Khruschev's broader domestic reforms to lift the country out of postwar scarcity began with stimulating agricultural production. He explained that industrial production, catapulted by Stalin's Five-Year Plan and intensified during

[170] Kunaev, *Ot Stalina do Gorbacheva*, 140.

World War II, far outstripped productivity in the countryside. Previously, it had been impossible for the country to concentrate on heavy industry, agricultural production, and consumer goods simultaneously, but now it was time for state planners to turn their attention to the countryside. Only by reforming the agricultural sector could the "main task of socialist production—the maximal satisfaction of the growing needs of the whole society" be effectively solved.[171]

Animal products were central to Khrushchev's notion of socialist abundance. To begin his agricultural state of the union address, Khrushchev conceded that the grain problem had been solved "in the sense that the country is provisioned on the basis of bread." The state even had the necessary grain reserves to export a portion of the harvest to socialist and capitalist countries. However, as the well-being of Soviet citizens increased, Khrushchev explained, "the demand for bread has shifted to meat and dairy products." [172] Later in his February 1954 address, Khrushchev linked the rise in consumer demand for animal products to the rationing system that had only been lifted in 1947.[173] Compounding the rise in demand was the massive postwar outmigration from Soviet villages to towns and cities. As historian Il'ya Zelenin has argued, Khrushchev was responding to very real demographic problems in the postwar era: while total agricultural output had steadily increased since the war's end, the population, and especially the urban population, had increased at an even greater rate.[174] Khrushchev insisted that "the most important task" in providing material abundance for Soviet citizens was to "improve the structure of consumption by increasing the production above all of animal products."[175] In other words, the grain problem had

[171] N. S. Khrushchev, *Stoitel'stvo kommunizma v SSSR I razvitie sel'skogo khoziastva*, v. 1 (Moscow: State Publishing House for Political Literature, 1962), 7.
[172] N. S. Khrushchev, *Stroitel'stvo kommunizma*, 10.
[173] N. S. Khrushchehv, *O da'neishem uvelichenii proizvodstva zerna v strane i ob osvoenii tselinnykh i zalezhnykh zemel'. Doklad na Plenume TsK KPSS 23 fevralia 1954 g.,* 9.
[174] Il'ya Zelenin, "N. S. Khrushchev's Agrarian Policy and Agriculture in the USSR," *Russian Studies History* 50, no. 3 (2011): 44-70.
[175] N. S. Khrushchev, *Stroitel'stvo kommunizma*, 14.

been solved insofar as Soviet citizens had access to all the bread they needed; it was the *meat* problem that Nikita Khrushchev sought to address to fill the bellies of Soviet consumers.

In these early speeches, Khrushchev understood the significance of socialist abundance in meat and dairy products in terms of the health of human bodies. He contended that the "all-around harmonious development of a healthy individual" required the study of the basic scientific norms for human food consumption.[176] At least in the fall of 1953, Khrushchev understood farm productivity not as an engine of industrialization but as a determinant of human wellbeing. This is evident in the kinds of data he presented to the Presidium to justify concentration in livestock. Khrushchev provided statistics on the capacity of a kolkhoz to meet the minimum scientific norms for human food consumption: Soviet planners had determined the minimum amount of cattle (including heifers), their slaughter weight and milk production (in centners) per 100 hectares of a farm's holdings that were required to maintain the health of the village's population according to scientific norms.[177] The purpose of agriculture is first and foremost to feed people; for Khrushchev, finding a theoretical justification for agricultural policy within Marxism-Leninism was beside the point.

Research bore out Khrushchev's concern about the low levels of meat and dairy consumption among Soviet citizens. The Institute of Nutrition at the USSR Academy of Medical Sciences set scientific norms for annual consumption per person of various food categories. In 1953 when the statistics were compiled, citizens in the Kazakh SSR and the Soviet Union as a whole had their fill of bread and bread products: the scientific norm was set at 121 kg per person per year, and people in the Soviet Union, including Kazakhstan, consumed 180 and 178 kg per

[176] N. S. Khrushchev, *Stroitel'stvo kommunizma*, 14.
[177] N. S. Khrushchev, *Stroitel'stvo kommunizma*, 16.

person, respectively. In Kazakhstan, bread was 20% (by weight) of the diet of both industrial workers and kolkhozniki. The glaring discrepancies in the Soviet and Kazakh diet were in meat and dairy products. Both in the Soviet Union and in Kazakhstan, meat consumption was less than half of the scientific norm set by the Institute of Nutrition (32 and 31 kg annually against the norm of 65 kg). Dairy consumption was even less satisfactory. If the scientific norm was 540 kg per person per year, in the Soviet Union as a whole, the average person only consumed 175 kg, and in the Kazakh SSR, 162 kg. Within Kazakhstan, the discrepancy between industrial and farm workers further stratified consumption. Meat and meat products were only 4.5% by weight of an industrial worker's diet, and only 2% (or 1.5 kg per month) for a kolkhoznik. While the total number of calories was about the same for industrial and farm workers, the distribution of nutrients was not. What meat that was raised in the countryside went to the population centers.[178] Meat was woefully absent from Soviet plates—and especially from the plates of those who produced the meat itself. In the postwar period, the Soviet Union produced enough grain to feed its human population; it did not produce enough grain if it was to feed its livestock population, too.

In September, Khrushchev's proposed interventions to increase livestock production concerned its intensification—improvements aimed at increasing agricultural output on existing acres. In this regard he differed little from Malenkov. At this stage in his tenure, expansion of the sown area (extensive agriculture) was not openly discussed. The first solution was to reform the

[178] See tables in Abdrakhmanova, 153-157. I don't know in what month the Academy of Medical Sciences released this report, and whether it was in response to Khrushchev's call at the September plenum, or if Khrushchev already knew about the findings and was using it to support his arguments that Soviet workers needed more animal products in their diets. Abdrakhmanova further extrapolates from this data the health consequences of such a grain-heavy diet lacking in essential vitamins and nutrients. Fruits were also well below scientific norms, especially in Kazakhstan, contributing to diseases of nutrient deficiencies. In 1954, the Kazakh SSR ranked ninth of the Soviet republics in terms of total calorie consumption after Estonia, Latvia, Lithuania, Georgia, RSFSR, Belorussia, Azerbaijan, and Ukraine. At an average of 2,721 calories per day, the Kazakh worker still was 300 calories short of the physiological norm set by the Institute of 3,053 calories per day.

economic levers to stimulate production in the agricultural sector. State leaders, Khrushchev maintained, had not created enough "material interest" for peasants to produce more; without mentioning Stalin, Khrushchev implicitly criticized his predecessor for not paying peasants enough to deliver more food. To remedy the situation, Khrushchev started with lowering overall mandatory state deliveries for livestock. Then, he laid out a new pricing structure for the animals that remained: the procurement prices for state deliveries of livestock and poultry would increase 5.5 times, while purchase prices for any meat above the requisite deliveries would increase on average by 30%. For dairy products, procurement prices were to double, and purchase prices increase by one and a half times. (Retail prices for consumers, meanwhile, would remain constant.)[179] This pricing structure was coupled with a new agricultural calendar for state deliveries. Instead of waiting until the end of the fiscal year for farms to slaughter its animals, Khrushchev shifted the harvest date to October 1. That way, farms would not have to expend resources to provision their livestock for two cold months, and the animals that were delivered were at their highest weights fattened by summer pastures. These incentives and adjustments promised to bring healthier animals to Soviet tables.

In terms of on-the-farm practice, Khrushchev mandated agricultural intensification by converting existing fields of row crops to forage crops. He was especially inspired by American examples of forage cultivation on livestock farms, corn in particular. The Soviet Union had long looked to the United States for inspiration in industrial agriculture, but in 1955, the editor of the *Des Moines Register* learned specifically of Khrushchev's admiration for American corn and extended an unofficial invitation. Historian Aaron Hale-Dorrell explains that between 1955 and 1956, the Soviet Union, United States, and Canada arranged an exchange of agricultural

[179] Khrushchev, *Stoitel'stvo kommunizma*, 16.

delegations. Andrei Shevchenko and Boris Sokolov—two of the Soviet Union's leading experts in corn—traveled with the Soviet Deputy Minister of Agriculture Vladimir Matskevich throughout the Corn Belt of North America to inspect best practices for growing the grain.[180] Back home, Khrushchev excoriated leaders of various regions for the "unacceptable nature" of their farms' forage bases. "The question of the production of one forage crop or another…depends on the soil and climactic conditions of the zone," but all zones should concentrate efforts to cultivate forages.[181] Khrushchev's only elaboration on this point was to note that corn could be grown in many more regions of the country than the limited areas where it is now cultivated. Still, there was no direct mention of an increase in sown area.

As many historians of Soviet Cold War consumption have noted, a common refrain of Khrushchev's canvassing in the mid-1950s was to "catch up and overtake" the U.S. in terms of meat and milk consumption. In 1959, Khrushchev first visited the United States on an official state tour of the Cold War adversary. In addition to political and cultural centers of Washington, D.C., New York City, and Los Angeles, Khrushchev also visited a corn seed farm in Iowa. There he personally witnessed what Matskevich's delegation had investigated just a few years prior. Khrushchev's vision of socialist abundance derived from both real discrepancies in Soviet diets as determined by the Academy of Health Sciences and in dialogue with terms for consumption set by the United States. Socialism could meet the needs of its population just as well as Western countries could but without the inherent exploitation of profit seeking under capitalism.

[180] See "Chapter 2: Industrial Agriculture, The Logic of Corn," in Aaron Hale-Dorrell, *Corn Crusade: Khrushchev's Farming Revolution in the Post-Stalin Soviet Union* (New York: Oxford University Press, 2018).
[181] N. S. Khrushchev, *Stroitel'stvo kommunizma*, 27. Khrushchev's panacea for cultivated forages was corn. See later in this chapter for a further discussion about how this was applied to Kazakhstan.

Political Maneuvering

The very next day after Khrushchev's September 1953 address, unprovoked and on his own initiative, he turned to the Party leaders from Kazakhstan to float his idea about plowing up the steppes to grow spring wheat. In the remaining months of 1953, there was genuine debate about the possibility of opening up virgin lands, with tugs and pulls from state and party leaders at all levels of administration, scientists, and farmers. In October 1953, at the Fourth Plenum of the Central Committee of Kazakhstan, party leaders at the republic level only approved 134,000 additional hectares of land to be sown with wheat for the 1954-1955 growing seasons, well below Khrushchev's vision for the republic.[182] Khrushchev found this conservatism unacceptable, and circumvented republican opposition by personally inviting a "bureau" of oblast' and district leaders from the steppe regions to Moscow. No one from Almaty was invited. Khrushchev bypassed republic-level leaders, perhaps fearing a kind of national separatism reminiscent of the years of the formation of the Soviet Union.[183]

Meanwhile, the chairman of the Kazakh Central Committee, Zhumabai Shaiakhmetov, turned to the scientific community in Kazakhstan for guidance. Shaiakhmetov relayed Moscow's criticisms of Kazakh party leaders who, because of their "complacency and self-satisfaction," held back agricultural productivity in the republic despite its vast territory.[184] Kazakhstan's scientists absorbed these criticisms and went back to their laboratories and offices to formulate a more politically pleasing plan for grain cultivation. By late December 1953, scientists reconsidered their earlier estimates and painted a more optimistic picture of the countryside: they recommended an

[182] F. K. Mikhailov, *Sovkhoznoe stroitel'stvo v Kazakhstane (1946-1970 gg.)* (Nauka Publishing House, 1973), 23.
[183] McCauley, 50.
[184] Kunaev, *Ot Stalina do Gorbacheva*, 87.

additional 2.5 million hectares of Kazakh lands be cultivated over the next 4 to 5 years beginning in 1955.[185] Over the course of four months, politicians and scientists across Kazakhstan wrestled with Nikita Khrushchev's September indictment of the agricultural sector. They tried to find ways to have plowing up steppe grazelands make political, economic, and ecological sense, but by the new year, Khrushchev silenced any arguments that did not allow for maximal grain cultivation.

Khrushchev officially announced his Virgin Lands Campaign at the February-March Central Committee Plenum in Moscow. He called for an expansion of wheat cultivation in virgin and fallow lands in Siberia, Kazakhstan, and the Northern Caucasus by 13 million hectares in 1954-1955.[186] Kazakhstan's Central Committee answered with a decree to expand grain cultivation in virgin and fallow lands by 6.3 million hectares. But their enthusiasm was still tempered by important figures within the Kazakh Communist Party. Zhumabai Shaiakhmetov cautioned against Khrushchev's scheme because "bringing virgin and fallow lands under the plow would violate the interests of the indigenous Kazakh inhabitants, since it would deprive them of livestock pasturage."[187] Scientists going back to the 1920s had warned of the precarity of turning over the soil in such arid conditions, and other Kazakh leaders insisted on the primacy of pastoralism as the best use of the steppe's resources. But Khrushchev would not budge; he dismissed Shaiakhmetov in February 1954 and replaced him with Panteleimon Ponomarenko, from Belarus, and instated Leonid Brezhnev of Ukraine as Second Secretary of the Communist Party of Kazakhstan. In his plenary address that month, Khrushchev justified his shakeup by underscoring that Shaiakhmetov was "an honest man…but for such a large republic he was a weak leader."[188] Members of the

[185] Kunaev, ibid.
[186] Mikhailov, *Sovkhoznoe stroitel'stvo v Kazakhstane (1946-1970 gg.)*, 26.
[187] Zelenin, 48.
[188] Nikita Khrushchev, *O dal'neishem uvelichenii*, 52.

Central Committee of Kazakhstan "assessed the situation in the republic significantly more critically [*znachitel'no ostree*] than the members of the bureau [of oblast' and raion leaders]," and provided low estimates for suitable agricultural lands.[189]

It is tempting to interpret oblast' and regional leaders enthusiastically providing Khrushchev with ambitious plans for extensive cultivation in their districts as evidence of local Kazakh support for agricultural expansion. But given the threadbare state of the farms on the steppe as described above, it is reasonable to assume that local leaders were eager for more investment and infrastructure in their communities to improve the wellbeing of their citizens and fulfill production quotas.[190] Republican leaders were bulwarks of Kazakh national interests when interfacing with Moscow, but local leaders seemed to be more concerned with day-to-day survival.

"Organize New Sovkhozes, Give Them Machines, And Send People There"

The feasibility of the scale of Khrushchev's agricultural ambitions depended above all on increasing the labor capacity on the steppe. As I showed in the previous chapter, Joseph Stalin had already named increasing livestock production on the basis of expanded forage cultivation in the late 1940s. However, there simply weren't enough laborers on the farms that already existed, let alone the requisite reserve labor to expand cultivation. Many existing kolkhozes already had hectares of virgin or long-fallow lands in their holdings; the limiting factor to agricultural activity was the number of laboring bodies. For example, Khrushchev notes after his first visit to

[189] Ibid. "It should be noted that the members of the plenum of the Central Committee of Kazakhstan assessed the situation that had developed in the republic much more acutely than the members of the bureau when they participated in the discussion of this issue in the Central Committee of the CPSU."
[190] The idea of constraints on decision-making in the Soviet system is informed by Botakaz Kassymbekova's essay. Regarding the Urals and Tajikistan, respectively, see James Harris and Artemy Kalinovsky.

Kazakhstan in late spring 1954 that on a particular kolkhoz in Kustanai Oblast, there was one laborer for every 103 hectares. Another kolkhoz in Northern-Kazakhstan Oblast had a whopping 42,000 hectares[191] in its holdings, so that each household (*dvor*) was responsible for 320 hectares. With so much land and so little labor, large expanses were left unused.[192] Khrushchev's solution was "to organize new sovkhozes, give them machines, and send people there."[193] Indeed, many land-rich kolkhozes voluntarily gave up hectares that they could not maintain for the creation of new state farms.[194]

The creation and consolidation of new sovkhozes exploded in 1954.[195] In Akmolinsk Oblast alone, 27 new grain sovkhozes were created by June of that year, nearly double the amount that already existed, expanding agricultural lands by over 1 million hectares.[196] As an example of this process, in the Stalin Raion of Akmolinsk Oblast, three grain-livestock state farms and two livestock state farms were to be created from the consolidation of weak kolkhozes (*malomoshchnie kolkhozy),* land from the state land bank (*goszemfond*), and grazing lands (*otgonnie pastbishcha)* from nearby villages.[197] By the end of the first year of the Virgin Lands Campaign alone, 337 new grain sovkhozes were created in the republic, compared to just 43 in the previous nine years (1945-1953).[198]

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[191] For comparison, newly created *state* farms (which are in theory are supposed to be larger than collective farms) between the fall of 1954 and fall 1955 averaged 25,000-30,000 hectares. F. K. Mikhailov, 35.
[192] N. S. Khrushchev, *Stroitel'stvo kommunizma,* 299.
[193] N.S. Khrushchev, *Stroitel'stvo kommunizma*, 299.
[194] F. K. Mikhailov, *Sovkhoznoe stroitel'stvo v Kazakhstane,* 33.
[195] Soviet historians were divided on the actual gains of the explosion of state farms in Kazakhstan during the Khrushchev era. While most agreed that it was "extraordinary" and "wholly necessary" in terms of the principles (*zakonomernost'*) of socialist development in the countryside, some historians argued these new state farms were actually less productive than the kolkhozes they replaced in terms of profit per hectare. See historiographical discussion in Mikhailov, 40-41.
[196] Mikhailov, 33.
[197] TsGARK 1481/1/500/1.
[198] Mikhailov, 35.

The next step in Khrushchev's plan was to supply these new state farms with machines. This scale of cultivation could only be accomplished with gasoline-powered tractors, harvesters, and combines. Moscow invested tremendous material and financial resources to direct state-of-the-art tractors, combines, trucks, and other agricultural machinery. At the time of Khrushchev's February 1954 plenums, Kazakh factories did not produce their own farm equipment. 280 factories in Moscow Oblast' sent to the steppe 57,000 tractors and 12,000 combines, redirecting purchase orders from other areas of the country.[199] This was nearly double the number of tractors that existed in the republic in 1950. In the first three years of the campaign alone, the state invested 10 billion rubles, or 2.5 times greater than the previous eight years.[200] In 1956 in the Virgin Lands areas alone, there numbered 160,000 tractors, 60,000 combines, and 70,000 automobiles.[201]

To populate these state farms, Khrushchev had to recruit laborers from other parts of the Soviet Union for his grandiose plan. He turned to the country's youth to supply the much-needed labor power. As highlighted in the introduction to this chapter, a huge propaganda campaign flooded newspapers, magazines, and bulletin boards to recruit adventurous youngsters to travel to an unknown faraway land and contribute their bodies to growing food for their country. Even some foreign students, hearing of Khrushchev's ambitious plans for socialist participation in food production, wrote letters to the Central Committee pleading that they be allowed to take part. Up to three million of teenagers and youngsters seasonally flocked to Central Asia to help grow food.[202] Virgin Landers received free transit from their home cities to the steppe and a modest

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[199] B. A. Tulepbaev, *D. A. Kunaev—vydaiushchiisia gosudarstvennyi I politicheskii deiatel'* (Nurly Alem, 2006), 137.
[200] S. B. Baishev, *Tselinnaia epopiia Kazakhstana: Osnovnye itogi i istoricheskoe znachenie* (Kazakhstan Publishing, 1979), 12.
[201] A. Tursinbaev, "Socialist Transformation in Agriculture in Kazakhstan," *Sel'skoe khoziastvo Kazakhstana* 11 (1957): 9.
[202] Michaela Pohl, "From White Grave to Tselinograd to Astana: The Virgin Lands Opening, Khrushchev's Forgotten First Reform," in *The Thaw: Soviet Society and Culture during the 1950s and* 1960s, Denis Kozlov and Eleonory Gilburd, eds. (Toronto: University of Toronto Press, 2013), 276.

relocation stipend to ease the transition.[203] But when they stepped off the train, many were aghast at the lack of infrastructure to support their farming endeavors. There was no housing, no water, no public services.[204] Instead, students had to build their accommodations from the chernozem up while they were helping to plant, harvest, and bale the wheat. Because of the chronic lack of social supports and basic amenities, many people turned back after seeing the conditions, thus creating a revolving door of student workers. They were building homes and schools to support families staying in the region—but building a functional and coherent community life on the steppe took time that many youngsters did not have the patience for.

Even taking into account the temporary workers, in the first decade of the Virgin Lands Campaign, the rural population of Kazakhstan increased by 1.7 million people (and the urban population by 2.5 million). According to the 1959 census, in the five northern oblasts of the republic, ethnic Kazakhs made up only 22% of the population, and over four-fifths resided in rural areas. Russians comprised 45% of the ethnic makeup of the steppe, while Ukrainians were a significant 14.4%.[205] Kazakhs were a minority in their own republic. Often, entire sovkhozes were created from arrivals from the European parts of the country: 94 sovkhozes were created during the Virgin Lands campaign from Ukrainian volunteers, 46 from Muscovites, 24 from Belorussian, and 15 new farms were created with students and technicians from Leningrad.[206]

This continued the ethnic plurality of the steppe regions that began with the first wave of Slavic peasant migration in the late 19th century. Khrushchev recognized that this sudden influx of

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[203] K. O. Bekishev, et. al., *Pod"em tseliny I vziamopomoshch kazakhskogo I russkogo narodov v reshenie khlebnoi problem,* (Kokshetau: KUAM, 2015), 12.
[204] Michaela Pohl's dissertation carefully chronicles this migration and the newcomers' interactions with the myriad of ethnicities already on the steppe, whether as war evacuees, prisoners, or old-timers who had come at the end of the 19th century.
[205] Aliya Wedelich, "The Virgin Lands Campaign in Kazakhstan: A Social History, 1954-1964," Ph.D. diss., Jacobs University, November 27, 2020, 78.
[206] Tulepbaev, *D. A. Kunaev*, 139.

Slavic settlers to plow up the steppe looked all too similar to pre-revolutionary migrations that were explicitly directed toward colonization. But this time, Khrushchev contended, the situation was different. Whereas settlers in the Tsarist era were enticed by the promise of "unlimited quantities of land" and the "prospect [of] enriching" themselves, collective farm workers under socialism had no such incentive. Kolkhozniki don't receive their own land, but they worked just as well, because there was no opportunity to make more money elsewhere.[207] Socialism and the Soviet state had removed the economic incentives for colonization, and so, according to Khrushchev, mass Slavic resettlement of the Kazakh Steppe was a sign of "brotherly assistance."

Scientists and their Institutions

Most of the virgin and fallow lands of Kazakhstan, so the authorities thought, had never been set foot upon, or at least not in any significant ways. These areas of the steppe were barely inhabited and often located far from lines of communication. As I showed above, Khrushchev knew but the basic characteristics of Kazakhstan's human geography. So, when he suddenly announced the opening of the Virgin Lands in the winter of 1954, he sent nearly 300 specialized brigades of land surveyors, agronomists, soil scientists, hydrologists to Kazakhstan to set about studying the steppe. The goal was to plant first and survey the land later. Local farmers, having at least a bit more knowledge of their surroundings, guided the scientific brigades. In addition, complex expeditions of scientists from the All-Union Academy of Agricultural Sciences (VASKhNIL) in Moscow, the Academy of Sciences of the Soviet Union, Ukraine, Belarus, and other republics joined local scientists from the Kazakh Academy of Sciences and the Kazakh

[207] N.S. Khrushchev, *Stroitel'stvo kommunizma*, 300.

affiliate of VASKhNIL to provide more detailed analyses of the terrain "in the brutal [*zlie*] February-March snowstorms and blizzards."[208]

To study agricultural practices of the first sowings of spring wheat, Khrushchev sent a team of engineers and agronomists from Moscow. The Ministry of Agriculture and Ministry of Sovkhozes of the Soviet Union both were invested in "carefully studying the issue and making specific proposals" in Kazakhstan. They first were to design a special kind of plow that was particularly suited to steppe soils: disc plows with a semi-mounted moldboard.[209] These initial plows from Moscow turned over too much soil and lead to the earliest signs soil erosion. What was required was a team of researchers with their institutional home on the steppe that developed best practices *in situ*.

Khrushchev justified the Virgin Lands Campaign based not on scientific rationale but economic expediency. The science of steppe agriculture developed *after* the first years of plowing and harvesting and was not used as a guiding principle at the start of the campaign. Especially in the drier steppe regions, there was no precedent for large-scale agriculture. As the first wave of farm laborers to the Virgin Lands stepped off the train, agronomists, botanists, soil scientists, geographers, hydraulic engineers, and scores of other scientists and technical specialists were right behind them to gather data on crop rotations, irrigation, soil composition, plant specimens. Scientific agronomical guidance for the Virgin Lands Campaign developed alongside the first year of trial and error in the fields. In March 1954, the Presidium of the USSR Academy of Sciences tasked the Soviet for the Study of Productive Forces to organize a complex expedition to study the experience of the first year of cultivation. Teams of scientists from the All-Union and Kazakh

[208] Mikhailov, *Sovkhoznoe stroitel'stvo*, 32.
[209] N. S. Khrushchev, "A Few Notes about Travels to Kazakhstan" in *Stoitel'stvo kommunizma,* 297.

branches of the Academy of Sciences, Agricultural Academies (including the Western Siberian branch), Ministries of Agriculture, Ministries of State Farms, Ministry of Water Resources, Machine Tractor Station representatives, and others spent the first agricultural year of the campaign collecting massive amounts of data to guide subsequent years in opening the virgin lands. Scientists from across the country formed 334 brigades of nearly 1,000 specialists to study the northern and eastern oblasts of the republic. They convened the following February 1955 in Moscow to discuss their findings and suggest new methods for land use.

The first sowings in April 1954 were based on cursory, outdated, or simply nonexistent land surveys. One repeated refrain among the various disciplines was the dearth of information scientists and agronomists had to make agricultural plans, even after their colossal efforts the previous year. Most farms were relying on a soil map published in 1933 by the Kazakh Institute of Land Management on the scale of 1: 2,000,000—not nearly detailed enough for *raiony,* let alone individual farms, to make planting decisions.[210] A number of expeditions in 1954 set out to create more detailed soil maps of an intermediate scale. These maps would help planners avoid large mistakes, but they were still too large for internal farm use. And so, the Ministry of Sovkhozes sponsored the creation of a new 1: 25,000 soil map, forthcoming in later years.[211] One N. N. Rozov lamented that there was still no unifying government body to conduct land quality surveys; even the Ministry of Agriculture did not include one under its jurisdiction. The Ministry of Agriculture

[210] U. U. Uspanov, "Pakhotoprigodnye zemli Kazakhstana i ikh osvoenie," *Osvoenie tselinnykh i zalezhnykh zemel' v 1954 godu: Materialy soveshchaniia pri Akademii Nauk SSSR po itogam i perspektivam nauchno-issledovatel'skikh rabot v oblasti osvoeniia tselinnykh zemel' (21-26 fevralia 1955 g.)* (USSR Academy of Sciences Publishing, 1965), 35.
[211] A. S. Preobrazhenskii, "The Use of Aerial Photography Upon Investigations of the Soil Cover of Northern Kazakhstan," *Osvoenie tselinnykh i zalezhnykh zemel'*, 25.

was only just now working out plans for state soil protection service. So, the report was based on mid and small-scale soil maps, and further research was needed to verify his results.[212]

Scientists openly discussed the challenges of doing agriculture on the steppe at these early conferences. Above all, they readily acknowledged the climactic constraints to agricultural production on the steppe. Scientists warned of soil erosion from little precipitation and high winds, and drastic fluctuations in daily and seasonal temperatures. Their language was not as triumphant as Stalin's "transformation of nature", but unequivocally positive: Soviet scientists simply needed more data and experimentation to figure out the right land use regime to meet production targets despite the conditions. One Kisliakov noted that although there were a series of unfavorable conditions for water in Kazakhstan, the problem was often not the absence of water, but an insufficient amount of scientific expertise and technical measures for acquiring, storing, improving, and using the water.[213] The role of science was to recognize the environmental constraints of the steppe and develop appropriate methods of cultivation to maximize yields within those limitations.

One particularly impassioned voice at the conference was that of the Kazakh geologist U. U. Uspanov in his presentation "Arable Land in Kazakhstan and Its Opening." His presentation centered around the soil cataloguing expeditions across the country that he participated in. To frame his results, he harkened to "the founder of modern soil science V. V. Dokuchaev" who had studied soil from all angles, and who thoroughly acquainted himself with all the natural qualities of the land. Dokuchaev articulated the two components of land valuation: natural-historic and

[212] N. N. Rozov, "Land Resources of the USSR and questions of broadening agriculture," *Osvoenie tselinnykh i zalezhnykh zemel'*, 9
[213] V. D. Kisliakov, "Nekotorye rezul'taty nauchnykh issledovanii po ratsional'nomu ispol'zovaniiu tselinnykh i zalezhnykh zemel' v Kazakhstane i na Altae," *Osvoenie tselinnykh i zalezhnykh zemel',* 23.

economic (but the natural-historic valuations should set the foundation for any economic one). Reminding the audience of Marx's writings on soil fertility, Uspanov added that "land that is suitable for cultivation [*pakhotnoprigodnyi*] as a category is not just natural, but also historical, social-economic. It depends on the level of development of the productive forces of society and the industrious activities of a person. Soil fertility is not in the least a natural and unchanging quality of the soil, as it can seem, [but] is closely connected with contemporary social relations."[214] For Uspanov, soils had a history. Uspanov lamented that many of Dokuchaev's teachings had been forgotten by Soviet soil scientists, and that the success of the Virgin Lands Campaign depended on restoring this conceptualization of soil fertility as an index of the social and economic relations of the society living on this soil.

For example, the black earth of Northern Kazakhstan is considerably specific: it is by some measure or another salinated and has various indicators of having been a meadow. The salination would need to be remediated before any crops could be grown. Without mentioning his countrymen, Uspanov implicitly blamed nomadic pastoral husbandry for not developing the chernozem of Northern Kazakhstan such that they would be suitable for cultivation. Here again, Dokuchaev's theories of soil formation were coupled with Marx's natural-historical materialism to make the case that extensive grain agriculture was bringing socialist means of production to the (pre-feudal) steppe. On chestnut soils, on the other hand, humus matter should be built up by "cultivation, [during which] this naturally occurring process should be accelerated as much as possible in order to bring chestnut steppe soils closer to the more modern type of chernozem."

[214] U. U. Uspanov, *Osvoenie tselinnykh i zalezhnykh zemel',* 34.

Khrushchev himself repeatedly emphasized the importance of regionally specific scientific institutions. In his February 1954 address, he insisted that "scientific agricultural institutes and experimental stations should be distributed in the zones that cultivate the crop that [they] study."[215] The scientific infrastructure that developed in Kazakhstan to investigate the incipient problems of the Virgin Lands Campaign was robust. The Kazakh Academy of Sciences and the Kazakh branch of VASKhNIL both were established and located in Almaty by the time the first plows broke ground. By 1956, a new Kazakh Scientific-Research Institute of Grain Husbandry opened in Shortandy, Akmolinsk Oblast. Four years later, after numerous breakthroughs in plant breeding, technological innovations, and cropping schemes, it was to be elevated to the status of an All-Union research institute under the direction of Academician Alexander Baraev. Institutes for farm machine construction, agricultural economics, veterinary medicine, and livestock production sprouted up across the steppe to support farms in the region. Smaller experimental farms developed cropping schemes to service the state and collective farms in the immediate vicinity that shared similar environmental profiles.

Part II: The "Second" Virgin Lands Campaign and the Birth of Livestock-Agriculture

In order to understand the monumental implications that wheat cultivation had for livestock production in Kazakhstan, it is necessary to briefly explain how animals were fed on Soviet farms on the steppe before the Virgin Lands Campaign. Animals could be fed on either natural pastures or, less often, on cultivated pastures, meaning those sown by human hands with perennial grasses.

[215] N. S. Khrushchev, *O dal'neishem uvelichenii proizvodstva zerna v strane i ob osvoenii tselinnykh i zalezhnykh zemel': Doklad na plenume Tsentral'nogo Komiteta KPSS 23 fevralia 1954 g.,* (State Publishing House of Political Literature, 1954), 48.

They could either graze in the open field in the summer months ("underfoot" or *podnozhnyi korm*), or the grasses could be harvested and either baled as hay or straw[216] or made into silage (*silos*; *sochnyi korm,* or wet feed) in silos, although ensilaging practices were almost non-existent in Kazakhstan before the Virgin Lands Campaign. In principle, combination feed was added to the animals' diets to provide micronutrients missing from natural pastures, but the availability of these vitamins and minerals was almost always lacking. Farms also cultivated squashes, beets, turnips, and other vegetables as livestock feed (*korneplod*), but before 1954, this was mostly confined to farmers' personal plots (*priusadeb'nie uchastki*). As I showed in the previous chapter, Kazakh herds in the postwar period suffered from high rates of malnutrition, starvation, freezing to death, stillbirths—all of which were attributed to insufficient forages. By 1954, leading Kazakh agronomists concluded that "in the concrete economic and environmental (*prirodnykh*) conditions" on the steppe, "it is impossible to successfully develop animal husbandry operating solely on large acres of natural forage resources."[217]

Within the first year of the Virgin Lands Campaign, agricultural leaders immediately grasped the monumental changes to animal husbandry that wheat cultivation would entail. In 1955, the Kazakh branch of the All-Union Academy of Agricultural Sciences (VASKhNIL) delivered its "Methods for Livestock Production in the Regions of Virgin and Unused Lands" to the Kazakh

[216] Hay, straw, and the chaff of grains are collectively referred to as roughage, or *grubie korma*. By definition, the moisture content is less than 40%, and the fiber content is greater than 19%. From *The Great Russian Encyclopedia* https://bigenc.ru/c/grubye-korma-840183. Accessed December 12, 2024. Roughage is far less nutritious than wet feed, or *sochnie korma*, which includes green matter from underripe corn, and silage. Silage is made from annual and perennial grasses that are fermented in silos or earthen mounds. Silage is much more nutritious and palatable than any roughage but requires that the grasses be harvested earlier in the season—when there is high labor demand for the harvest of field crops—to retain the necessary moisture content; silage is also heavier and harder to transport than roughage.

[217] TsGARK1481/31/516/3.

Ministry of Agriculture to provide recommendations for guiding these transitions. Their report was the result of observations of the leading kolkhozes and experimental farms in the Virgin Lands.[218]

The agronomists presented the twin developments in grain cultivation and livestock production as "two inextricable (*nerazryvno sviazannykh mezhdu soboi*) processes in…creating an abundance of food in the country." Grain cultivation demanded that farms suddenly devise a new system to feed their animals—one that required much more land and labor resources than shepherding their herds as they grazed on natural grasslands. If in the first year of the campaign, roughage accounted for 92% by weight of animal feed, by 1957, the Kazakh Agricultural Academy projected that only 53% of livestock forages would come from natural pastures. [219] By taking these pastures out of rotation, farm operations were fundamentally [*korennym obrazom*] altered in two primary ways: farms were now forced to provision their animals by other means, namely planting, harvesting, and processing silage grains, root and tuber crops, grasses, and green forages.[220] Secondly, growing spring wheat changed the entire system of crop rotation (*sevooborot*) for a farm, both seasonally and over the years, which set limits to the kinds of livestock forages that could be cultivated. Agronomist Terentii Mal'tsev's method of crop rotation would be widely adopted across the Kazakh Steppe.

As detailed above, in the first years of the Virgin Lands Campaign, hundreds of new state farms appeared in Kazakhstan. The unifying feature of these new farms was their immense size. Going forward in this new era of Kazakh cultivation, the quality and quantity of crop production

[218] Although a disclaimer at the beginning of the report notes that the findings need further verification because many of the farms under investigation included in their numbers land that was to be given to sovkhozes that were still in the process of being created. Clearly, this was an early attempt to grasp the dramatically changing agricultural sector. TsGARK 1481/31/516/2. "Methods for conducting animal husbandry in the regions of the opening of the virgin and unused lands in the Kazakh SSR of the Kazakh branch of VASKhNIL for 1955."
[219] TsGARK 1481/31/516/10.
[220] TsGARK 1481/31/517/12.

would determine the quality and quantity of livestock production. But the farms were still to remain diversified in the production directives: grain-growing sovkhozes would still operate livestock farms within its holdings, and stock breeding sovkhozes would devote a portion of their lands to crop production. This reduced the need for artificial fertilizers to be imported from beyond the farm. In its report to the Ministry of Agriculture, the Kazakh branch of VASKhNIL established that the degree to which the lands in these gigantic farms were cultivated "is the deciding factor in determining the system of forage production and the form of the linkage of livestock production with agriculture."[221] The report then goes on to delineate the authors' recommendations for kolkhozes based on the percentage of arable land in the farm's holdings that are plowed for crop production. For example, farms that plow 80-90% of the acres in their holdings, 30 to 40% of the fields should be under forage crop rotation, primarily for grazing in the warmer months (not ensilaging or haymaking). On these farms, grains should be 48-50% of the cultivated fields. On farms with 60 to 80% of their lands under the plow, forage crops should be 20 to 30% of this land, and grains should comprise 50-55% of the total holdings. In general, the more area a kolkhoz had under cultivation, the greater its demand for green forages. In place of hay, farms were to substitute wet forages, or silage, green fodder, and concentrated feed.[222]

The transition to cultivated forages required animals to be housed indoors in order to efficiently deliver them food. Traditionally in Kazakhstan, herdsmen relied on tethering animals outdoors or confining them in stalls in the absence of the lumber necessary for barns or fences. With the introduction of cultivated forages on the steppe, scientists and farm managers repeatedly called for the transition to an open-barn system of confinement (*bezpriviaznoe soderzhanie*) with

[221] TsGARK 1481/31/516/6.
[222] TsGARK 1481/31/517/19.

forages administered to livestock in mechanical feeders. Confining animals indoors allowed for greater control of the productive and reproductive capacities of the animals: food could be more precisely measured and automatically dispensed; cowherds and dairymaids could more effectively care for individual animals; and the reproduction of animals could be closely controlled. (This, of course, is much more labor intensive than shepherding livestock as they graze in natural pastures.)

The earliest recommendations to the Kazakh Ministry of Agriculture stipulated, however, that the guidelines for provisioning livestock on green forages in stalls only hold for highly productive dairy cattle. Young cattle (*molodniaka*; male or female animals before reproductive age), beef cattle, sheep, and horses should graze on cultivated pastures. High quality pasture grasses—if they were rationally cultivated and timely processed—were still considered the most valuable and healthy feed for beef cattle. The report concluded that "no kind of walks for animals 'for motion' can substitute for rational [cultivated] pastures."[223] Grazing animals in pastures is essential for strengthening their organism, but dairy cattle were excluded from this recommendation. Early farms were still understaffed to transition all cattle to cultivated forages.

But by 1959, these recommendations for animal confinement had already changed as the human population swelled to meet the labor demands. A working group from the USSR Ministry of Agriculture sent a resolution to their counterparts at the Kazakh Ministry of Agriculture that outlined even more detailed directives regarding herd management. On the basis of studies conducted all across the Soviet Union, the working group now recommended the use of open barns for beef cattle, *molodniaka*, and dairy cows. However, the practical implementation of this confinement system should be differentiated by "natural-climactic zones, with consideration of the

[223] TsGARK 1481/31/516/11-12.

direction [i.e. grain cultivation, dairy production, sheep raising] the breed composition, productivity, forage provisioning, bedding, work force and local building materials" of the farm in question.[224] The goal was the widespread adoption of barns, but the exact form these structures were to take depended on local conditions.

With better structures in which to confine animals, Kazakh breeders were better able to control the selection of animals for reproduction. Khrushchev noted in his early addresses on the state of Soviet agriculture that although the total head of cattle in the republic had increased in gross terms the postwar period, the proportion of heifers in the herd actually decreased, hamstringing the possibilities for naturally regenerating the herd.[225] To address this reproductive capacity, the Kazakh branch of VASKhNIL recommended that heifers expand as a proportion of animals on kolkhozes in the north: by 1960, heifers should increase to 40% of the herd, from 28% in 1954.[226]

Over time, greater reproductive control allowed for increased specialization and concentration of breeds on farms. Soviet planners aimed to alter the breed distribution of animals to better utilize the new feeding regime. This principle found basis in Trofim Lysenko's revolutionary re-evaluation of biological sciences in the USSR. As Jenny Leigh Smith rightfully points out, historians are quick to criticize Lysenko's debunked theories and experiments about the heritability of acquired traits, but scholars underappreciate Lysenko's contributions to the practice of animal husbandry, and in particular livestock breeding.[227] Lysenko declared at the infamous

[224] TsGARK 1481/31/807/4.
[225] N. S. Khrushchev, *Ob uvelichenii proizvodstva productov zhivotnovodstva: Doklad na Plenume Tsentral'nogo Komiteta KPSS 25 ianvaria 1955 goda* (State Publishing of Political Literature, 1955), 21-23.
[226] TsGARK 1481/31/516/5.
[227] Jenny Leigh Smith, *Works In Progress: Plans and Realities on Soviet Farms, 1930-1963* (Yale University Press, 2014).

1948 session of VASKhNIL that "the selection and creation of breeds [should be] according to the conditions of feeding, housing, and climate and, simultaneously and inextricably with this, that the feeding and housing [conditions] should create the corresponding breeds."[228] Cattle raised in the northern regions should increase the proportion of dairy or dairy-beef breeds (Aulie-Ata, Red Steppe, Alatau, and Simmental breeds) from 65.4% to 73.7% of all cattle; correspondingly, beef and beef-dairy breeds (Astrakhan, Kazakh White-Headed) should decrease from 34.6% to 26.3%.[229] Breeding programs could intensify and proliferate under the protection of barns.

Importantly, the tremendous cultivation of the steppe in the north impacted the development of agriculture and livestock production in other regions of the republic. If the north was to concentrate its efforts in raising mixed-use dairy-beef cattle on cultivated forages, the south was to make use of its favorable climate for year-round grazing. Seasonal pastures should be improved by constructing more wells and other water sources and by organizing proper "pasture rotation" (*pastibishcheoboroty*).[230] In the southern oblasts of the republic where the land was less suitable for crop production, pastoralism—even with seasonal migration—was to persist. By 1960, kolkhozes in the five main grain growing oblasts of northern Kazakhstan (Kustanai, Northern-Kazakhstan, Kokshetau, Akmolinsk, Pavlodar) held 40% of all kolkhoz cattle in the republic. Sheep production should be concentrated in the six southern oblasts, accounting for 45.5% of all of Kazakhstan's sheep.[231] In addition, dairy cattle should be limited in the southern regions because pastures there have the characteristic wormwood and tumbleweed (*polynnaya* and *polynno-soliankovaya rastitelnost'*). Beef cattle should predominate in the southern regions.

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[228] V. A. Bal'mont, *Michurinskie metody raboty sovetskikh zootekhnikov po sozdaniiu novykh porod sel'skokhoziastvennykh zhivotnykh* (Alma-Ata, 1949), 24.
[229] TsGARK 1481/31/516/6-7.
[230] TsGARK 1481/31/516/14.
[231] TsGARK 1481/31/516/5.

The Second Virgin Lands Campaign allowed for a division of livestock labor within the republic itself. Beef cattle were primarily born and raised in the desert and dry steppe regions to the south and then shipped to the grain producing regions of the north for fattening and finishing in feedlots. Not only was this system more economical because it "effectively uses sources of cheap feed—straw and grain stalks" abundant in the north, it also allowed for the southern regions to specialize in breeding.[232]

The Transformation of the Steppe

Many aspects of the Virgin Lands Campaign seem similar on the surface to the first wave of Slavic peasant migration to the steppe at the turn of the nineteenth century: massive emigration of newcomers with different economic and cultural practices, territorial disputes, and the state apparatus to facilitate both. However, there are important differences in the two histories of human migration. First, the late Tsarist administration explicitly encouraged emigration in the hopes of acquiring territorial control. The Kazakh SSR had already been incorporated into the Soviet Union for three decades before *tselinniki* arrived, and Khrushchev and others vehemently refuted any accusations of neo-colonial aims on the steppe. Second, while at previous moments in Soviet history of grain and livestock requisitioning, the Kazakh population was disproportionately affected, there is no indication that the fruits of the Virgin Lands Campaign went elsewhere in the Soviet Union at the expense of those who produced them. In fact, many voices in the Brezhnev era lamented the fact that such enormous amounts of state investment went to the Virgin Lands at the expense of other agricultural areas in the country. Third, and related to the first two, is that

[232] Zubriianov, *Ot kochevogo k intensivnomy,* 109.

there was an absence of violence (to the human populations, anyway) during the Virgin Lands Campaign that had accompanied both Slavic peasant migration at the turn of the century and Stalin's brutal collectivization and forced sedentarization campaigns of the early 1930s. The significance of the Virgin Lands Campaigns in the long history of Slavic settler colonialism on the Kazakh Steppe is not population movements[233], but the fundamental restructuring of soils, plants, and livestock, and the relationships between them. A metabolic rift ensued in which the delicate balance of soil nutrition could no longer support human settlement without significant environmental damage or exogenous mineral fertilizers. This resultant metabolic rift, in turn, was the fatal blow for Kazakh nomadic pastoralism not only as a mode of economic production, but as a way of relating to the steppe environment, which formed the touchstone of Kazakh national and cultural identity. Khrushchev's Virgin Lands Campaigns—unwittingly—achieved the eradication of nomadism that had been the ire of late-Tsarist colonial administrators and Stalin-era nationalities policies.

The"Mal'tsev Method"

While Joseph Stalin was busy propagating Vil'iams' travopol'e system in the late 1940s, a little-known agronomist at an experimental farm in the lower Urals named Terentii Mal'tsev was running his own tests of the grassland crop rotation system. Rotating fields of perennial grasses just wasn't as productive per hectare on the forest-steppe region of Kurgan Oblast as Vil'iams,

[233] Population movements, of course, had immense significance for the Russification of the Kazakh Steppe in terms of demographic makeup, linguistic supremacy, educational opportunities, and other markers of culture. My argument here is that simply moving large groups of humans with different lifeways to settle in a territory long occupied by other groups of humans in an attempt to "assimilate" or "civilize" the local population is only part of the story of settler colonialism. By transforming the soils, plants, and animals of the Kazakh Steppe, the Virgin Lands Campaign accomplished a metabolic rift that irrevocably broke the culture of nomadic pastoralism.

Lysenko, and Stalin promised. Perennial grasses only yielded 2 to 4 centners per hectare—hardly enough to sustain the farm's livestock while delivering the requisite grain to the state. And so, Mal'tsev and his colleagues at the Lenin Farm began experimenting with other methods of working the soil that included annual grasses, fewer fallow fields, and new plowing technologies. Although the agronomist repeatedly stressed that farms should not take the "Mal'tsev Method" as universal—as the *travopol'e* system had been—but should experiment with the best cropping system to fit the farm's unique ecology, Khrushchev quickly latched onto the Mal'tsev Method as the standard that should be implemented across the steppe zones of the Soviet Union. The central pillar of the Mal'tsev Method was the premise that annual grasses can also restore soil fertility just as well as perennial ones but on a much shorter time scale. Mal'tsev showed through his experiments that wheat could be planted more frequently than Vil'iams' system allowed. At an All-Union meeting for the study and distribution of the methods of T. S. Mal'tsev in October 1954, the humble agronomist laid out his agricultural philosophy before an audience of collective farm chairmen, agronomists, scientists, and farm workers from across the union.

The Mal'tsev Method consisted of three interlocking components: working the soil, planting annual grasses, and inventing new farm machines to do it with. Whereas Vil'iams' system existed in a well-developed, holistic conceptualization of agriculture as a natural system, the epistemological weight of the Mal'tsev Method resided in experimental results. It was correct because it worked. Yields were higher. Soil analyses showed an improvement in organic matter. Labor costs were reduced. Farms were more profitable. These were the metrics used to understand the nature of steppe soils. However, animals largely dropped out of the Mal'tsev's agricultural system, both as grazers and as fertilizers. The Mal'tsev Method provided the scientific basis for repeated commercial grain sowings, the widespread adoption of Khrushchev's favorite annual

grain, corn, and the spatial separation of grain cultivation and livestock raising. This laid the groundwork for a metabolic rift on the steppe in which the soil nutrients lost during cultivation were replaced in turn by the manure of grazing livestock.

When Academy of Sciences scholars convened in the winter of 1955 to discuss their surveys, there was no mention of Vil'iams' *travopol'e* system. Promising news of Mal'tsev's experimental station was often mentioned as a possible avenue for cropping, but only veiled negation of Vil'iam's and Lysenko's agronomical models were uttered in passing. For example, one V. D. Kisliakov decried that "any attempt to apply as a template [*shablonno primeniat'*] a system of husbandry upon the opening of virgin lands—techniques of working the soil, using land resources, crop rotation plans—can only cause harm. Only differentiated approaches for further use of virgin lands in various natural zones, with their different soils, reliefs, climates, levels of subsoil water in various combinations" could lead to economically profitable and environmentally appropriate cultivation.[234] Kisliakov and his team were collecting data from aerial photography to assist in determining these regions and zones to "assist in the implementation… of Mal'tsev's new methods."[235]

The centerpiece of the Mal'tsev Method was a corrective on the Stalinist steppe epistemology grounded in Vil'iams' *travopol'e* system. Mal'tsev concedes that perennial grasses and annual legumes, like those in the *travopol'e* system, do indeed increase the protein and calcium content of the soil. But so far there had been no experiments aside from Mal'tsev's own that tested annual and perennial grasses based on these factors. His research showed that annuals could also improve soil fertility: "Annual plants, if appropriate conditions are created, can enrich the soil with

[234] V. D. Kisliakov, "Some Results of scientific investigations on the rational use of virgin and unused land in Kazakhstan and the Altai," 19.
[235] Kisliakov, 21.

organic matter and leave it more fertile than it was before their sowing."[236] There was no necessity to delineate within the crop rotation between periods of soil restoration and soil destruction—all cultivars could potentially replenish the soil.

The problem with annual grains and grasses, and indeed the entire *travopol'e* system, was not the types of plants sown, but the annual disruption to the soil. "Yearly plowing, plowing by means of turning over the top layer [of soil], destroys the natural course of the soil-forming processes."[237] It was impossible to plow deeply every year; instead, farms should only conduct plowing to depths of 40-50 centimeters once in four or five years. The subsequent years should use either no-till methods or surface tillage with a disc cultivator, without moldboards. Deep plowing would help curtail weeds, while no-till or surface tillage would not disrupt the soil-forming processes.

But Mal'tsev had little to say about Lysenko or Vil'iams' integrated agrobiology. His agronomical system was based on the premise that annual plants can be successfully cultivated year after year if only the soil is not also plowed deeply year after year. There was almost no mention of livestock production in Mal'tsev's writings, or a theoretical conceptualization of how plants, soils, animals, and humans interacted. Mal'tsev had the empirical data to justify the implementation of his cropping scheme over the *travopol'e* system on his experimental farm's parcel of land, but the metric justifying its efficacy was the annual yield. This appealed to Nikita Khrushchev's urgent need to increase meat and milk consumption on the basis of the expansion of cultivated forages on the Kazakh Steppe.

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[236] *Vsesoiuznoe soveshchanie po izucheniiu i rasprostraneniiu metodov raboty T. S. Mal'tseva. V g. Shardinske, Kurganskoi oblasti, 1-3 oktiabria, 1954 g.,* 18-19.
[237] *Vsesoiuznoe soveshchanie po izucheniiu i rasprostraneniiu metodov raboty T. S. Mal'tseva. V g. Shardinske, Kurganskoi oblasti, 1-3 oktiabria, 1954 g.,* 15.

Red Steppe Cattle and the Kazakh (Bovine) Dairy Boom

Slavic settlers brought Red Steppe cattle with them when they first arrived in the early twentieth century, but their presence increased in earnest after the mass death event of collectivization beginning in 1933. Although purebred animals only accounted for 3.3% of all animals with Red Steppe heritage at this time, the number of bred and improved animals was much higher. I showed in the previous chapter that after the state's initial investment in dairy stock after the collectivization collapse of Kazakh herds, breeding plans shifted to developing the first all-beef breed of cattle in the Soviet Union. Red Steppe cattle were less utilized because dairy farming is more labor and forage intensive. But during the Virgin Land years, the proportion of Red Steppe Cattle in Kazakhstan grew tremendously. Ukraine sent east to Kazakhstan more than 300,000 head of cattle during the Virgin Lands decade.[238] Most of these would have been Red Steppe cattle, as nearly half of all bred cattle in Ukraine were of the Red Steppe variety; the remaining breeds were conditioned to the boreal regions of the republic.[239] The struggle to mass-produce dairy products on the Kazakh Steppe thwarted Soviet planners throughout the second half of the twentieth century. Although the cattle themselves are well-adapted to the harsh climate of the steppe, the coordination of human and forage resources to provision the animals often failed to consistently produce healthy heifers. As I suggest in the next chapter, the sudden increase of Red Steppe Cattle on concentrated dairy operations in the northern steppe regions plagued production.

[238] B. A. Tulepbaev, *D. A. Kunaev*, 139.
[239] For statistics on the number of bred cattle in the Soviet Union in 1960, see *Chislennost' porodnogo skota v kolkhozakh I sovkhozakh SSSR na 1 ianvaria 1960 g.* (Central Statistical Department, 1961).

State breeding stations (*gosplemstantsii*) were organized in 1957 in every oblast in the republic by an order of the Soviet of Ministers of the Kazakh SSR. These stations would purchase the highest quality reproductive bulls from the surrounding farms, often importing studs from other republics, to keep on their pastures. The state breeding station was outfitted with artificial insemination technologies and specialized refrigeration equipment for storing semen.[240]

Sovkhozes in Tselinograd Krai were undergoing specialization by the time the *gosplemstantsii* plans were in operation, but even dairy sovkhozes kept beef cattle raising farms stocked with replacement female calves, older culled females and younger low-yielding females. These were bred with bulls of beef breeds. But this strategy so far was insufficient for supplying the region's beef demands. Instead of growing the number of beef studs, their numbers have only declined. Although the bulls at the state breeding farm were of high quality in terms of their pedigree as recorded in the state stud book, their potency was often lacking. After a blood analysis, it seemed that the state breeding farm had been sent the wrong bulls. Of the 118,000 dairy heifers in the oblast, in 1962 only 33,900 were bred with bulls from the state breeding station. And of these conceptions, many were the products of low-quality bulls. The authors note that the artificial insemination technicians at the farm incorrectly prefer to use bulls that respond better to the artificial vagina, whether or not the bulls themselves are of high quality.

In Karaganda, breeders had crossed imported Red Steppe cattle from Ukraine and the Caucasus with local Kazakh cattle to make the dairy breed have better beef. In Karaganda, the temperature variation is much greater than in Ukraine, and the grass cover is different, and it was

[240] V. T. Shubaev and N. D. Zhdanova, "A Few Issues in the Breeding Work at the Tselinograd State Breeding Station," *Zemledelie i Zhivotnovodstvo*. *Trudy Tselinogradskogo s.-kh. Instituta*, vol. 4, no. 3 (1964): 81-82.

hypothesized that the temperature fluctuations altered the cow's metabolism such that they would produce better meat in this environment.[241]

Kazakh White-Headed cattle, the pride of the Soviet Kazakh herd, were distributed in nearly every oblast in the republic. They grazed on abundant steppe grasses in Karaganda Oblast, ate silages and hay in places where barns with stalls were common, like in Semipalatinsk Oblast, and were driven to pastures in high elevations in Alma-Ata Oblast. Over the generations, this led to a bifurcation within the breed based on "constitutional-productive type" with some herds bred for higher dairy quality, while others remaining primarily for beef production.

Conclusion

Results from the early years of the Virgin Lands Campaign were impressive, the drought of 1955 notwithstanding. In just three years, heifers on kolkhozes produced 138 kg more milk per year, and on sovkhozes a whopping 219 kg more.[242] Improved feeding regimes contributed most to this dramatic increase in productivity, but it also can be attributed to better shelters and more attentive care for individual animals. To put it differently, an increase in human labor inputs considerably accelerated and intensified the metabolic exchange between black earth soils, harvested forages, and dairy cows, resulting in more calories for human consumption. By 1956, a single Virgin Lands cow could close the gap by half between the scientific norm for annual dairy consumption per person and what Kazakh inhabitants consumed in 1953. Khrushchev's lack of a

[241] A. V. Lanina, "Formirovanie porodnykh kachestv zhivotnykh pod vliianiem mestnykh uclovii," *Zhivotnovodstvo* 12 (December 1960): 60-64.
[242] A. Tursinbaev, "Socialist Transformation in Agriculture in Kazakhstan," *Sel'skoe khoziastvo Kazakhstana* 11 (1957): 7.

coherent steppe epistemology—despite unprecedented investments in science and technology in the Kazakh SSR—did indeed increase meat and milk production.

Conclusion

In June 1962, in a small city in southern Russia just north of the Don River, workers at the Novocherkassk Electric Locomotive Works walked off the factory floor and took to the city square, trading their soldering irons for picket signs. Their immediate demand, visible from the banners they waved, was to protest the recent increases in retail food prices. One photo of the demonstrators shows posters that read, "Meat, Butter, and Higher Wages!" "Whoever works, eats," and "Make a sausage out of Khrushchev!" [*khrushcheva na kolbasy!*]. (One manager at the factory reportedly snapped back, "If there isn't enough money for meat and sausages, let them eat pirozhki with liver."[243]) Ultimately, Soviet troops were brought in to disperse the workers. Twenty-four people were killed and many more wounded. Later trials would condemn another seven people to death. While the specifics of the labor conditions at the Novocherkassk plant also colored workers' grievances, this mass demonstration underscores the expectations of Soviet workers far from Moscow and Leningrad for their daily allotment of animal products—and not offal, as the factory manager tartly quipped. It also reveals the state's grave concern for any sign that quotas for socialist abundance were being woefully under-fulfilled.

A year later in 1963, anxious not to repeat the Novocherkassk tragedy, Nikita Khrushchev authorized the first purchase of foodstuffs on the global commodities market in times of peace. Crop failures across much of the black earth region left hardly enough grain for the following year's seed. Khrushchev negotiated contracts with Canada for the purchase of 9.4 million tons of grain, or about 10% of the gross harvest. This cost the Soviet Union 372.2 tons, or one-third, of

[243] Lewis Siegelbaum, "Novocherkassk Massacre," *Seventeen Moments in Soviet History*. Date accessed: June 15, 2025. https://soviethistory.msu.edu/1961-2/novocherkassk-massacre/.

precious gold currency that year.[244] Not even a decade into his monumental Virgin Lands Campaign, the premier had to concede that despite increasing the sown area by tens of millions of hectares, the Soviet Union could not meet its growing demand for livestock feed.

It is in this context of converging pressures from above and below that Khrushchev admitted to previous mistakes and pivoted to a new agricultural paradigm for the steppe regions of the country. He realized the importance of agricultural intensification as means to improving soil fertility and tacitly conceded Alexander Baraev's anti-erosion protocols were worthy of investment.[245] But for Khrushchev, it was too little too late, and the inconsistent harvests in the Virgin Lands contributed to his ouster in 1964. When Leonid Brezhnev took the helm, he passed a series of agricultural reforms that implemented as state policy many of the ideas that Khrushchev had come to in his final years as first secretary.[246] Ultimately, however, Khrushchev had set the Kazakh Steppe on a kind of path dependency that his successor could ultimately not exit.

Khrushchev's Turn to Intensification

At the Twenty-second Party Congress in June 1961, Nikita Khrushchev still held hard and fast to diversified and integrated agricultural production. "We deliberately solve the problem of

[244] Zelenin, 56.
[245] Other historians, namely Marc Elie, Timm Schönfelder, and Zhanna Mazhitova and colleagues have extensively detailed Alexander Baraev's anti-erosion protocols and dryland agricultural program that was developed in the wake of massive soil erosion during the Virgin Lands Campaign. These primarily concern planting methods for wheat and other grains. In this conclusion, I will highlight two developments that pertain specifically to cattle and have yet to be comprehensively examined: the institutionalization of fattening and finishing farms in the Virgin Lands, and the proliferation of bovine tuberculosis. Timm Schönfelder, "The Good, the Bad, and the Pochvoved: Viktor Kovda, Soviet Soil Science, and the Agromeliorative Complex," *Cahiers du Monde Russe* 63, no. 1 (2022): 59-80; Zhanna Mazhitova, et. al., "Environmental Consequences of Khrushchev's Virgin Land Campaign in Kazakhstan (1950s-1960s)," *E3S Web of Conferences* (2021): 1-12.
[246] For more on Soviet agriculture under Brezhnev, see Alex Nove, "Soviet Agriculture under Brezhnev," *Slavic Review* 29, no. 3 (1970): 379-410.

the production of grain, meat, and milk," he explained, "as a singular task." It would be incorrect to separate the two.[247] This premise applied to all levels of agricultural production, from the intra-republic coordination to a single farm's productive capacities. As I showed in the previous chapter, Khrushchev's original vision for the Virgin Lands was to create enormous state farms whose primary commercial product was grain, but had robust livestock sectors to both consume the grain and produce fertilizer for future plantings. This both helped to revitalize a flailing livestock population in Kazakhstan and reduced the need for farms to buy urea or ammonia from distant processing facilities.

In the early 1960s, this tune of diversification started to change. To prepare for Khrushchev's speech at the 14th Komsomol Congress in 1962, he admitted that the spring planting was proceeding well, and that hopefully in the future the party and Komsomol can guide agriculture "independent of climactic conditions." Although for the time being, "across many [enterprises] agriculture still depends on meteorological conditions, [and] how they turn out [*skladyvat'sia*]."[248] Harvests and yields had varied widely for the past seven years, and this oscillation could not be explained by variations in human design.

In one of his last addresses to the Presidium of the Central Committee in June 1964, Khrushchev laid out his plans for transitioning to intensive agriculture within the country. As he explained it, he was fulfilling Lenin's long desire for large, collective farms operating on an intensive, industrial, and scientific basis. He assuaged his audience that this was not another attempt at reorganizing the agricultural organs of the state. Instead, intensive agriculture for

[247] TsGARK 1481/42/283/124.
[248] N. S. Khrushchev, "Proposal for the preparation of a speech at the 14th congress of VLKSM on agriculture, dictated by N. S. Khrushchev," 18 April 1962, *Nikita Sergeevich Khrushchev: Dva Tsveta Vremeni* (Moscow: Rossiia XX Veka, 2009), 182.

Khrushchev meant "the direction of agriculture [in terms of] organization should be based on the principle of guiding the production of separate productions of separate cultivars, one or another kind of meat and other agricultural products."[249] Even large state farms would now only be responsible for producing goods for a single agricultural industry. Intensification would be guided by scientists and industry leaders—it would not be a peasant-led initiative.

Farm restructuring during the Second Virgin Lands Campaign allowed for the specialization and coordination of feeding regimes across the lifecycle of the cow. When it was time for a farm to deliver its quota of animals to the state for processing, livestock were first weighed and graded at requisitioning points (*zagotskot*) before being sent to a slaughterhouse (*miasokombinat*). Previously, if the animals were under-weight or malnourished, they would graze on surrounding pastures to reach desired weight. With fewer pasture reserves as a result of the Virgin Lands Campaign, state livestock requisitioning points transformed into fattening and finishing farms based on grains, not grasses. This system, called *zagotskotootkorm,* unified into a single body the tasks of procurement, purchasing, feeding and fattening livestock. These special farms primarily cultivated corn and potatoes, two crops that are prized for their ability to easily be converted to fat in livestock. In 1959, these farms were relieved from their obligations to deliver grain or any other agricultural product to the state: their sole function was to grow forages to add bulk quickly to livestock.[250] Finishing sovkhozy would receive animals from the surrounding farms. If the animals were under-weight or malnourished, they would be fattened with scientifically-determined rations according to their age group (*otkorm* for animals approaching

[249] N. S. Khrushchev, "Notes of N. S. Khrushchev to the Presidium TsK KPSS 'On the leadership of agriculture in connection with the transition to the path of intensification," 13 June 1964, 209.
[250] "On the measures to improve the acquisition and distribution of livestock received from kolkhozes and sovkhozes of the republic in 1959." Soviet of Ministers of Kazakhstan. June 1, 1959. GAAO 1425/1/1782/92.

slaughter, *nagul* for younger animals, or *dorashchivanie* for animals recently weaned). If these finishing sovkhozy received healthy animals, they would be sent immediately for slaughter. Finishing farms were able to deliver to the state twice the amount of full-weight cattle than other state or collective farms because they could concentrate agricultural production (and thus labor and mechanical resources) on only corn and potatoes—the best feed for putting on weight fast. Finishing sovkhozy also received the waste products of other food industries to use as animal feed. Before the consolidation of *Zagotskotootkom*, enterprises of food production would spend huge resources to transport sugar beet pulp to farms in the area for animal feed. Now, sugar beet refineries, breweries, bakeries, and distilleries could all deliver their waste products to the closest finishing state farm, thus reducing costs.[251] By 1970, there were 104 of such fattening and finishing farms under the auspices of *zagotskototkorm*.[252]

By the mid-1960s, Khrushchev was also back-tracking on his earlier disavowal of chemical and mineral fertilizers in agriculture. When he first proposed his Virgin Lands Campaign in the winter of 1954, he justified rapid extensive cultivation because the grain situation was so dire that the country did not have time to wait for an indigenous chemical industry to develop. After visiting a few leading chemical factories across the country, he charged the Central Committee to work with Gosplan to gather data on the plants that were currently producing mineral fertilizers in order to create plans for further production. He was especially concerned about those mineral fertilizers that were produced from fossil fuels which had recently been discovered in locations across the country, including Siberia.[253]

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[251] A. E. Elemanov and P. M. Pozdyiakov, eds., *Miasnoe skotovodstvo Kazakhstana* (Kazakh State Publishing, 1959), 309-311.
[252] Mikhailov, *Sovkhoznoe Stroitel'stvo*, 62.
[253] N. S. Khrushchev, "Notes to the Project of N. S. Khrushchev to the Presidium of TsK KPSS with proposals on the issue of the further development of the chemical industry," 29 March 1963, 719.

Bovine Tuberculosis and the Fate of Red Steppe Cattle

It is hard to overstate the impact of artificial insemination technologies on the refinement of livestock breeding practices. Artificial insemination allows for controlled breeding: a specific bull, with a desired phenotype profile, will reproduce with a specific female, also selected for its productive or reproductive characteristics. In settings of natural reproduction, herders could only hope through confinement and fencing that two desired animals would mate. Furthermore, with artificial insemination technologies, sperm from fewer desired bulls can impregnate a larger population of females. At the population level, this allows for both a narrowing and greater control over the genetic material of a herd, with the aim of, over successive generations, breeding more homogenous and desirable animals. For example, one report notes that one bull can be used for 400 to 800 heifers with artificial insemination technologies, but only 40 dairy heifers in natural reproduction.[254]

The Soviet Kazakh herd faced challenges when trying to reproduce itself using artificial insemination technologies, which only furthered regional differentiation. From 1964 to 1968, only 33-35% of reproductive female cows were artificially inseminated, but with great discrepancy between regions. For example, in the dairy producing regions of Northern-Kazakhstan, Eastern-Kazakhstan, and Alma-Ata Oblasts, around half of all reproductive females were artificially inseminated, while in Gurev, Kyzyl Orda, and Aktiubinsk Oblasts, the rates were well below average (0.06%, 2%, and 16%, respectively).[255] The report notes that in these primarily beef cattle

[254] TsGARK 1481/31/1027/10.
[255] TsGARK 1483/31/1273/171.

raising areas, “there still remains the custom of working in the ways of old,” i.e., relying on natural reproduction. What’s more, in these areas, livestock workers use low-quality bulls, some with “dubious reproductive capacities.”

Most breeding took place on the farm. One of the hallmarks of the Second Virgin Lands Campaign—to further specialize and concentrate animal husbandry across state and collective farms—saw application in the proliferation of dedicated stud farms. To help facilitate artificial insemination and distribute approved sperm for reproduction, the Kazakh Central Committee organized 16 oblast and 20 inter-district, district, and state breeding stations to serve the surrounding farms. Due to a lack of refrigeration technologies and transportation, frozen sperm was only used in a minority of artificially inseminated females. In 1968, 43,000 heifers out of 775,100 were impregnated using frozen sperm as compared with live artificial insemination. The report notes that using refrigerated semen would economize means of transportation, human resources, and the sperm of high-quality bulls—not to mention result in higher rates of fertilization.

As dairy production intensified in the steppe regions with a greater proportion of sown fields, it became more difficult to standardize and reproduce the Red Steppe breed in Kazakhstan. There were two contingents of Red Steppe cattle: one in the northern districts of Tselinograd, Kokshetau, and Northern Kazakhstan Oblasts; and the other in the drier steppe regions of Karaganda Oblast. Teams of breeders in Karaganda had been trying to convert Red Steppe cattle to a mixed-use dairy-beef breed by crossing it with indigenous Kazakh cattle so that it could better make use of the extensive pastures in the southern areas of the steppe. Entirely new breeding lines were formed in Karaganda. In the north, by contrast, breeders repeatedly had to import new Red Steppe bulls from Ukraine or Belarus to replenish the herd. These cattle were crossed with even more imported stock such as Yaroslavl’ and Lithuanian Red Cattle—breeds that were not suited to

the harsh steppe climate.[256] State breeding books were recording an increasing amount of second-class cattle that lacked the requisite pedigree information for recordkeeping. In one study that ran from 1962 to 1965 was conducted by one of the leading specialists for Red Steppe Cattle in the Soviet Union, T. F. Tavildarova. She reported that in the conditions of the Kazakh SSR, and particularly the Tselinnyi Krai, Red Steppe cattle were quite variable in constitution with low productivity.[257] Only now, at the project's onset in 1962, was the Tselinnyi Krai state breeding station beginning to study the studs used for reproduction and detail their characteristics in the region's stud book.

If Red Steppe Cattle were raised on farms with the most human, plant, and material resources—in Tselinnyi Krai—why were there so many difficulties in standardizing the breed with high-quality animals? Why did farms have to continuously import animals as replacement stock and breeding material? One possible explanation is the amazingly prodigious bacteria that thrived in the new conditions of the Virgin Lands Campaigns: bovine tuberculosis. Although bovine tuberculosis existed in Kazakhstan before 1954, it exploded in the new steppe environment that humans created. More animals were concentrated in smaller areas, and in dairy-producing regions, were confined indoors in close quarters for much of their lives. These are prime conditions for bacteria to spread.

Bovine tuberculosis (*mycobacterium bovis*; zoonotic tuberculosis) can be spread from animals to humans through direct contact with an infected carcass and, crucially, through milk that had been improperly pasteurized. Tuberculosis in humans (*mycobacterium tuberculosis*) is a distinct but related bacteria; however, the two are clinically very difficult to distinguish. The

[256] TsGARK 1481/31/1027/7.
[257] TsGARK 1481/42/283/12.

Kazakh Ministry of Health did not distinguish in their statistics whether the presentation of the disease in humans came from cattle or not, but there are clues that suggest a significant proportion of the bacteria had originated in cows.

Table 2: Cases of Tuberculosis in the Kazakh SSR and USSR per 1,000 people[258]

	Kazakh SSR 1960	Kazakh SSR 1963	USSR 1960	USSR 1963
Total	248	281	170	147
Cities	302	299	182	150
Villages	205	263	158	143

The table above indicates that cities fared better than villages in terms of rates of tuberculosis: in 1963, there were 299 people per 1,000 urban residents who had tuberculosis, while just 263 in the countryside. However, further in the report, the realities of the numbers become clearer. In many places in the countryside, there were so few tuberculosis medical dispensaries that the data was grossly underreported. When the researchers from the Ministry of Health conducted their own surveys going from village to village, they found that actual rates of tuberculosis were 4, 8, and even 12 times greater than the official statistics.[259] In Karaganda, Uralsk, and Kyzl-Orda Oblast, there was not a single tuberculosis dispensary; in Kustanai there was only one; and in the whole

[258] TsGARK 1473/5/716/51.
[259] TsGARK 1473/5/716/199.

of Tselinograd and Northern Kazakhstan Oblasts there were only two.[260] In general, tuberculosis treatment and prevention was much better organized in cities than in villages.

Rates of bovine tuberculosis ballooned in the second half of the 1960s. If in 1964 there were 812,800 infected cattle, by 1968 there were 1,413,670.[261] (Most likely this number also reflected improvements in surveillance as well as incidence.) Northern Kazakhstan Oblast had nearly twice the rate of infection than the next closes oblast (Kustanai). In 1970, a striking 6.1% of cattle in Northern Kazakhstan tested positive for bovine tuberculosis.[262] None of the oblasts had the required number of pasteurizers for proper handling of milk; in Northern Kazakhstan Oblast, 313 were needed, but they only had 49.[263] In Pavlodar Oblast in 1973, the chairman of the executive committee directly linked rates of tuberculosis in humans to those in cattle: "The territory and buildings where infected cattle are held in the most unsatisfactory, unsanitary conditions…Milk in many farms is not pasteurized."[264]

A lack of veterinary Inspections, vaccines, or culling and quarantining protocols for diseased animals does not explain how rates of the bacteria exploded during the 1960s. Tuberculosis was being passed between state and individual cattle, but only cows owned by the farm were tested and regularly monitored. Authorities blamed the high rates of tuberculosis on individually held animals because their keepers were not following proper hygienic protocols. (Farm workers were most likely reluctant to test their personal livestock; if the animals carried the disease, they were immediately slaughtered, and a family would a valuable source of nutrition.) A more compelling hypothesis for the proliferation of a contagion in the least densely populated

[260] TsGARK 1473/5/716/3.
[261] TsGARK 1481/68/82/18.
[262] TsGARK 1481/68/82/20.
[263] TsGARK 1481/68/82/23.
[264] TsGARK 1473/6/1802/46-47.

areas of the least densely populated republic in the Soviet Union is the sudden explosion in cattle numbers in a short period of time.

The environmental historian Manuel Tironi and his colleagues have argued for understanding soils as active agents that "soil the social"—that is, that force human societies to adapt their practices and institutions in response to soil conditions and changes.[265] The eroded topsoil did indeed shape agricultural practice and steppe epistemology, but the peace and prosperity of the Khrushchev years had set consumer demand high for animal products. The grain purchase of 1963 established the precedent of buying grain from the capitalist West—rather than double-down on autarky—to ensure socialist abundance. Despite high rates of bovine and human tuberculosis in the dairy-producing regions, Red Steppe Cattle from Ukraine were continually imported to replace diseased animals and keep the milk flowing. In this sense, nature certainly "fought back" and "resisted" the pinnacle of socialist aspirations of mass-producing animal products entirely in industrial feedlots, but enormous grain monocultures persisted because of wholly capitalist values: irreversible consumer demand for meat and milk maintained by creditor-debtor relations on the global market.

Yet the case of Kazakhstan also reveals the limits of agrobiological agency in the face of powerful economic and political forces. Despite overwhelming scientific evidence of environmental degradation, despite the development of ecologically sound alternatives, and despite repeated crop failures that threatened food security, the Soviet system proved unable to

[265] Manuel Tironi, et. al., "Soil Theories: Relational, Decolonial, Inhuman," in *Thinking with Soils*, 17.

fundamentally alter the agricultural trajectory established during the Virgin Lands Campaign. The demands of urban consumers for meat and milk, the prestige associated with high-tech agricultural modernization, and the enormous sunk costs in infrastructure and expertise all militated against a return to more sustainable farming systems.

The grain purchases of 1963 established a crucial precedent that would shape Soviet agricultural policy for the remainder of the socialist period. Rather than reducing livestock herds to match domestic feed production, or adopting farming systems better suited to steppe environments, Soviet planners chose to import grain from capitalist countries to maintain the industrial livestock-agricultural system. This decision reflected not ecological rationality but political calculation: the social stability of the Soviet system increasingly depended on meeting consumer expectations for animal products that had been established during the prosperous Khrushchev years.

The persistence of tuberculosis In the dairy herds of northern Kazakhstan offers perhaps the clearest example of the limits of environmental adaptation. Despite evidence that the disease was linked to overcrowding and intensive confinement systems, state farms continued to import Red Steppe cattle from Ukraine and concentrate them in ever-larger dairy operations. The solution to zoonotic disease was not to reduce herd densities or adopt more extensive grazing systems, but to invest in pasteurization equipment and veterinary surveillance. Nature did indeed "fight back" against the Soviet industrial livestock-agricultural system, but human institutions proved remarkably adept at developing technological workarounds that maintained production levels while ignoring ecological feedback. The absence of a cohesive steppe epistemology to guide Khruschev and Kunaev's Virgin Lands Campaigns from the outset enabled the final, irreversible destruction of the ecological relationships that had sustained nomadic life for centuries.

The most profound consequence of this transformation was not the environmental degradation, significant though it was, but the severing of the metabolic relationships that had connected human communities to the steppe ecosystem for generations. The loss of nomadic pastoralism represented more than the disappearance of an economic system; it marked the end of a way of knowing and being in the world that understood humans as participants in rather than masters of ecological processes. The industrial agricultural system that replaced it treated the steppe as a machine for producing commodities rather than a living community of interdependent beings.

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