Science and the steppe: Agronomists, nomads, and the settler colony on the Kazakh steppe, 1881-1917

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Science and the steppe: Agronomists, nomads, and the settler colony on the Kazakh steppe, 1881-1917

by

John Britton Seitz

A dissertation submitted to the graduate faculty

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Rural, Agricultural, Technological, and Environmental History

Program of Study Committee:
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The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this dissertation. The Graduate College will ensure this dissertation is globally accessible and will not permit alterations after a degree is conferred.

Iowa State University
Ames, Iowa
2019

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DEDICATION

To my father Jacob Raymond Seitz and my wife Savanna May Lyons
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ACKNOWLEDGEMENTS

I have incurred a great number of debts while completing this project, which is to be expected for a project that in some ways began over a decade and a half ago. Certainly, the help and patience I have been given is worth more than a few words here, however, I hope they will suffice for now. I firmly believe no one writes a dissertation alone, therefore the strengths of this project lie in the communal effort, kindness, and wisdom I have been given along the way.

I have received significant financial support to complete this work, for which I am grateful. Though there are no citations or immediate examples from my time on a Fulbright in Kazakhstan 2005-6, I cannot imagine this dissertation being written or even conceived of without that support. Perhaps, it is the foundational piece, for it was while I was in Kostanay researching the Virgin Lands Campaign, that I realized that I had no idea what I was doing, because I had not really thought much about Kazakhstan before Khrushchev. In many ways, this dissertation is an attempt to fill that gap in my own knowledge. In addition, I received summer research support from the Iowa State Department of History’s “Anonymous Donor,” and also the Garst Dissertation Fellowship. In 2016-2017, I was grateful to be supported by the ASEEES Cohen-Tucker Dissertation Completion Fellowship for research in Russia and Kazakhstan. Finally, the Mellon/ACLS Dissertation Completion Fellowship gave me generous support while writing.

I have a number of academic debts whose work and guidance is in these pages, albeit in sometimes hidden ways. I am eternally grateful to Elena Duzs, Christopher Lemelin, and Fillipova for their patience and excellence in the Russian Department during my time Dickinson College. Also at Dickinson, my introduction to Russian history by Karl Qualls as well as his constant support and advice has been invaluable. In addition, I must express my deep appreciation to my host family during my time in Moscow, 2003-4. Irina and Elena
Alexandrovna not only taught me much, but Elena Alexandrovna’s stories about evacuation to Tashkent during the war were my first firsthand introduction to Central Asia. At Indiana University, thanks to my patient and dedicated Kazakh teachers Aigerim Turlybekova, Dana Ziyabekova, and Marzhan Arenova. In addition, Devin DeWeese, Ron Sela, Bill Johnston, and Kevin Martin are challenging teachers, and supportive advisors. I am also grateful to Michael Hancock-Parmer and Kristoffer Rees for their insights and encouragement. Of course, I must also thank “the gang” without whom I cannot imagine my time in Bloomington being so warm, fun, and intellectually stimulating. Elizabeth Geballe, Holly Schreiber, Sally and Hess Yntema, Michael Young, Hubert Izienicki, and Meg Arenberg, thank you for taking in this poor orphan.

I count myself very lucky to have ended up completing my PhD at Iowa State University. The History Department, with its focus on rural, environmental, and technological history has allowed me to explore this topic and develop as a thinker through a strong thematic lens rather than simply a geographic or chronological one. The highest praise must go to my advisor, James T. Andrews, he is a brilliant scholar and a supportive yet critical reader. I cannot say enough about how lucky I am to have had his support, guidance, and insight over the years, and I am truly thankful. In addition, Kathy Hilliard has been a crucial supporter and careful reader whose questions often cut right to the heart of my own questions, sometimes without me fully realizing. Her kind and generous spirit is a real gift to the academy. Pam Riney-Kehrberg and Julie Courtwright have been wonderfully supportive mentors and incisive critics, your insights into the American experience of rurality and your deep love of the places you study has been invaluable and inspiring. Jana Byars, your support, insights, and friendship was crucial to bringing this project to fruition, thank you. John Monroe, Larry McDonnell, and Michael Bailey have also been supportive and inspiring teachers and mentors. Of course, the highest praise goes to
Jennifer Rivera whose wisdom and generosity is both legendary and well-deserved. Finally, although he came quite late in my time in Ames, Chris Low’s fingerprints are all over this work and his friendship, advice, and generosity have kept me going and inspired me to aim higher countless times during this project and beyond. Beyond Iowa State I have benefitted from the advice and encouragement from several scholars including Ian Campbell, Willard Sunderland, Virginia Martin, Matthew Payne, and Sam Dolbee, thank you.

I was fortunate to find myself with a group of wonderful and incredibly clever graduate students at Iowa State. Your conversations, camaraderie, and challenges have made me grow as a scholar and a person in countless ways. Most especially thank you to Maria Howe, Kelly Wenig, and Rachel Kleinschmidt for convincing me while surveying the metropolis of Manhattan that there really was a place for me in Ames, you were not wrong. Thanks also to my comrade Caroline Schoonover for her ability to mix humor with an inspiring spirit to fight for what is right, to Katherine Warming, whose mind is like a steel trap, yet who has a kind and clever heart, and Mickey Belding for your incisiveness and helping this Appalachian begin to understand the Midwest. Thanks also to Lindsay Bell for showing what true generosity and friendship look like, to Brandon Duxbury for your quiet yet profound insights, and to Nick Waldrop, Matt Margis, Aimee Burch, and Mark Howe for your friendship and intellects. To the entire Lloyd family, especially Fred, thank you for making me feel at home in far Iowa. Finally, thank you to my dear friend, intellectual sparring partner, and devoted scholar Margret Weber, your friendship and kindness as well as your challenges and insights have helped me grow and I am grateful to you.

During my time abroad, I have also incurred several debts. In Kostanay I cannot thank enough Gaukhar Galikhan, my first Kazakh tutor and an invaluable guide and friend who helped show me just how wondrous and proud Kazakh history is, and how great its future can be. Also
in Kostanay, Kristina Prokhorova and Timur Khassanov, thank you so much for your kindness and friendship, and for your wonderful souls. Finally, the Peace Corps crew in Kostanay, Tommy Elwood, Dan Wienecke, Abby Schmidt, and Nicole Stivaletta Contini, thank you for your friendship during some difficult times. In Moscow 2016, and since then, thank you to Susan Grunewald, Erin Hutchinson, and Kelsey Norris for your camaraderie. My time in St. Petersburg was wonderfully improved by the hospitality and friendship of my fellow kommunalka roommates Olga, Anton, and Snezhanka, thank you for the adventures. In Almaty, I am grateful to the help, guidance, and continued support of Gulmira Sultangalieva and the staff and students at Al-Farabi Kazakh National University. Also, Saule Sateyeva is a true friend and staunch ally, thank you for your kindness and support. Most especially, my deep thanks and gratitude to Sean McDaniel for your camaraderie, advice, and commiseration in the Almaty and St. Petersburg archives and beyond. Also, to Missy and Shea for your friendship, hospitality, and humor.

Finally, thanks to my family who have been supportive and patient as I traveled and wrote. My brothers Drew and Blaine, always engaging debating partners got me off to any early start. To Concho and Conwy for demanding walks and useful perspective on what matters. My parents Jacob and Susan who always encouraged me to explore, and who taught me so much about the world and service to it and our fellow humans. It is especially bittersweet to think that my father will not read this work for many reasons, but in large part because his own scholarship on Kenyan agricultural and colonial history made an imprint on framing this work. What is more his model of curiosity and as a teacher has had a deep and abiding effect on me, as well as on lives of countless other students. Finally, and most importantly to my love Savanna Lyons to whom, along with my dad, this work is dedicated. Darlin’, your patience is appreciated, your insights, wisdom, and inspiration valued, and your love cherished. Thank you.
ABSTRACT

In the late nineteenth century and the beginning of the twentieth century, Russian officials and scientists undertook a project of exploiting the Kazakh Steppe to turn it into an agricultural breadbasket. However, this project ran into difficulties both among the indigenous nomadic Kazakh population and with the challenges of farming in a new environment. Therefore, officials and scientists turned to another group to attempt to transform the steppe: peasant settlers from European Russia. While they did not fully overcome the challenges and achieve their most extreme visions for the steppe, this process that included demographic, scientific, and economic changes would have far reaching affects on the story of Kazakhstan down to the present day.
CHAPTER ONE: INTRODUCTION

Agricultural science was central to Russia’s colonial project on the Kazakh steppe at the turn of the twentieth century. While fundamentally agricultural in nature, this project extended beyond crops and animals and transformed the environment, society, demographics, and economy of the region in ways that had far reaching consequences. Imperial authorities sought to change the region from one that was dominated by nomads and pastoralism into a zone of sedentary peasant farmers. Utilizing the most up to date farming practices and technologies, they hoped to integrate the steppe more fully into the empire and world grain markets. While, like most colonial undertakings, it did not always achieve the exact outcomes authorities sought as quickly as they had hoped, this dissertation argues that agricultural science was central to transforming the steppe and its inhabitants. However, the story of this transformation is not a simple narrative of how science and imperial power enacted their vision on the steppe without resistance or setbacks. Instead, it is also the story of how those setbacks and that resistance interacted with and sometimes contested and thwarted the visions, technologies, and ideologies of imperial power on the steppe.

Nevertheless, today Kazakhstan is annually among the top ten wheat producing countries in the world. This is a direct legacy of the strategies, research, and infrastructures developed by imperial administrators and scientists. While it was not until the Soviet period that sedentary agriculture achieved supremacy on the steppe, this dissertation argues that this development has colonial roots that predate Soviet rule. However, these roots were not only colonial, they also

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involved science which was an inherent aspect of the colonial project, and it was this interaction of science and colonial administration that is the focus for this study and also the catalyst for the environmental, agricultural, and social changes that followed.

Early attempts to remake the steppe according to colonial visions included an important role for indigenous Kazakhs. Imperial authorities encouraged them to give up their nomadism (and semi-nomadism) in favor of sedentary agriculture. Agricultural scientists played a key role in these plans, serving as teachers of new methods of animal breeding, feeding, and care. They also taught nomads how to use plows, seed drills, and mowers. However, Kazakhs stubbornly resisted these changes, all of which threatened to upend their nomadic society. On the other hand, the challenges of transferring agricultural practices developed in European Russia to a Central Asian steppe environment doomed this approach to failure. By the early twentieth century, with the explosive growth in the agricultural sciences and in the number of agronomists, imperial officials changed their tactics. Instead of focusing this new agronomic infrastructure on local Kazakhs, the empire largely turned its attention to supporting peasant settlers from

4 On the challenges Russian science and settlers faced when moving from a forest to a steppe environment in an earlier period see, David Moon, The Plough that Broke the Steppe: Agriculture and Environment on Russia’s Grasslands, 1700-1914 (Oxford: Oxford University Press, 2013). Moon’s work is especially important as it illustrates how the agronomists arriving on the Kazakh steppe, already had significant experience in a similar—although not identical—steppe environment, and many of the theories and practices they brought with them had already been developed on the steppe further to the West.
European Russia. Officials hoped these transplants would serve as the vanguard of the environmental and economic changes they had envisaged.\(^6\)

However, in spite of massive state intervention, the settler colonial project in the Kazakh steppe constantly teetered on the verge of failure. These investments were necessary if officials were going to maintain the settler colony on the Kazakh steppe. While diverse environmentally, many areas of the steppe were incredibly inhospitable to sedentary agriculture, and just keeping peasant settlers alive was a massive undertaking that illustrates the deeply held belief in the project by officials and agronomists. It is estimated that around 22% of the settlers in the most intense period of settlement (between 1896-1917) gave up and returned home.\(^7\) However, officials and the majority of settlers believed in the project enough to continue even in the face of incredible setbacks like drought, famine, and disease.

While also revolutionizing the steppe environment, authorities also hoped to transform these Russian peasant settlers from inefficient communal farmers into an independent yeomanry. They wanted these farmers to utilize the newest production methods and technologies in order to exploit the steppe, turning it into an agricultural breadbasket capable of financing Russia’s emergent industrialization. Their plans required an expansive agronomic bureaucracy as well as new institutions like experimental farms, laboratories, and agricultural schools. They would also require new physical infrastructures from grain silos and farm machinery stations to stockyards and grain elevators. This human, institutional, and physical infrastructure formed the basis of a nascent frontier technostate, which would eventually develop over the course of the colonial

\(^6\) On how the Stolypin Reforms to modernize Russian agriculture and peasant settlement to Siberia and Central Asia were linked see, George Yaney, *The Urge to Mobilize: Agrarian Reform in Russia, 1861-1930* (Urbana: University of Illinois Press, 1982).

encounter on the steppe. It would also set the region on a new trajectory toward the scientifically integrated and heavily capitalized sedentary agriculture that would fully emerge after 1917.

In addition to connecting the history of science on the steppe across the 1917 divide, this dissertation makes several other interventions into Russian history. Most fundamentally, it seeks to further explore the history of Russia as a colonial power. This is a sometimes contentious position within some groups of Russian historians, especially those in Russia itself. However, this dissertation makes clear that the realities of power and of the destruction of Kazakh ways of life to benefit settlers indicate the steppe was the site of a rather typical settler colonial encounter. In addition to making a case for the Kazakh steppe as a site of settler colonialism, it also adds to the discussion in Russian history on the connection between science and empire. It builds on the work of scholars like Nathaniel Knight, David Moon, and Maya Peterson who examine how colonial encounters affect and are affected by science. However, unlike these scholars who focus on empire and colonialism, it seeks to engage specifically with settler colonialism as the lens of analysis.

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This framework is important, because this work argues that science on the steppe is best understood as “settler colonial science.” This particular type of science was marked by several important aspects. First, it sought not only a transformation of the landscape, but it also sought a transformation of people which, in a deviation from more typical colonial science, largely ignored indigenous Kazakhs. Instead the targets of remaking were the settlers. This took many forms and was a multi-layered process that included both Cossack and peasant settlers. Drawing on Veracini’s notion of how settler projects aim to “an exemplary model of social organization.” In the Kazakh steppe, this was complicated by the ambiguous way officials viewed peasants and Cossacks as both more advanced than the Kazakhs, and less advanced than they would have liked. However, in spite of this multi-layered attempt at remaking peasants as well as the environment, settler colonial science was always fundamentally about aiding the settlers and dispossessing the Native. This is in spite of the fact that much of the knowledge and practices that underpinned settler colonial agricultural science on the steppe was influenced by, or even appropriated from indigenous knowledge.

In addition to their role as targets of settler colonial science, this dissertation also contributes to our understanding of how peasants who migrated to the Kazakh steppe were part of a larger Russian story. While migration was a focus of policymakers behind the Stolypin reforms much study of this phenomenon in earlier periods examined the issue from the center. More recent studies, such as Willard Sunderland’s which this dissertation seeks to complement have begun to examine the issue with a more peripheral lens. This work builds on these

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13 Yaney, *The Urge to Mobilize*; Demko, *The Russian Colonization of Kazakhstan*.
previous approaches that have emphasized the political aspects of peasant settlement by centering the questions of science, technology, and environment in its analysis.

Finally, this dissertation is also a history of science and of the environment in the Russian Empire.15 It seeks to continue the conversation by framing the discussion of these two aspects as connected and seeks to meld them together. The environment was a major factor driving the work of scientists on the steppe. While things like professional identity and state power were at work, and are discussed in this dissertation, it seeks to explore the interactions between science and the environment.16 Recently, there has been important pioneering work done addressing the agriculture and science in imperial period by historians like David Moon, Anastasia Fedotova, and on the Kazakh Steppe specifically by Ian W. Campbell.17 This work follows in a similar vein, and seeks to emphasize how settler colonialism affected ideas about the environment and the nature of the science being practiced. It also posits a particular mode of domination in the form of “settler ecology.” Some analyses of science and empire emphasize the way scientists and officials attempted to use science to dominate the landscape. Instead, “settler ecology” described in this dissertation is a process that recognizes the insights of ecology and connectivities within the natural world, and puts those insights into the service, not of dominating nature, but instead of dominating and dispossessing indigenous peoples and cultures.

15 On the history of Russian and Soviet science see, Alexander Vucinich, Science in Russian Culture and Loren R. Graham, Science in Russia and the Soviet Union.
16 Two important theoretical guides for this focus on the Soviet period: Douglas Weiner, Little Corner of Freedom: Russian Nature Protection from Stalin to Gorbachev (Berkeley: University of California Press, 1999); Stephen Brain, Song of the Forest.
Additionally, this dissertation is a story about what is today Kazakhstan. While Kazakhs are not the central actors in this story, they are uppermost in the concerns of settler colonialism and the author. While settler colonialism is often about the story of indigenous resistance and colonial power, as Veracini said, “It is important that we focus on the settler, on what they do, and how they think about what they do. True, they have been the traditional subject of historical inquiry, and only recently the experience of indigenous people in settler contexts has been the subject of extensive scholarly activity. And yet, there are also risk intrinsic in focusing primarily on indigenous peoples and their experiences.”\(^{18}\) Since those creating agricultural science were overwhelmingly Russian, and their archival record is rich, this dissertation is focused on their work. However, it seeks to focus on the agronomists in a way that recognizes Kazakhs and also peasant settlers as important actors. It is certainly imperfect in doing this, however, it does identify key areas that are easily overlooked where scientists were being resisted or navigated, and even more importantly, where Kazakh and peasant knowledge was ignored and then absorbed by the agronomic bureaucracy. As such, these groups played a key role in the creation of this science even if their contributions were hidden or outright stolen and claimed by Russian science.

Kazakhstan is also central in the considerations of this work because later Soviet developments have their antecedents in the labor of earlier imperial agronomists. In addition to its large agricultural sector, today Kazakhstan is ethnically diverse, “developed” and urban, in large part because of a history that includes arguably genocide and ecocide. These developments are connected. The Soviet Virgin Lands project in Kazakhstan, beginning in the 1950s, brought millions of settlers to the region and made it a site of investment by the Soviet government was

\(^{18}\) Veracini, *Settler Colonialism*, 20.
crucial to Kazakhstan’s history. However, this project was a continuation of a vision that took hold in the first decades of the 20th century. That same vision was what brought the social and human catastrophe of the imperial dispossession and poverty, then the famine and destruction of Collectivization which finally made the land more truly “empty” by the time of the Virgin Lands Campaign. While these developments were not inevitable, especially in the specifics of how they were carried out, they do have deep roots, and the earlier work of imperial officials and their science gave the Soviets a firm foundation of infrastructure, knowledge, and imagination grounded in a settler colonial ethos of what the steppe was and what it could become.

In addition to its contributions to the history of Russia and Kazakhstan as well as the subfields of science and empire and science and the environment, this dissertation also explores the ways in which the colonial encounter on the Kazakh steppe and its accompanied development of steppe agronomy represented a particular brand of empire and field of study: settler colonialism. Settler colonial studies posits that these colonies were fundamentally different from other forms of colonialism and revolves around the ways settlement changed colonialism. While scholars of Central Asia have begun to address settler colonialism in the region, at present it is still rarely used as a primary lens of analysis. What is more, while some scholars refer to a settler colony and even sometimes use the phrase “settler colonialism” they

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typically do not engage with the theoretical ideas of settler colonialism that extend beyond
colonialism plus settlers.  

This dissertation seeks to make two main interventions in the discussion of settler
colonial studies. First, it emphasizes the usefulness and compatibility of settler colonial theory
with materialist approaches, and secondly, it seeks to make a claim for a particular type of settler
colonialism that is represented in the Kazakh steppe. Recognizing that settler colonial studies is
often centered in cultural history, my research seeks to bring in a more material angle. 

Grounding the story of settler colonialism on the Kazakh steppe in the physical changes to the
environment and society brought by agricultural science, this dissertation strengthens the
arguments of settler colonialism as a unique form of colonialism that is fundamentally about the
destruction of indigenous peoples in the service of empire and the privileges of settlers.

This material approach also contributes to the small body of research on Central Asia that
seeks to move beyond the lenses of Islam or nationality. While both played an important role,
focus on these aspects of society has dominated research in the region. This dissertation
addresses this shortcoming because in addition to settler colonialism, it engages with ideas

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23 Sunderland frequently refers to settlers and their particular attitudes, but does not use the term “settler colonialism” see: Willard Sunderland “Peasant Pioneering: Russian Peasant Settlers Describe Colonization and the Eastern Frontier, 1880s-1910s” *Journal of Social History* 34 no. 4 (Summer 2001): 895-922. However, he does see the story of the steppe as one of colonialism, though he often also uses the term, “imperialism” see, “The Ministry of Asiatic Russia: The Colonial Office That Never Was but Might Have Been” *Slavic Review* 69 no. 1 (Spring 2010): 120-150. Jeff Sahadeo is more willing to take on the colonialism and settlement, but he focuses on regions further south in modern day Uzbekistan, Jeff Sahadeo, *Russian Colonial Society in Tashkent* (Bloomington: Indiana University Press, 2007). Steven Sabol recognizes the similarities between the United States and the Kazakh Steppe as colonies, but refers to them with the problematic term, “internal colonization” instead, Steven Sabol, “The Touch of Civilization”: Comparing American and Russian Internal Colonization (Boulder: University of Colorado Press, 2017).


pioneered by environmental historians in Ottoman, North African, and Middle Eastern history. These historians and this dissertation do not ignore the role of Islam or nationality, but use environmental history to examine the interactions of society, politics, economy, and the environment in an Islamic colonial setting.

In order to examine these interactions it is necessary to uncover the hidden voices and intentions in the colonial environment. However, finding these hidden voices, deconstructing the effects context had on science, and identifying the deep ideological effect settler colonialism had on this story requires a critical lens. In addition to settler colonialism, this dissertation also utilizes an analytical lens grounded in technopolitics as described by Paul N. Edwards and Gabrielle Hecht as, “hybrids of technical systems and political practices that produce new forms of power and agency.” In this case, agronomy was just such a hybrid of systems and practices. However, it is sometimes difficult to identify this hybrid because it was often hidden and a colonial environment especially could give the appearance that “the realm of intentions and ideas seems to come first and… [controls and organizes] the nonhuman.” Therefore, it is necessary to interrogate the words and deeds of agricultural scientists in order to probe at their assumptions.

My own approach to technopolitics sees it as a basket of tools and technologies and their associated expertise that were both shaped by forces like capitalism, colonialism, the environment, and bureaucratic power while at the same time shaping and defining those forces as


well as the environment and people on the steppe, or at least attempting to do so, usually with mixed results.

However, the technopolitical lens is not only a lens for deconstructing and reading sources, it is also a chronological tool. Technopolitics is usually framed as a twentieth century phenomenon, especially the idea of a technopolitical state. Therefore, this dissertation tracks the development of technopolitical power across time. When the dissertation begins in 1881, the steppe was not yet the site of a technostate, in fact, even on the eve of the First World War when this dissertation ends, it is more apt to label the steppe as a nascent frontier technostate. The institutions that would make up this technostate were under development during the course of increasing settlement. As such, this dissertation fits within other approaches like Willard Sunderland’s ideas of trend toward a growing bureaucratic apparatus on the steppe that culminated in an eventual phase he called “correct colonization.”

However, while Sunderland and others have examined the steppe primarily through a political lens, this dissertation is focused on how political power and science were intertwined and developed in unison with one another simultaneous to the science that underpinned the settler colonial project being created. This instability of technopolitics driven by the dual nature of scientists as having political and administrative power while still having identities as scientists in part helps explain the difficulties and failures faced by imperial authorities on the steppe. Nevertheless, because of the certainty that settler colonialism provided as an ideology, this instability did not lead to those same scientist-administrators giving up on the dream and on the work. Therefore, the technopolitical project continued in spite of setbacks and failures and the ideology of grain-driven settlement continued to hold such promise that it outlived even the

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29 Sunderland, *Taming the Wild Field*, 177-222.
empire and Stalinist purges until it was implemented on a massive scale under Khrushchev. Nevertheless, it did not outlive the infrastructure created by the nascent technostate, nor—at least in people like the agronomist Sokrat’ Chaianov—did it always outlive the scientists themselves.

Beyond emphasizing a material approach to settler colonial history, this dissertation aims to begin to make a case for a particular type of settler colonialism that occurred as a global phenomenon in the late nineteenth and early twentieth centuries, which I term “grain-driven settler colonialism.” The Kazakh steppe in some ways serves as a case study for this phenomenon, but it is not only a case study, because the phenomenon was not one that occurred in several places as distinct developments. Instead, this phenomenon and intellectual framework is unique in part because it links these regions which existed as part of a global moment where ideas, people, and outcomes were shared across imperial borders.

In the late nineteenth century, several settler colonial states began a new phase of settlement. This new phase was centered around white settlement on arid and semi-arid lands that was built upon grain farming. This process was driven both by rapid industrialization that created a need to feed rapidly expanding cities, and also by an emboldened scientific class of agronomists and policy makers that believed they now possessed—and in many cases actually possessed—the tools to make grain agriculture profitable in previously uninhabitable environments. Regions as diverse as the High Plains in the United States and Canada, French North Africa, British East Africa, South Africa, Australia, the Pampas of Argentina, Siberia, and the Kazakh Steppe were all part of this process. As such they were all competitor nations who sought to entice and encourage settlers and compete on world grain markets for dominance.

especially in wheat.\textsuperscript{31} Yet they were also simultaneously sharing knowledge about how to develop irrigation, dry farm, battle locusts, drill wells, and even share crop varieties from across the globe.\textsuperscript{32}

In a similar way to how Daniel Hedrick and others argued that technological changes drove the scramble for Africa as diseases could now be battled and steam transport could move goods and people; the science and technology of applied agronomy were part of what made this grain-driven settler colonialism possible.\textsuperscript{33} However, this was not simply a technological determinist story. While technology made it possible, the implementation and creation of this technology and science was driven by the impulses and ideologies of settler colonialism that sought more than just taking of land, but also the establishment of market relations, and what Veracini described as an attempt at, “constituting an exemplary model of social organization” in the form of “correct” land use.\textsuperscript{34} What is more, settler colonial ideas were not only encouraging while science was enabling, the two were actually working iteratively in these new arid environments to create new knowledge to enable settlement and agricultural change. It is therefore impossible to separate out the settler colonial experience and ideas from the science that was created to help settlement along because these processes were simultaneous.

Settler colonial spaces were also not only sites of creating knowledge, if they were to work, they needed to also be sites of science popularization. Agronomists had to convince settlers to adopt the practices they recommended. All of these regions were also sites to varying

\textsuperscript{31} On one axis of this competition and trade see, Carl E. Soldberg \textit{The Praries and the Pampas: Agricultural Policy in Canada and Argentina, 188-1930} (Stanford: Stanford University Press, 1997). A crucial early influence on thinking about the global and local nature of this development is Jacob Raymond Seitz, “A History fo the Samia Location in Western Kenya, 1890-1930” (PhD diss., West Virginia University, 1978).

\textsuperscript{32} For example see, Maya Peterson, “US to USSR: American Experts, Irrigation, and Cotton in Soviet Central Asia, 1929-1932 \textit{Environmental History} 21 no. 3 (July 2016): 442-446.


\textsuperscript{34} Veracini, \textit{Settler Colonialism}, 8-9.
degrees and success of agricultural extension work, even if it was not always called by such a name. However, the fact that this popularization work was conducted by scientists who were themselves new to working in these environments—and therefore, not entirely experts—meant that this popularization faced significant challenges.

While this dissertation posits the idea of grain-driven settler colonial settlement as a new global phase, it does not seek to create a massive comparative study of these regions. Instead, it focuses on just one of these regions and connects the processes that occurred there to this global story both by focusing on individuals whose work and ideas crossed international boundaries, and by reflecting on the similarity of impulse, and—perhaps just as important—outcomes. In many ways the Kazakh steppe is not even the most exemplary example of a region of this phenomenon. Nevertheless, while none of these regions succeeded or failed to the same degree or in the same ways, the scientists who were part of this process were all engaged in a global project that on the whole transformed all of these regions as well as the nature of the global grain trade which not only supplied urban areas with the food they needed to grow and continue industrial expansion, but also which underpinned the very creation of capital to build factories and mills.

Therefore, the Kazakh steppe is not simply a case study that illustrates how similar things were happening in other regions. In some ways it is instead helpful to think of this dissertation as framing a new region made up of all the grain-driven settler colonial environments, and to think of the science created on the steppe as both local and also part of the knowledge that enabled

increased settlement in other regions. This was true whether referring to steppe native Boris
Uvarov who went on to work on the problem of locusts in the British Empire, or the varieties of
wheat or alfalfa that came from Central Asia and collected by Russian agronomists and then
were planted in the United States and Canada.\textsuperscript{36} The boundaries between these empires are clear
and real, yet, analyzed from this angle, the boundaries between the Kazakh Steppe and the
Pampas become less important in certain cases than the boundaries between Manitoba and
Toronto. Therefore, rather than focusing on comparison, this dissertation focuses on the linkages
of the Kazakh steppe and its developing settler colonial agronomy with other settler colonial
regions and understands the Kazakh steppe as both unique and also as a part of larger holistic
phenomena of grain-driven settler colonialism.

In spite of this attempt to reframe the boundaries of a grain-driven settler colonial world,
there were real boundaries on the steppe as well. However, this dissertation, like the indigenous
Kazakhs, does not always respect those boundaries. Nevertheless, some general outline of the
administration of the steppe is useful. Before the Russian empire began penetration of the steppe
beginning in the eighteenth century, most of what is today Kazakhstan was occupied by nomadic
Kazakhs who kept herds of mostly horses and sheep, and made long range migrations in search
of seasonal pasture. However, they did not wander in the steppe, the patterns were coordinated
by kinship groups. The largest groupings of the Kazakhs were the three zhus (sometimes called
hordes). The Uly Zhus (Senior Zhus) occupied the lands to the south, the Orta Zhus (Middle
Zhus) lived in lands of most of modern day central and eastern Kazakhstan, and the Kishi Zhus

\textsuperscript{36} A. A. Fedotova and A. V. Kouprianov, “Archival Research Reveals the True Date of Birth of the Father of Locust
Russians’ Steppes: The Introduction of Russian Wheat on the Great Plains of the United States of America” \textit{Journal
of Global History} 3 no. 2 (July 2008): 203-225.
(Junior Zhus) nomadized on lands in the west of modern day Kazakhstan. During the period discussed in this dissertation, the Kazakhs still lived on these same lands.

Imperial authorities were ambivalent about supporting or suppressing peasant settlement up until the early years of the twentieth century. In fact, most settlers to the steppe may have been illegal settlers who the government sometimes tried to hinder, and other times supported even if the settlement was officially illegal. This illegal settlement was coupled with legal Cossack settlements that established military fortification lines and Cossack villages along the edges of the steppe in an attempt to surround the Kazakhs. The first official law that governed peasant settlement in the steppe region were called the *Temporary Rules for Resettlement* which were created in 1881. By 1889, the government issued another reorganization to regulate the flow and settlement of peasants to the region called the Resettlement Act. This act officially designated Akmolisk, Semipalatinsk, and Semirechye, three steppe oblasts (regions), as sites of peasant settlement. In 1891 Turgai and Uralsk oblasts were added to the list.

The governance of these regions is complicated because they did not constitute a single region in the thinking of the Russian empire as a whole in terms of governance. Instead, the region was divided between the Steppe Governor-Generalship (Akmolinsk and Semipalatinsk) and the Governor-Generalship of Turkestan (which included Semirechye and the rest of Russian Central Asia).\(^37\) Turgai and Uralsk were not a part of either Governor-Generalships. Each oblast was then divided into *uezds*. However, there were other different administrative levels as well, such as *volosti* that were an attempt to establish administrative boundaries for nomadic Kazakhs, as well as lands of the Cossack Hosts that were not officially part of the regular administrative divisions. The situation was complicated even more as the Resettlement Administration grew in

\(^37\) Semirechye was briefly part of the Steppe Governor-Generalship.
size, and began to serve as a kind of government within the boundaries of official administration. Therefore, agronomic aid on the steppe could, at different times, come from the level of governor-generalship, oblast, uezd, volost, Cossack host, resettlement district, or even the Trans-Siberian Railway Commission. It was complicated and often led to work being duplicated or not done by anyone as responsibilities were not always clear. Therefore, rather than focus on particular aspects of administrative-level agronomic work, this dissertation attempts to get a sample of the diverse providers of agronomic work and attempt to understand them as a group. This is a complicated project, but also, given the frequent personnel exchanges between different levels and types of government administration, some clear values and processes being to emerge.

This dissertation comprises six chapters that trace how agricultural science developed and changed the steppe while simultaneously being developed and changed by the settler colonial environment of the steppe itself. Chapter 1, “Steppe School” focuses on the early attempts by bureaucrats and agricultural scientists to transform the steppe by training young Kazakh boys in the basics of agricultural science and sedentary agriculture. This project proved more difficult than first thought due to resistance of Kazakhs, and eventually was modified to include the children of Cossacks and later Russian peasant settlers. While the schools attempted to remake the students, in the end they were more effective as means of expanding the reach of agricultural scientists into the steppe. They also created an opportunity for the agronomic bureaucracy to learn about the new environment, conduct experiments on crop varieties and growing practices, and served as early sites of agronomic outreach.

Chapter 2, “Experimental Fields” describes the growth in the numbers and work of agricultural specialists who arrived on the steppe following waves of peasant colonization beginning in the 1890s. It examines the work of this new bureaucracy not only at the level of
policy in St. Petersburg, but on the steppe itself. It is especially focused on telling the story of how the bureaucracy and its science did not come fully formed to the steppe, but was rather created there, and was therefore intimately tied to and influenced by the ideas and ideology of settler colonialism. This chapter concentrates on the work of Sokrat’ Chaianov at the Timiriazev Experimental Field to explore the process of how science developed on the steppe. It also establishes a continuity through Chaianov’s work on the steppe 1907-1911 with his later role in Khruschev’s Virgin Lands Campaign in the 1950s.

Chapter 3, “Grazing the Steppe” examines the plans and projects of agricultural scientists and bureaucrats to turn the steppe into an exporter of animal products. However, the focus of these plans was not always on encouraging better nomadic husbandry or expansive ranching. Instead agronomists often centered their efforts on building sedentary mixed dairy farming and sought improved dairy stock, feeding, and care practices. This chapter concentrates on the difficulties agronomists faced in establishing dairy cooperatives and illustrates how the ideas and cultural values of settler colonialism often created un-scientific and culturally chauvinistic notions of what made “good agriculture.”

Chapter 4 “Planting the Steppe” describes imperial, peasant, and Kazakh attempts to grow grain in the steppe. It focuses on projects that encouraged planting imported wheat varieties and their associated difficulties. It also examines the competition wheat received from other indigenous crops like millet that were better adapted to the steppe environment, and how agronomists reacted to the challenges posed to their authority by these crops. This chapter also centers the role of global grain markets in the assumptions of scientists and discusses how the steppe was part of the growth of the Russian Empire as a grain producer and examines the environmental implications of these assumptions.
Chapter 5 “The “Plague” of Aridity” explores the challenges of practicing agriculture in the arid steppe environment and what effects this had on the work and thinking of agronomists. It is focused especially on the hydrotechnical work of the Resettlement Administration and sees irrigation projects as a chance for imperial authorities to inscribe their narrative of modernity on the steppe environment in a very tangible way. However, this chapter also illustrates how the quest for water was also about disease and links the search for clean water with the fears and realities of the global spread of diseases like cholera. Ironically, the threat of these diseases was continually increasing due to the further penetration of market ties. In addition there was an increase in settlers from regions near the Black Sea ports that were often sources of cholera outbreaks in European Russia.

Chapter 6 “The Technostate vs. the Locust” examines attempts to solve the critical threat of locusts. It traces the changing methods of locust control from physical control practiced by settlers that imperial authorities absorbed into their cannon by “scientizing” them much as they had done with irrigation technologies. It then describes the failed project of biological control of locusts through bacteria, a project that did not see widespread adoption but that illustrates the steppe’s role in a global network of scientists. This signaled a change in scale for the empire as it sought eradication of the locust instead of the amelioration of the problem. Biological control experiments on the steppe were conducted in consultation with the biologist Konstantin Merezhkovskii. His connections to global research in locust control with scientists in Argentina, Algeria, and at the Pasteur Institute in Paris tells an important story about this peripheral region’s interconnectedness with a global network of scientists.

The chapter concludes with the large spraying campaigns on the eve of the First World War as the highest expression of the nascent frontier technostate that built on the developments
described in earlier chapters. In order to protect newly important wheat crops from locusts, this project, led by agronomists, sprayed thousands of acres with pesticides imported via newly constructed rail networks (that also exported the grain that the pesticides protected), and reached into every local community in the region through relationships with local village headmen and progressive farming elements. This apparatus and the corresponding reordering of knowledge, people, the environment, and economics served as an important precursor to later Soviet projects. Furthermore, the survival of much of the infrastructure, personnel, research, and assumptions made the steppe fertile ground for Soviet projects of Stalinist Collectivization and the Virgin Lands Campaign.
CHAPTER TWO: STEPPE SCHOOLS

In 1907, N. Krishtofovich, an agronomist working for the Governor Generalship of the Steppe, was tasked with making an inspection tour of the nine agricultural schools located in the region. During a tour that covered nearly 3,500 verst, he encountered a wide array of successes and failures. Some schools had well-kept buildings and others contained falling-down classrooms. Some housed well-tended farms and gardens and at others there were little more than weeds where crops should have been growing. He even found one school that “only existed on paper.” When visiting the school in Atbasar and inspecting a weed patch where the school wheat fields had been planted, a pupil asked him, “What are we supposed to do if they teach us one way in the classroom and in the fields they do things entirely differently?” Krishtofovich had no answer for the boy, but the interchange reflects the contradictions and challenges inherent in the creation and administration of lower agricultural schools in the unfamiliar environment of the Kazakh steppe.

More broadly, the project of agricultural schools also represents the contradictions and challenges of Russian imperial agronomists’ attempts to deploy agronomic knowledge and expertise as a technology of power on the steppe in spite of their limited knowledge of the region. Experts like Krishtofovich might have had significant scientific training, but their experience with farming in the steppe environment, even as late as 1907, was still limited. However, this limited knowledge did not hinder the imperial agronomic bureaucracy from

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38 1 verst equals .66 miles
40 Ibid., l. 14,
establishing these schools—meant to teach the basics of farming to students, Kazakh and Russian alike—on the steppe already in the 1880s.

While schools like the one in Atbasar were largely considered to be a failure by the time of Krishtofovich’s report, they also played an important role as sites of information gathering about a new environment and informed the agricultural bureaucracy about the challenges faced when attempting to practice scientific farming on the steppe. Although they were conceived and deployed as sites of remaking and science popularization, they were in fact more effective as places of knowledge creation and experimentation. Agricultural schools were an important early phase in the construction of the scientific knowledge infrastructure that officials hoped could exploit the steppe and bring it more fully into both the world capitalist system and the Russian Empire. In other words, they represent an important material attempt to remake both the people and environment of the steppe so that they might better serve the aims of the empire. Therefore, in spite of their failures, they are important for what they can tell us about the ideologies underpinning the steppe settler colony and how they actually functioned on the ground.

The story of the creation and administration of these schools does not illustrate simply the introduction to the steppe of a fully formed agricultural science and its related ideologies. Rather, this science and these ideas were formed on the steppe simultaneous to attempts at their popularization. Therefore, their study can shed light on an important aspect of the history of

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41 There is a large amount of research on the connection between science and technology and colonialism, one of the first works to focus on this connection is Headrick, *Tools of Empire*. In the Russian imperial context much of this type of study has focused on ethnography, two particularly important works are: Knight, “Science, Empire, and Nationality” and Hirsch, *Empire of Nations*.

science in the late Russian Empire. As such, it contributes to the debates about the connection between civil society and agricultural science in the late imperial period. Many of these debates have centered around whether the state or civil society was the catalyst for scientific development. Others have discussed whether the center or periphery was more important in the growth of Russian science. This chapter—and dissertation more broadly—seek to illustrate how in the steppe at least, previous frameworks about the creation of agricultural science are not always as useful as they might be in some other regions of the empire. Instead, it seeks to examine the creation of science on the steppe by grounding the discussion in the reality of how settler colonialism—both as a physical presence and an ideological framework—drove the creation and administration of agricultural schools and imbued the scientific research they conducted and popularized with a settler colonial ethos.

However, agricultural schools were not only made up classrooms, farms, and curriculum. They were also composed of students, and in the early days of the schools, Kazakh students were the primary—and sometimes the only—target. Examining lower agricultural schools on the steppe through the lens of what they meant for Kazakhs adds to our understanding of Russian rule over Muslim subjects in the steppe and can add context to broader debates about the

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43 The two most important overviews of this topic are: Alexander Vucinich, *Science in Russian Culture* and Graham, *Science in Russia and the Soviet Union*.
45 Olga Elina makes this one of her central criticisms of Graham and Vucinich in Elina, “Between Local Practices and Global Knowledge”.
46 Alexander Morrison similarly showed that because of the realities of settler colonial citizenship operated in a different way in Turkestan, Alexander Morrison, “Metropole, Colony, and Imperial Citizenship in the Russian Empire” *Kritika: Explorations in Russian and Eurasian History* 13 no. 2 (Spring 2012): 327-364.
disputed colonial nature of the Russian Empire’s involvement in Central Asia and its reliance on racial and ethnic difference.\textsuperscript{47}

**Steppe Study and the Creation of Settler Colonial Science**

Lower agricultural schools were one of the earliest opportunities for imperial agricultural scientists in the steppe to actually farm according to their own methods. This is especially significant because in 1887, the year the first agricultural schools opened, imperial officials still lacked detailed information on steppe environments and on how well or poorly certain crops, animals, and plants weathered the steppe. However, the schools were not founded as sites of experimentation, instead they grew into that role due to their physical existence in a colonized environment.

Although some schools like the Zaisan Kazakh Agricultural school were founded under their own rules and guidelines, eventually all agricultural schools on the steppe came under the category of lower agricultural schools ostensibly under the imperial ministry responsible for agriculture.\textsuperscript{48} These agricultural schools, whether on the steppe or in European Russia, were founded to teach pupils (usually Russian peasants) in both the practical and theoretical aspects of agriculture along with basic reading and math. In order to teach practical agriculture every school was supposed to have a school farm where students could learn and practice agriculture according to scientific standards. It was these farms that would serve as the basis of an important process of experimentation, adaptation, and eventual science popularization on the steppe.

\textsuperscript{47} For debate about what role Orientalism and by extension race played in the Russian Empire see: Adeeb Khalid, “Russian History and the Debate Over Orientalism” and Nathaniel Knight, “On Russian Orientalism: A Response to Adeeb Khalid” *Kritika: Explorations in Russian and Eurasian History* 1 no. 4 (Fall 2000): 691-715.

\textsuperscript{48} The Russian Empire had a shifting and complex and hierarchical collection of different types of schools. The “lower” (sometimes translated as “elementary”) in this instance refers not to the age of students, but to it being the type of school intended for farm laborers and farmers instead of those who might manage larger estates or work in government. Those students would attend either secondary agricultural schools (of which there were 15 in the whole empire by 1917) or higher agricultural schools (neither of which existed on the steppe). W.S. Jeisen, *Secondary Agricultural Schools in Russia* (Washington: US Government Printing Office, 1917), 10.
In 1887 however, one of the first agricultural schools to open on the steppe, the Zaisan Kazakh Agricultural School did not have a farm. This school had a more specific focus than most schools as its stated purpose was the “dissemination of agricultural knowledge among the Kazakh population.” Instruction was supposed to take two years with a possible supplementary year, and was open to any Kazakh boy of good health aged between ten and eighteen years old. It was to carry out this task through a mix of practical and theoretical learning. Practical learning was to take place on the school’s farm, where during the summer months students were expected to work and learn how to use farm machinery and modern farming practices. The theoretical learning was to take place in a regular classroom and included rudimentary subjects like basic math and science as well as Russian language.\(^{49}\) However, it took nearly a year after opening (March 1888) before the school was able to secure a farm location 12 versts from the school building in town. The land itself was located between the Vyusen’yu and Bitpak-su rivers, however, it was not irrigated.\(^{50}\) On April 12 the students and teachers moved to the new farm site and began conducting “practical classes” on irrigation, plowing, and planting.\(^{51}\)

For all agricultural schools like Zaisan, securing land was the first step in establishing a school farm, and the process was often time consuming. It was unclear who was responsible for supplying the land, whether they should choose the best land, or simply take what was available, or if the school should even pay for it. Even in the 1880s, especially in more humid regions of the northern steppe that were quickly filling up with peasant settlers, good land was sometimes hard to come by. For example, in Pavlodar, which was already the site of significant peasant settlement by the late 1880s, school officials selected a 1,000 desiati\(^{52}\) piece of land because it

\(^{49}\) TsGARK f.64, op.1 d. 6083a, l. 25, “Otchet o Zaisanskoj kirghizskoi sel’skokhoziaistvennoi shkole, 1889.”
\(^{50}\) Ibid., l. 1.
\(^{51}\) Ibid., ll. 22.
\(^{52}\) 1 desiati equals roughly 1 hectare or 2.47 acres.
was neither particularly good or bad. Reports described it as having a “steppe character” with good soil and a good well, and it was previously the site of Kazakh pasture. Therefore, it had good potential, but was not yet improved. This location was specifically selected because officials wanted to show what proper agricultural methods could do on a regular piece of land.  

School officials in Pavlodar recognized that at least part of their role was to improve peasant settler agriculture since schools were meant to serve those living in their environs. Nevertheless, it was not peasant settlers who were expected to front the capital for this investment in the future. Instead the land was taken from Kazakhs. There were nine agricultural schools eventually established in the steppe, and potentially thousands of good Kazakh pasture lands were taken for the creation of schools. Importantly, these schools were neither sought after, nor particularly well received by most Kazakhs. While this was not the only or the grossest injustice done to the Kazakhs in the Russian pursuit of a steppe settler colony, it was significant, and it reflects how even something as benign as schools came at a cost in the settler colonial environment.

Breaking ground and planting for the first season at Zaisan in 1888 was completed under the supervision of the school head, Ignaitii Mikhailovich Lisovskii. Lisovskii had finished a course at the Gorygoretskaia Agricultural School and then worked for several years on the estates of the nobleman L. D. Viazemskii in European Russia. He then completed a practical course in agriculture. On paper, Lisovskii had impeccable credentials with both a practical and theoretical background in agriculture. However, he appears to have had no experience with dry environments like the one in Zaisan, and in its first years under Lisovskii, the school struggled

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53 TsGARK f. 64, op. 1, d. 6084a ll. 1-3. “Otchet Pavlodarskoi sel’sko-khoziaistvennoi shkoly, 1892.”
54 Today the Goregoretskaia school is the Belorussian State Agricultural Academy.
55 TsGARK f. 64, op. 1, d. 6083a, l. 26.
because of this shortcoming. While the land taken from the Kazakhs in Pavlodar was eventually turned into a somewhat profitable school farm, the same cannot be said for Zaisan. The Zaisan region is in the far East of Semipalatinsk Oblast, and the town is less than 50 miles from the Chinese border. It is also significantly drier than other steppe regions. In the early days of the school, officials at Zaisan spent significant time deciding whether the region was more similar to the irrigated regions to the south or if it was suitable for un-irrigated agriculture like regions to the north. Eventually school officials recognized that agriculture would be impossible on the Zaisan farm without irrigation, however, they did so only through much trial and error, that was funded with government taxes.\(^\text{56}\)

After securing a location for the farm, the next question was what to plant. In spite of the fact that several showed significant independence, the heads of lower agricultural schools were given directives by the agronomy section of the Governor Generalship about what to plant. These represent one of the first opportunities for the relatively small agronomic staff at the Governor Generalship to gain systematic information on what plants grew well across a broad cross section of the massive steppe region. However, these directives also reveal that the agronomic section was not simply a group of objective scientists that were only curious about what plants grew best in the steppe. Instead, they came to the steppe with plans to transform it.

The prescriptive directives illustrate how even several decades before the expansion of the agronomic bureaucracy under the Resettlement Administration, officials showed an overwhelming preference for grain farming. Instructions from the agronomy section told school farms to plant five desisatins each of spring rye and wheat as well as four desiatins of oats and one desiatin of millet. The remaining area was supposed to be planted with $\frac{1}{2}$ a desiatin of

\(^{56}\) TsGARK f. 64, op. 1, d. 6083a, ll. 73-76.
potatoes, one *desiatin* of buckwheat and less than a half *desiatin* of peas.\(^{57}\) The fact that officials were uninterested in prioritizing the planting of fodder crops demonstrates how focused officials were in transforming the steppe into a particular kind of agricultural zone in spite of already mounting evidence that the steppe (especially in dry regions like Zaisan) would not easily become a grain producing region.\(^{58}\) Lisovskii did report planting some pasture and fodder crops; however, he argued that caring for them took precious water away from grain crops and therefore he was opposed to giving them too much focus. Instead, the school cut some hay from wild grasses and let the livestock graze on the open steppe.\(^{59}\)

However, a preference for grain crops did not signify a partiality toward all grains. Officials encouraged an overwhelming focus on particular types of grain crops that were not always well-suited to the steppe environment—wheat and rye. Interestingly, this was not necessarily because they fetched a higher price in the region. In fact, at Zaisan in 1889, the one grain crop that showed significant promise—millet—was relegated to only 1/5 the area officials wanted to dedicate to wheat or rye. This occurred despite the fact that in the second year of the school farm, millet brought in twice as much profit on just half as much land as did wheat. It should be noted that by the second year, either because of the inability to get seed or because school officials recognized the profits to be made with millet, the plan from the agronomic section was not carried out. Instead, the farm only planted just under 4.5 *desiatins* of wheat, almost two *desiatins* of barley, two *desiatins* of oats, lesser amounts of buckwheat, peas, flax,

\(^{57}\) TsGARK f. 64, op. 1, d. 6088 ll. 3-4, “Materialy Zaisanskoi sel’sko-khoziastvennoi shkoly”, September 1894-February 1900.
\(^{58}\) For discussion of the debates taking place in Russian science about the limitations of planting grain in arid steppe regions see, David Moon, *The Plow That Broke the Steppe: Agriculture and Environment on Russia’s Grasslands, 1700-1914* (Oxford: Oxford University Press, 2013), 89-166.
\(^{59}\) TsGARK f. 64 op. 1, d. 6083a. ll. 9-12.
hemp, corn, and clover, and 2.5 desiatins of millet.\textsuperscript{60} In spite of the difficulties in growing wheat, the farm planted several acres of it every year and nearly every year yielded a poor crop.\textsuperscript{61}

In addition to directives on how much and which crops to plant, school officials also were tasked with reporting on the school in a very regimented format that was dictated not by officials in Omsk, but by those in St. Petersburg who set reporting requirements for all lower agricultural schools.\textsuperscript{62} In spite of—or perhaps because of—the challenges of an unfamiliar environment Zaisan became a significant experiment site, an impulse exhibited at other lower agricultural schools. Although apparently not required by the agronomy section, under Lisovskii’s direction the school planted orchards of apples, pears and by the second year plums and cherries. What is more, the varieties they planted were not local unimproved varieties but were the best varieties available from the Petrovskii Agricultural Academy in Orlovsk.\textsuperscript{63} In addition, there were plans for planting forest trees to supply wood for heating and building.\textsuperscript{64}

Lisovskii’s interest in fruit was not only due to his curiosity as a scientist, and his focus on these crops illustrates how it was sometimes difficult to untangle what drove steppe agronomists to ask certain research questions over others. Although the school’s fruit trees had not yet been in the ground a year, by 1889, Lisovskii was already promising a “great future” for orchardry in the entire Zaisan region. While he believed climatic conditions were well suited to orchards, he also felt that “economic conditions were no less favorable.” Lisovskii pointed out that while it was close to the Zheti-Su (Semirechye) region where fruit trees grew very well,
there were no easy transportation routes linking the two regions so they were not in competition. He believed the Zaisan region had the advantage of being linked via the Irtysh River to other regions further north such as the Irtysh valley and Siberia where fruit growing was more challenging, yet which had seen large amounts of recent peasant settlement. Lisovskii’s vision for regional linkages and agricultural specialization predated by nearly three quarters of a century more famous plans by the Soviets.

The influence of economic considerations on the choices surrounding scientific experimentation in agricultural schools was not limited to the question of orchards. In the same report, Lisovskii discussed how the school farm should operate on a profit-driven logic that should be copied by farmers in the region. From the first year of operation, school farms were supposed to keep meticulous records about costs and profits. This was in part because while schools did receive government funding, the goal was for them to be self-supporting, and officials hoped the farms and workshops could pay for the schools’ upkeep. Lisovskii was particularly fastidious in his record keeping. He included costs for seed, equipment, labor, and irrigation. In the first year of operation, he appeared surprised that in spite of a late harvest, frosts, and pest damage the school farm made a profit of 131 rubles. He also noted that one of the biggest expenses—the digging of irrigation ditches—would not be necessary at most other schools.

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65 Interestingly, apples are believed to have originated in the Zheti-su region near modern day Almaty. Sean Adams, “Roots: Returning to the Apple’s Birthplace” Agricultural Research 42 no. 11 (Nov. 1994): 18-21.
66 TsGARK f. 64, op. 1, d. 6083a, ll. 16-17.
67 While the Virgin Lands Campaign was focused on land in Siberia and Kazakhstan, it was because it was hoped these lands could be turned into wheat growing regions to replace historic wheat regions in the Black Earth, which Khrushchev hoped would be able to specialize in growing corn for animal feed. See, McCauley, Khrushchev and the Development of Soviet Agriculture.
68 TsGARK f. 64, op. 1 d. 2803, l. 48. “Preobrazovani kirgizskii internatov sel’sko-khoziastvennyi wkol’ v oblastah Stepnoi general-gubernatora”, 1883-1893.
69 TsGARK f. 64, op. 1 d. 6083a, l. 5.
While Lisovskii included a surprising number of costs in his calculations such as machinery and livestock repayments over time and projected depreciation of irrigation works, his report is interesting for what it did not include. Most notably, it included no calculation for the cost of land which had been allocated to the school. The categories that Lisovskii was supposed to use to calculate the costs of the farm were included in standardized directives for all lower agricultural schools throughout the empire. Based on only the required categories, Lisovskii found the farm made a profit of 334 rubles, however, this did not include costs for hired labor, irrigation ditches, or equipment and livestock rental. That no one in the empire-wide administration nor Lisovskii saw fit to calculate the cost of land is a significant oversight. While across the empire, it was perhaps assumed land would be donated or secured by local zemstva for lower agricultural schools, Lisovskii’s oversight also indicates a devaluing of Kazakh land.

Wolfe pointed to the centrality of land in settler colonialism when he wrote, “Whatever settlers may say—and they generally have a lot to say—the primary motive for elimination is not race (or religion, ethnicity, grade of civilization, etc.) but access to territory. Territoriality is settler colonialism’s specific, irreducible element.” However, once the settlers had the land, they quickly wrote previous indigenous habitation out of history.

Just as glaring as the lack of the cost of land is a lack of labor costs. Lisovskii did recognize the need to account for hired workers who dug irrigation ditches and who often actually planted the fields. However, missing in his account was the value of the students

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70 Ibid., l. 25. The area of the school farm had actually been given by a trustee of the school, A. N. Lisskie, but as he was not a Kazakh, it appears he acquired the land via government grant.

71 Ibid., ll. 3-4.

72 Zemstva were local organs of self-government that were created after the liberation of the serfs as part of the Great Reforms carried out under Tsar Alexander II. However, there were no zemstvo in the steppe region as they were under the military rule and the zemstvo regulations did not apply to these regions.

themselves. While this was likely something no agricultural schools were valuing, in the case of
the Zaisan school that was established especially for Kazakh boys, the assumption that their
labor was insignificant is notable. What is more, this lack of respect for the labor of the students
would continue to plague the school, because many Kazakh students felt that their labor was not
valued, and they therefore refused to work on the farms.

Inattention to labor is significant, because officials believed that population (specifically
labor) was one of the things most lacking in the steppe. Their conviction that underpopulation
was a problem was connected to a belief that the land was underexploited by nomads and by
extensive Cossack agriculture.\textsuperscript{74} Instead of focusing, as both of these groups did, on livestock,
officials hoped to turn the steppe into a grain growing region, which required significantly more
labor. Therefore, much of the experimentation conducted at agricultural schools, whether it was
by fruit enthusiasts like Lisovskii or not, was focused on wheat. Lisovskii attached great
importance and expended significant energy into test trials of wheat varieties during his first
seasons on the farm. In 1889, he planted three varieties of wheat, two varieties (churchinskaia
and chuchuchaksaia) that were soft, and one variety (chernokoloska) that was hard.\textsuperscript{75} He found
that the soft varieties grew faster but were more susceptible to rust disease and had a lower yield.
Therefore, he recommended the farm, and the entire Irtysh valley, should only grow hard wheat,
especially the chernokoloska variety.\textsuperscript{76} However, this did not mean he believed soft varieties
were ill-suited to the entire region. Instead, apparently because of its faster growth, he thought

\textsuperscript{74} On what officials believed were wasteful Kazakh grazing practices see P. Khvorostanskii, “Kirgizskii vopros
sviazis kolonizatsii stepi” Voprosy Kolonizatsii no. 1 (1907): 53-104. On criticism of Cossack agricultural practices
on the steppe see, TsGARK f. 64, op.1, d. 6083a, l. 22.

\textsuperscript{75} Soft wheat varieties grow faster, but usually have less protein and gluten, while hard varieties grow slower but
have higher protein and gluten contents.

\textsuperscript{76} This variety was also called arnautka and was a very popular export variety grown in South Russia in the second
half of the nineteenth century. Yu. Ianson, Statisticheskoe izsledovanie o khlebnoi torgovli v Odesskom raion, vol. 2
(St. Petersburg, Tipografia Bezobrazova, 1870), 129.
soft varieties were still well suited to the higher elevation mountain valleys.\textsuperscript{77} Due to the fact that the agronomy section had few other sources of information for how to grow wheat in Zaisan district, this advice from a well-trained agronomist who had lived in the region for less than two growing seasons became cannon for the entire region. The willingness to accept this advice illustrates how—in addition to undervaluing land and labor—agronomic professionals also often exhibited a patronizing attitude that undervalued local knowledge and overvalued their own.

While wheat was the main focus of Lisovskii and later school heads, it was not the only early experimental work carried out on school farms. In addition to the three varieties of wheat, he also tested spring rye, three varieties of oats, buckwheat, barley, and two varieties of millet in the first year. Additionally, he planted peas, flax, and hemp alongside a local variety of alfalfa from China, and five varieties of corn. He dutifully reported which varieties appeared to grow best, and all of this information was reported to officials at the Governor Generalship who previously had little idea what grew best, or even what average yields could be expected.\textsuperscript{78} Lisovskii also conducted experiments on the question of whether or not irrigation was necessary in the Zaisan region. The necessity of irrigation was only decided firmly for Lisovskii following a failed experiment which attempted to grow rye at higher elevations which had cooler temperatures and more moisture.\textsuperscript{79} While the main difficulty Lisovskii faced was aridity, there were several other challenges for school heads. In addition to plant diseases that probably were more prevalent because plants were stressed due to lack of water or poor fertilization, lower agricultural school officials also faced significant pest problems.\textsuperscript{80} For example, in 1892 the head of the Pavlodar school reported a very bad harvest, where half the crops were lost due to drought.

\textsuperscript{77} TsGARK f. 64., op. 1, d. 6083a, l. 5.
\textsuperscript{78} Ibid., ll. 5-6.
\textsuperscript{79} Ibid., ll. 73-76.
\textsuperscript{80} Ibid., l. 5
and the other half were destroyed by locusts. In a foreshadowing of things to come, he believed that he could solve the water problem, but did not believe there was anything that could be done about the locusts.  

The new and challenging arid environment and its associated pests was not the only difficulty school farms faced. Farms were often located far from major transportation networks. The steppe in the 1880s lacked significant transportation infrastructure as the railways that eventually connected the region were not yet completed. Transportation problems were a major difficulty Lisovskii faced in getting high quality root stock for his growing orchard and forest plantations. Similarly, the schools’ small budgets and transportation problems meant that the schools were often using old farm implements. For example, several years after the school in Zaisan opened, it was still plowing using a traditional and primitive sokha plow. Additionally, much of the sewing of grain was done by hand, harvests were completed using hand sickles, and there was rarely seed sorting and cleaning equipment available. In spite of these difficulties, school heads like Lisovskii usually carried out annual crop experiments and reported on them to their superiors in Omsk who would later use this information to attempt to aid, influence, and control the steady stream of peasant settlers who began flooding into the region beginning in the 1880s.

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81 TsGARK f. 64., op. 1, d. 6084a, l. 4. “Otchet Pavlodarskoi.”
83 TsGARK f. 64, op.1, d. 6083a, l. 60.
84 Ibid., l. 97
85 Ibid., l. 55.
Adaptation and the “Birth of Extension” on the Kazakh Steppe

While it is easy to view school administrations as hapless bureaucrats lost in a totally new environment with little practical farming experience, they often did make changes to adapt to their new surroundings. However, these changes often mimicked the nomads or the extensive and “wasteful” peasant and Cossack farms. What is more, as school officials grew in confidence, they began to see themselves as potential catalysts for science popularization and eventually began to play a role of a kind of agricultural extension service on the steppe in spite of the relatively primitive state of their own farms.

While as previously discussed much of the focus of school farms was on planting grain crops, officials did not entirely neglect livestock and pasture. Although grain was central, many also believed that proper farms in the region should eventually adhere to the ideal farm that was a mix of crops and livestock, especially dairy.  

Lisovskii was especially excited about the prospects for developing a cattle dairy industry in Zaisan. His calculations indicated that if a cow could produce 50 vedro of milk per year it could yield a profit of just over a ruble per year. However, he indicated that this was only possible with “Russian” varieties of cows or at least those crossed with a local Kazakh breed because Kazakh varieties did not yield enough milk. In spite of the fact that all steppe agricultural schools wanted to have improved livestock, even as late as 1907 the majority of animals on most school farms were local Kazakh breeds.  

This prevalence for mixed agriculture was not limited to the steppe, but was instead a global phenomena that saw intensive agriculture in countries like Denmark as the highest ideal. For discussion of this trend in America and its global reach see, Steven Stoll, *Larding the Lean Earth: Soil and Society in Nineteenth Century America* (New York: Hill and Wang, 2003).

It is important to make a distinction between cattle and horse dairy because the Kazakhs already were milking horses in significant numbers for household dairy.  

1 vedro is equal to roughly 3.25 U.S. gallons.  

TsGARK f. 64, op. 1, d. 6083a, ll. 10-12.  

TsGARK f. 64., op. 1, d. 6138, l. 21.
himself failed to acquire any improved dairy stock, and milk production at the Zaisan farm was usually between 30 and 50 vedro per cow.\textsuperscript{91}

In addition to relying on local breeds of livestock, agricultural school farms also practiced methods of animal feeding and care that were similar to local practices. Although school heads often reported on the need for proper shelter for livestock, during the first years of operation several schools had no barns for their animals.\textsuperscript{92} At Zaisan, Lisovskii mentioned this problem frequently in his reports, but was still unable to find the time, supplies, or labor to build livestock barns. What is more, officials rarely planted enough pasture to feed livestock, instead they typically let the animals graze on the steppe and the majority of hay for winter was cut from unimproved pasture of steppe grasses.\textsuperscript{93} At the Vernyi (now Almaty) School of Orchardry, one official was frustrated to report that while the school had nice gardens and orchards, livestock roamed free and damaged them because the school had no fences.\textsuperscript{94} These examples of problematic infrastructure and laissez faire management were rather hypocritical when considering frequent Russian criticisms of Kazakh and Cossack “extensive” agriculture.\textsuperscript{95}

The fact that at most schools like Zaisan, the school and farm were not located in the same place was a frequent concern of officials.\textsuperscript{96} The distance between the farm and classroom building meant that the school year was divided into two parts, summer and winter. During the

\textsuperscript{91} TsGARK f. 64, op. 1, d. 6083a, ll. 62-63.
\textsuperscript{92} At the Ust-Kamenogorsk school while they had barns and corals, by 1907 they were in horrible disrepair. TsGARK f. 64, op.1, d. 6183, l. 24.
\textsuperscript{93} TsGARK f. 64, op.1, d. 6083a, l. 175.
\textsuperscript{94} TsGARK f. 64, op. 1, d. 6083, l. 128 “Otchet o deiatel’nosti za 1890 god. kopiia polozheniia s ob’iasnitel’no zapiskoi, smeti na postroiku zdaniia dlia uchilisha, shtaty I drugiia material’ Vernenskogo uchilisha sadovodstva,” 1884-1889.
\textsuperscript{95} Ibid., l. 9.
\textsuperscript{96} The power of the notion of what a farm should “look” like is a strong current in agronomist thinking on the steppe. See Judith Pallot also for the corollary of correct farming appearing to be a “rationalized landscape” that did away with dispersed peasant holdings in European Russia. Judith Pallot, “Imagining the Rational Landscape in Late Imperial Russia” \textit{Journal of Historical Geography} 26, no. 2 (2000): 273-291.
winter months students lived at the school in town and attended classes that addressed the “theoretical” side of their education. In winter, rather than travelling between the school and farm every day, the entire school simply moved and lived on the farm. Zaisan was not alone in this practice. For example, at the Kopal Agricultural School’s farm, during the summer months, students and teachers—the majority of whom were ethnic Russians—lived in yurts on the farm property. That this transience (or perhaps even nomadism) occurred at a school that existed to encourage the greater adoption of intensive sedentary agriculture is an ironic and telling adaptation by Russian trained agricultural experts to the steppe environment.

However, even the association of a sedentary life with Russian agriculture, and nomadism with the Kazaks is too simple. Russian and Cossack peasant settlement had already begun to disrupt and block Kazakh migration routes, and this process only continued in severity as peasant settlement increased. Although the land taken for the school farm in Pavlodar was reportedly pasture, at Zaisan the farm occupied land that had previously been used by Kazakhs for sedentary agriculture. While he decried Kazakh nomadism in one sentence, in the next, Lisovskii freely admitted that the land that the school farm was located on had been farmed and irrigated by the previous Kazakh proprietors. However, because they did “not value” the land, they had given up and moved to China five years before the school acquired the property.

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97 TsGARK f. 64, op.1. d. 6083a, l. 99.
98 Rossiiskii Gosudarstvennyi Istoricheskii Arkhiv [Russian State Historical Archive] hereafter referred to as RGIA. RGIA f. 382 op. 10, d. 108, “Ochety Pishishkekskoi i Kapol’skoi nizshikh s. kh. shol Semirechenskoi obl. za 1913-1914.”
Nevertheless, admitting the land had previously been farmed was not the same as admitting that the school was largely copying Kazakh agricultural practices, which it appears Lisovskii also did. The site of the school farm was traversed by a small stream, and the school built a dam at one end to collect water to fill up the small gulley that the stream ran through. They then constructed several smaller channels off the gulley to allow for the irrigation of fields. However, rather than using modern dam building and irrigation methods that involved mathematics and blueprints, and rather than constructing the dam of concrete, the dam and the feeder canals were built out of brush and swales in ways that appear very similar to local irrigation practices. In fact, it seems likely that the school simply reconstructed the irrigation works that the Kazakhs who had farmed the land had left behind. However, the dam and irrigation channels were now part of the Russian scientific approach to agriculture even if they differed little in construction, conception, or application from the earlier Kazakh irrigation works.

While school officials had high hopes that they would succeed where the Kazakhs had failed, due to their perceived backward agricultural practices and “not valuing” the land, their experience was less triumphant. For the duration of the school’s existence, the farm site was constantly plagued by a lack of water and crops suffered. However, this was not because the site was ill-suited to irrigation. Instead, it appears the farm was robbed of most of its water by a nearby Cossack settlement that took more than its share of water from the incoming source. The Kazakhs, therefore, failed in their previous attempts to farm the area not because of their

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101 Ts GARK f. 64 op. 1 d. 6083a l. 2.
102 In Turkestan, Maya Peterson found a similar instance where the Murghab Estate in began construction on a dam in 1888 to irrigate “empty” land in the same spot where earlier the Sultan-Bent dam had stood centuries earlier. Maya Peterson, “Engineering Empire: Russian and Foreign Hydraulic Experts in Central Asia, 1887-1917” Cahiers du monde russe 57 no. 1 (2016): 129.
103 TsGARK f. 64, op.1, d. 6083a, l. 172.
lack of knowledge but instead because of a colonial order that privileged Cossacks over Kazakhs.  

School farms were not only sites of experimentation and adaptation, they were also one of the first significant attempts to disseminate knowledge and popularize modern scientific farming on the steppe. While students were one of the targets of schools as sites of demonstration, they were not the only ones. Within the first years of the founding of the school farm at Zaisan, Lisovskii was already planning how to develop the farm into a good example for the local populace. He hoped that Kazakhs would come to the farm, see how productive and rich it was, be amazed by the advanced machinery, and want to go home and start farming themselves using the newest methods.

Lisovskii believed it was likely that Kazakhs would take up some sedentary agriculture even before they completely gave up nomadism. In this regard he was correct, as many nomads continued to practice nomadism while cutting hay for winter feed. However, Lisovskii thought that the change would come through the school garden, provided it could supply a healthy amount of vegetables to the students. The students would then learn to like these vegetables and share them with their parents who would also recognize their profitability. While confident in the power of vegetables to convert the Kazakhs to sedentary agriculture, Lisovskii was still worried that the Kazakhs also needed to learn about the profitability of all other types of agriculture besides livestock raising. Interestingly, these ideas were not based on the proclivities of Kazakhs and settlers which Lisovskii was well aware of. He himself noted that the reason fruits and vegetables fetched such a high price was because there was so little Russian settlement in the

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104 On the wasteful practices of Cossacks in another imperial periphery see, Thomas M. Barrett, “‘The Land is Spoiled by Water: Cossack Colonization in the North Caucasus’” Environment and History 5 no. 1 (February 1999): 27-52.
105 TsGARK f. 64, op. 1, d. 6083a, l. 8-9.
region. It is likely that if settlement increased as Lisovskii hoped, Kazakhs would most likely be at a comparative advantage if they ignored his advice and focused on raising horses which they were already quite good at rather than raising unfamiliar vegetables, which is what most Kazakhs did.\(^{106}\)

In addition to the school garden as a demonstration and dissemination site, Lisovskii also hoped the school could be part of a municipal herd of improved cattle.\(^{107}\) This would allow the school to begin a breeding program where local unimproved cattle could breed with the improved varieties and the entire region could begin to develop a dairy industry. This idea and aim anticipated later attempts at developing a cattle dairy industry on the steppe by several decades. Similarly, Lisovskii hoped that his prized orchard plants could serve as the basis for a local nursery of improved rootstock to help develop the region’s fruit marketing potential.\(^{108}\)

Projects like these were relatively common at agricultural schools throughout the steppe region and were often included as part of their work in their reports as some kind of work to “spread the rational methods of afforestation, horticulture, and truck farming in the local population.”\(^{109}\) However, what “local population” meant was affected by where the school was located. In Vernyi where there was already significant Cossack settlement, school officials focused on outreach that they believed would help small Cossack peasant households. This meant that the school should not encourage growing hops and grapes as these crops were already grown in abundance on large private plantations between Vernyi and Pishpek (Bishkek).\(^{110}\)

Similarly, in places like Pavlodar that were already seeing significant peasant settlement,
outreach was focused on peasants even though there were still large numbers of Kazakhs in the region.

However, at Zaisan, officials could not ignore the fact that the school was founded to help Kazakhs. Therefore, beyond the goals of an orchard nursery and a municipal dairy herd, the school also had a program to give away corn and oat seeds as well as apple root stock to the local Kazakh *volosts* in the hopes of encouraging these types of sedentary agriculture.\(^{111}\) This appears to have been in part a continuation of an earlier program to distribute mulberry trees and silkworms to Cossacks begun by the governor of the Semipalatinsk region.\(^{112}\) School reports do not indicate how successful most of these programs were, so it is unclear what their actual effects were on local agriculture.

However, one program of free plant distribution did include some reports after the fact. In the first year of the school farm, Lisovskii ordered a trial of two potato varieties, an unimproved white variety with no name and an English early red potato. Lisovskii reported that the school had good success with both varieties and was even able to get two harvests from the English variety. Recognizing the potatoes grew well in the region, and that Kazakhs apparently did not grow potatoes, he distributed some free seed potatoes to a local Kazak named Borombaev. It is unclear what Borombaev’s connection was to the school if any, however, he reported great success with the plants and had a good harvest, and Lisovskii hoped that he shared the crop with his neighbors.\(^{113}\) Once again, while the scale of these projects was small, the impulse would foreshadow later attempts under the Resettlement Administration which sought out partnerships

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\(^{111}\) TsGARK f. 64, op.1, d. 6083a l. 72.
\(^{112}\) Ibid., l. 15.
\(^{113}\) Ibid., l. 7.
with local agricultural societies and progressive farmers to establish demonstration plots that others could visit and learn from in their local community.\textsuperscript{114}

While in the early years of the school Lisovskii sought simply to share seeds and plants with locals and hope they might visit the school farm, it was often in such a poor state that a visit might convince a visitor the school was not to be copied. In 1896, a government inspector was horrified to find that the school was a site of a plague outbreak among the cattle, and that the school had done nothing to quarantine it.\textsuperscript{115} Similarly, the newspaper \textit{Sibirskaja Zhizin} wrote a long expose on the Zaisan school and found that it was farming at a primitive level if at all, and alleged that its instructors read from books and ignored the local soil and climate.\textsuperscript{116}

However, these reports came several years after Lisovskii had left the school in 1892. By 1894 a new school head had taken over responsibility for the farm at Zaisan: Vasily A. Saenko. Saenko had graduated from the Saratov Vocational School, and then completed another course at the Krasnoyarsk Industrial School.\textsuperscript{117} In the years between Lisovskii and Saenko, the school had suffered from changes in leadership. Therefore, when Saenko arrived, he tried to return the school to some of its earlier mission of outreach to Kazakh boys. In pursuit of this goal, Saenko laid out a rather grand vision of how the school could serve as the catalyst for the transformation of nomads into settled farmers in the Zaisan district and beyond. Other schools had plans at least on paper for similar projects, but Saenko’s appears to be the most ambitious, and was also one of the few that was confirmed to have been implemented.

\textsuperscript{114} On the spread of potatoes among the Uzbeks in a later period see, Marianne Kamp, “Hunger and Potatoes: The 1933 Famine in Uzbekistan, and Changing Foodways” unpublished paper presented at the Midwest Russian History Workshop, Bloomington, Indiana, April 2018.
\textsuperscript{115} TsGARK f. 64, op. 1, d. 6088 l. 183 Letter from the Military Governor of Semipalatinsk to the Governor General of the Steppe, 19 October 1896.
\textsuperscript{116} Sibirskaja Zhizin (Omsk), March 11, 1898.
\textsuperscript{117} TsGARK f. 64, op.1, d. 6083a, l. 146.
Saenko’s transformational plan called for giving each graduate of the school a piece of land of about 20-30 acres along with improved seeds, livestock, and agricultural equipment. The school would also continue to instruct the graduates in what crops to plant and when to plant them. However, these farms were not meant to be at the site of the farm, instead the goal was to establish farms among the graduates’ home communities. Saenko called these homesteads “exemplary peasant farms” (obraziatsovaia krestianskaia khoziastva). He believed this was necessary because he thought that even if Kazakhs tried to farm using scientific or Russian methods, they lacked community support, which he recognized as integral to their success.

Saenko admitted that the school was not currently doing this even though he saw it squarely within their mission of “spreading agricultural knowledge to the local population.” He believed this was in part because the school farm itself was in such poor shape. It lacked improved seeds and even good agricultural equipment. In spite of these shortcomings, the next year in 1895 two Kazakh graduates received plots of land along with tools, seeds, and livestock to begin the first exemplary peasant farms established with help from the Zaisan school. While a small project that only ever included a few graduates, for the time this undertaking was on the cutting edge of global agricultural extension work. Saenko’s plan for exemplary peasant farms began seven years before Seaman Knapp was given decision-making power over part of Walter Porter’s farm in East Texas and “cooperative extension” as it became known in the United States was begun. It is unclear how these students and their exemplary peasant farms fared, and the program does not have appeared to have continued for many years. However, this does not

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118 Ibid., l. 160.
119 Ibid., 161.
120 Ibid., l. 168
necessarily mean for certain that the graduates failed. Beyond failure, the program may also have ended because the same year the graduates were placed on their new farms, the school changed its mission and began admitting Russian students alongside Kazakh boys.

The Ambiguities of Remaking Students in the Settler Colony

Agricultural schools were enigmatic entities. On the one hand they were organized under rules for a type of school from European Russia that sought to encourage more efficient agriculture among peasant families. However, on the steppe, they took on new roles as sites of experimentation, knowledge gathering, and agronomic outreach. Eventually this meant that they largely focused their efforts to reform steppe agriculture on teaching peasant children and agronomic outreach to settlers. This was, however, not the original intent of all the schools as Zaisan and Semipalatinsk in particular were founded specifically for the education of Kazakh children.¹²²

While there have been significant studies of the educational work of Kazakh-Tatar and Kazakh-Russian schools, there has been almost no study of the Zaisan Kazkah Agricultural School or the Semipalatinsk Lower Agricultural School, both of which at first instructed only Kazakh students.¹²³ This is understandable, because the other schools educated more students and often educated much more important students.¹²⁴ However, these schools are also significant.

¹²² However, there was no prohibition against having Kazakh students at any of the other lower agricultural schools, and they appear to have had some Kazakh students at some point.
because they come close to assimilationist educational projects found in other settler colonial environments. In the United States these were called Indian Boarding Schools and in Canada they were called Indian Residential Schools.\textsuperscript{125} Like on the steppe, the focus at these other schools was on manual and vocational training coupled with rudimentary schooling, the idea being that Kazakh, Navajo, or Sioux children required little else. Additionally, while it does not appear either Zaisan or Semipalatinsk graduated famous authors or politicians like the Kazakh-Russian schools, they still tell an important part of the history of these lower level, and less well-studied Kazakhs who were part of the colonial agronomic apparatus.\textsuperscript{126}

In 1884, a commission of five advisors met in Omsk to make their recommendations for how to address the failures of an earlier project of Kazakh boarding schools, all of which had recently closed due to a lack of students and mismanagement. None of the committee members were Kazakhs, however, that did not stop them from making recommendations on how best to educate Kazakh children with the goal of “spreading agricultural education in the province... as between Russians as well as among the natives.”\textsuperscript{127} They were directed to make recommendations on how to open a series of boarding schools that would teach both agriculture and handicrafts to Kazakh students. This project eventually was merged with the project of lower agricultural schools. These lower agricultural schools on the steppe, like schools throughout the empire endured a constant stream of decrees and reorganizations from the imperial bureaucracy, therefore, at times who was officially in charge was not always clear, or even particularly

\textsuperscript{125} J.R. Miller, Shingwauk’s Vision: A History of Native Residential Schools (Toronto: University of Toronto Press, 1996); David Wallace Adams; Education for Extinction, Margaret D. Jacobs, White Mother to a Dark Race: Settler Colonialism, Maternalism, and the Removal of Indigenous Children in the American West and Australia, 1880-1940 (Lincoln: University of Nebraska Press, 2009).

\textsuperscript{126} For a thorough biography of one of the more famous early Kazakh intellectuals and intermediaries see Ian W. Campbell, Knowledge at the Ends of Empire, Chapter 3 “An Imperial Biography: Ibrai Altynsarin as Ethnographer and Educator, 1841-1889.”

\textsuperscript{127} TsGARK f. 64, op. 1, d. 2083, l. 34, Letter from Governor Generalship of the Steppe to M.G. Sokolov, December 1883.
important. In the words of one historian of education in the empire “A bewildering variety of primary schools, which operated under a number of authorities, coexisted in Russia in the second half of the nineteenth century and persisted until the 1917 revolution.”

To the officials in the Governor Generalship who undertook the project, the work was driven both by a perceived economic need and by what could be interpreted as a humanitarian one. According to their report, “it can be said with sufficient certainty that there exists among the mass of the population a simple form of agriculture and that its improvement is only possible with a parallel economic improvement among the nomads.” They went on to point out that every year there were more nomads requesting help and complaining about their situation, but that these problems would only continue to get worse due to natural population increases among the Kazakhs as well as increased settlers coming to the steppe. They believed this would only change, “either through economic targets or shocks,” as “most nomads will not change over to economic systems requiring less cultivated land and a more secure income, i.e. agriculture and in conjunction with it: settlement.” Although the plans would go through changes, these meetings laid the groundwork for what would later become lower agricultural schools. It is telling that officials thought the process of sedentarization among the Kazakhs was inevitable. However, they did not think it so inevitable that they left it to its natural processes (if the massive government-backed settlement project could be considered “natural”). Instead, they wanted to

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129 Similarly in the United States O.H. Browning the Secretary of the Interior who was responsible for American Indian education after the Civil War once wrote that instilling the fundamental concepts of agriculture is “no doubt the best, if not the only, policy that can be pursued to preserve them from extinction.” Donald Grinde, “Taking the Indian out of the Indian: U.S. Policies of Ethnocide Through Education” *Wicazo Sa Review* 19 no.2 (Autumn, 2004): 25.
130 TsGARK f. 64, op. 1, d. 2083, l. 58, “Положение о школах практического сельского хозяйства и ремесел в областях степного генерал-губернаторства,”
aid the process by encouraging sedentary farming through outreach and Kazakh agricultural schools.

In spite of their sometimes unique mission, classrooms at lower agricultural schools on the steppe differed little from any other primary school. At Zaisan in 1890 for instance, the first two grades received instruction in the following subjects: Russian language, arithmetic, handwriting, gymnastics, and singing. Sometimes, students also received instruction in “explaining the important phenomena of nature” which was roughly equivalent to a general science course.\textsuperscript{131} However, a lack of qualified teachers often meant that even this general subject went untaught for periods of time at schools like Zaisan.

The majority of time spent in the classroom at Zaisan and Semipalatinsk (just like at the majority Russian lower agricultural schools on the steppe) was focused on Russian language instruction. This can be explained in part by the fact that textbooks and other instruction most typically took place in the Russian language, and literacy was a focus of all primary education in Russia. However, beginning in 1879, the famed Kazakh pedagogue and father of formal Kazakh education, Ibrahim Altynsarin had already begun his project of Kazakh and Russian language schools in Turgai Oblast.\textsuperscript{132} Therefore, the choice of focusing on Russian was exactly that, a choice that was made and reflects how in the minds of officials Russian language and sedentary civilization were inexorably linked.

In the first year of instruction at Zaisan, there were 22 Kazakh boys enrolled in the class. The school divided these students into two groups based on their age. Instruction began by using

\textsuperscript{131} TsGARK f. 64, op.1, d. 6083a, l. 41.
a textbook written by the educational reformer Konstantin Ushinsky. However, this textbook was deemed too difficult for non-native Russian students, and the school began using a textbook written specifically for non-Russian speakers by Vol’per. The school however, chose Vol’per’s text over Altynsarin’s *Kirghiz krestomanty* published in 1879 or even Il’minskii’s *Samouchitel’ russkoi gramoty dlia Kirgizov* published in 1861 and written using Kazakh in the Arabic script. Because instruction in classroom subjects was not the only mission of these schools, language was at the center of their mission. As vehicles of “civilization” they were similar to indigenous boarding schools in other places like the United States and Canada. The aim of these schools was clearly not only to teach subjects, but also to “teach nomads how to live a sedentary Russian life” and learning Russian was thought to be part of this process.

Although there is no evidence Kazakh agricultural schools banned the speaking of Kazakh as occurred in many American Indian Boarding Schools, it was clearly discouraged or at least Russian was given preference in an effort to “civilize” the Kazakhs at the expense of their native language.

Once Kazakh boys had completed and tested out of two years of mostly Russian language with a smattering of arithmetic, handwriting, gymnastics, singing, and when possible general science, they continued Russian language study but now also began the study of special subjects—provided there was a teacher to teach them. The special subjects consisted of two

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133 Ushinskii was also interested in the educational advances of another settler colony, The United States, on its quickly expanding frontier. See Konstantin Ushinskii, “Shkolnyi reforme v Severoi Amerike” Zhurnale dlia vospitania no. 1 (1858). [http://az.lib.ru/u/ushinskij_k_d/text_1858_1_shkolnye_reformy.shtml](http://az.lib.ru/u/ushinskij_k_d/text_1858_1_shkolnye_reformy.shtml)

134 TsGARK f. 64, op.1, d. 6083a, l. 18.


136 TsGARK f. 64, op. 1, d. 2083 l. 60.

137 While many Indian Schools in the U.S. punished students for speaking native languages, this was not the case everywhere, although even in these cases it was “frowned upon.” John R. Gram, *Education at the Edge of Empire: Negotiating Pueblo Identity in New Mexico’s Indian Boarding Schools* (Seattle: University of Washington Press, 2015), 112.
classes “Basic Understanding of Agriculture” and “Livestock and Livestock Rations.” This division echoed the focus of the general science class that focused on the categorization of plants and animals. In the agriculture class, all topics were aspects of growing plants, and animals did not fit anywhere into the curriculum. The agriculture class covered soil formation and types as well as mechanical plowing and cultivation and their associated equipment. It also included curriculum on the murky topic of “the concept of plants in general.” There was also a focus on the division between perennial and annual plants. The livestock curriculum showed similar features to the agriculture classes. Here too, division and taxonomy were the primary focus of much of the instruction with students learning the division of animals between domesticated and wild, as well as the categories of mammals, birds, fish, and insects. However, the most surprising aspect of the class was that horses were one of the most important types of livestock discussed in depth. The class included how to properly house horses, care for their hooves, deliver young, and even discussed the various diseases that might befall horses.138

Examination of the lessons from 1890 at Zaisan gives an interesting insight into the “hidden curriculum” of the Kazakh agricultural schools.139 In addition to a primary focus on Russian language that would encourage assimilation, the schools also showed a tendency towards taxonomy and division. This reflects a broader trend in colonial thinking that in the hands of colonial officials was often used to create racial hierarchies to justify colonialism.140 That so much of the classroom instruction also centered around the division of natural phenomena that Kazakhs already had their own methods of understanding is significant. In his

138 TsGARK f. 64, op.1, d. 6083a, l. 42.
139 Giroux and Penna define the “hidden curriculum” as “the unstated norms, values, and beliefs that are transmitted to students through the underlying structure of meaning in both the formal content as well as the social relations of the school and classroom life.” Henry A. Giroux and Anthony N. Penna, “Social Education in the Classroom: The Dynamics of the Hidden Curriculum” Theory and Research in Social Education 7 no. 1 (1979): 22.
140 Ann Laura Stoler, Carnal Knowledge and Imperial Power: Race and the Intimate in Colonial Rule (Berkeley: University of California Press, 2010).
work on colonial Egypt, Timothy Mitchell showed how the creation of these types of divisions was an important technology of power for pre-twentieth century colonial rule. The focus on taxonomy and hierarchy was playing a similar role to the one Mitchell ascribed to exhibitions and museums (both institutions which built taxonomy into their core) in that they were “not just reflections of this [colonial] certainty, however, but the means of its production, by their technique of rendering history, progress, culture and empire in ‘objective’ form.”

It is notable, that in the non-colonial environment of contemporary Germany, taxonomic understandings of plants and animals were supplanted in science classrooms by notions like “biotic communities” that examined environments not individual organisms.

In addition to creating hierarchy and division within the school environment, the classroom at Kazakh agricultural schools was also doing something else that would continue to be practiced by agronomists throughout the era of the settler colonial state on the steppe. Instruction in the classroom at Zaisan allowed teachers to claim scientific authority over things that indigenous Kazakhs arguably had much more knowledge about than Russian scientists did. School officials no doubt recognized that especially among Kazakhs, knowledge of horses, their feeding and lifeways was immense. Therefore, to claim some authority and show their superiority teachers needed a way to raise their stature and reinforce the lesser status of things Kazakh. Much of the new knowledge proclaimed by the teachers at Zaisan was no doubt not very new. For example, most Kazakh boys probably knew how to deliver a foal. However, framing it in scientific terms as they had done with the irrigation works at the school farm,

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142 However, this different approach also had socio-political underpinnings and was also not solely about “pure science.” See, Lynn K. Nyhart, “Civic and Economic Zoology in Nineteenth Century Germany: The “Living Communities” of Karl Mobius” *Isis* 89 no. 4 (Dec. 1998): 605-630.
teachers could reinforce their privileged status and continue to speak with authority about the superiority of Russian ways and sedentary agriculture.

In spite of the fact that the hidden curriculum of the school was reinforcing notions of European hierarchies and of the superiority of Russian, Russia, and sedentary agriculture, surprisingly not all of the actors in the structure were always themselves Russian. In fact, when the Zaisan school opened, the main teacher—who was responsible for classroom subjects except for special agricultural subjects—was a Muslim Kazakh, Abul Nurzhanovich Nurbzhanov who was a graduate of the Omsk Teachers Seminary.\(^1\) It is unclear exactly how closely Nurbzhanov followed the prescribed curriculum, and it is indeed possible that he sometimes used Kazakh in the classroom. However, it is just as likely that he did not.\(^2\) Even if he wanted to it is most likely that he was unable to fully thwart the structures and textbooks that told him what to teach and how. This was especially true because he had a Russian, Lisovskii, overseeing him and teaching the special agriculture lessons.

The position of head of the school was very important in shaping the nature of the school. Therefore, it is surprising that for a brief moment, the Zaisan school was actually headed by a Kazakh. In May of 1892 for unclear reasons Lisovskii left his post as head of the school and was replaced by a Kazakh, Asyn’ Khadcha (probably Khoja) Kirmanbaev who had completed a course at the Orsk teachers school.\(^3\) However, during Kirmanbaev’s tenure, Nurbzhanov was replaced as head teacher of general subjects by a Russian named Ipplolit P. Nikolaev. Kirmanbaev did not remain head of the school for long and was replaced in 1893 by a graduate

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\(^{1}\) TsGARK f. 64, op.1, d. 6083a, l. 26.
\(^{2}\) In addition to Ian Campbell’s *Knowledge at the Ends of Empire* on the topic of Muslim intermediaries and their complex role in the Russian empire see Edward J. Lazzerini “Local Accommodation and Resistance to Colonialism in Nineteenth-Century Crimea” in *Russia’s Orient: Imperial Borderlands and Peoples, 1700-1917* eds. Daniel R. Brower and Edward J. Lazzerini (Bloomington: University of Indiana Press, 1997), 169-187.
\(^{3}\) TsGARK f. 64, op.1, d. 6083a, l. 91-92. The school in Orsk had actually been founded by Altynsarin in Troitsk, in 1880, and in 1881 it moved to Orsk. See Wayne Dowler, *Classroom and Empire*, 141.
of the Cossack Cadet Corps Nikolai Pavlovich Kir’ianov.\textsuperscript{146} Kir’ianov was himself replaced in 1894 by Ippolit Nikolaev as an interim head before finally in August of 1894 Vasili A. Saenko was hired as the new head of the school who was capable of teaching special agricultural subjects. This period of several interim and short-term heads had a detrimental effect on the school and Saenko would spend significant effort trying to get the school back in order.

Even if there were Kazakhs involved in the schools, it is clear they never had the power to significantly make them more sympathetic to the Kazakh boys. This is similar to what Ian Campbell found in his study of the Scherbina Expedition and the role played by Kazakhs. While Kazakhs who were involved in the expedition were in part responsible for reports that were wielded to protect Kazakh interests, Campbell found that the expedition’s work was also used to promote settlement, and in the end, Kazakh interests were overruled in favor of settlement.\textsuperscript{147}

However, involvement in the apparatus was not the only way Kazakhs could navigate or even resist the agricultural schools as sites of colonial power and Kazakh disempowerment. The students themselves, and the way their parents navigated the schools for their own benefit, is also an important story of navigation and resistance on the steppe. Like all schools, the Kazakh agricultural schools faced the issue of discipline. However, in the colonial environment, this topic took on a different meaning that extended beyond just misbehavior but also included aspects of racism or cultural chauvinism on the part of Russian school officials. Since the archival record holds few Kazakh voices from these experiences, we can only guess how a dislike of Russian colonial practices and presence on the steppe influenced the behaviors of

\textsuperscript{146} TsGARK f. 64, op.1, d. 6083a, l. 121.
Kazakh boys. However, it would be surprising if colonial resentment did not factor into student behaviors at all.

Part of the reason it is so difficult to untangle racism and cultural chauvinism from the question of behavior, discipline, and punishment in the case of Kazakh agricultural schools is because Russian educational systems were incredibly harsh and discipline-focused in any environment. Nevertheless, the same rules applied in a different context can take on different meanings, and they almost certainly took on different meanings for Kazakhs. In his massive study of Russian peasant schools Ben Eklof wrote, “Nothing in the relationship between state peasants and serfs, on the one hand, and gentry and local officials, on the other, suggests that peasant children would have been treated with kindness and consideration in the schools.”

This harsh treatment was in many ways driven by the othering of peasants by the Russian upper classes, similar to the othering officials practiced towards Kazakhs. The idea that Russian peasants were a lesser class apart in need of improvement had a long history. Often peasants were viewed as not fully part of the same society as Russian elites in part because of their backward ways and lack of education. One historian remarked that as late as the eve of the First World War, “Most peasants—even ethnic Russians—were not yet “Russians” in the sense of civic identity. The divide separating peasants from educated Russian society appeared as wide as ever.”

As lower agricultural schools were structures that were meant to remake both Kazakhs and peasants into “proper” farmers, this similar attitude and othering is unsurprising.

In spite of similar chauvinistic attitudes towards both peasants and Kazakhs, there were differences in the ways school officials at the Kazakh schools talked about their students’

behaviors that had racial overtones. In 1890, Lisovskii reported that the, “morals of the Kazakh boys in the school is too low,” and he accused them of having an identity that was “far from European.” This identity meant that “the concepts of honesty and truthfulness were foreign.”

Lisovskii did not see students lying as a problem that was universal, instead it was specific to Kazakhs and part of their heritage as “non-Europeans.”

Whether this was a racial category in Lisovskii’s mind is unclear, however, in practice such a distinction meant very little. Perhaps, he saw the possibility for Kazakh boys to overcome this shortcoming with proper education and punishment, so they might not be destined to act this way simply by virtue of their race. Lisovskii believed punishment of misdeeds should be a primary focus of attention of the school—followed closely by attention to cleanliness that he thought was also linked to improving the boys’ behavior. Lisovskii’s punishment for lying was to reprimand the student and then deny them either meat or tea for a period of time. If this did not work, or if the student continued to offend, the school was supposed to confine the child to a punishment cell (*kartser*). The fact that officials made taking away food and solitary confinement a punishment for students against whom they held chauvinistic and perhaps racist ideas is telling. Nevertheless, at Zaisan teachers were less inclined to use harsh punishment than at Semipalatinsk. Perhaps because they faced fewer discipline problems, which could be because the teacher at Zaisan was Nurbzhanov, a Kazakh.

School officials at the Semipalatinsk agricultural school were constantly plagued by the misbehavior of Kazakh boys. In 1894, the head teacher at the Seimpalatinsk school S. Bryukhavich reported that three Kazakh boys—Kumanov, Dochekenov, and Kozyvdansov—in particular were causing frequent disturbances. As evidence of the continued existence of

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150 TsGARK f. 64, op.1, d. 6083a, l. 49.
151 Ibid., l. 50.
“thievery” among the Kazakh students he reported several events that occurred just during the month of November. The first instance took place on November 6 when three students Kumanov, Dyusenskeno, and Asano stole potatoes and intended to sell them to other Kazakhs. This was followed by an event on November 8, when Kumanov stole footwraps from the school supplies. He was punished for this by having his dinner taken away. While we cannot be sure whether the boys were motivated in part by a resentment towards Russian colonizers, it is likely this factored somewhat into their behavior. Regarding insubordination, James C. Scott wrote:

“The question of whether a clear act of insubordination has occurred is not a simple matter, for the meaning of a given action is not given but is socially constructed. At the extremes, there is less interpretive freedom. When a slave strikes his master in front of other slaves, a reasonably clear public challenge has been made. When the thief or poacher moves surreptitiously at night it is reasonably certain that no public challenge to property relations has been issued. Between these extremes there is a great deal of interpretive freedom.\footnote{153}

While these thieves were acting in secret, and it is likely that they were not attempting to thwart property relations or the colonial order, their brazenness is a sign that they probably did not respect the school, its mission, or its employees and part of that lack of respect probably involved colonial resentment. Bryukhavich himself said as much. He believed that this frequent misbehavior was an indication that the Kazakh boys did not respect the school, and that to gain the boys’ respect, the school needed harsher punishments than simply reprimand and taking away food. He felt that there was inequality in the relationship between the school and students because the school needed the Kazakhs as students more than the students needed the school.

\footnote{152} TsGARK f. 64, op.1, d. 60846, l. 4, “Otchet na Semipalatinskoï sel’skokhoziastvennii shkole,” 1895
However, he believed that in the near future the school would “stand in an independent position from the Kazakhs” and they would need the school more than it needed them.\(^{154}\)

Bryukhavich was not entirely correct that the Kazakhs did not need the school. At the very least, the Kazakhs wanted to use the school, but for their own ends. Interestingly, the somewhat problematic method by which the school made a clear division between “practical” and “theoretical” education played into this. Many Kazakh parents probably sent their kids to the school simply to give them a chance to learn Russian. Ben Eklof argued that Russian peasant parents took a similar approach to schools and navigated them in order to help their children gain what he called the “tools of literacy and numeracy” while avoiding the “larger socialization involved in the process of organized, prolonged schooling.”\(^{155}\) The focus on Russian in the classroom at the expense of everything else made it in some ways easier for Kazakh parents to navigate the system. The schools never attracted the most prestigious families and appear to have been a way for lower class families to give their children an education in Russian if they could find some way for them to be accepted. Knowing Russian opened up a series of other jobs for these youth either in the imperial service, or through commerce and guiding.\(^{156}\) These could serve as important paths to social mobility.

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\(^{154}\) TsGARK f. 64. op.1 d. 60846, l. 9.

\(^{155}\) Ben Ekloff, “Peasant Sloth Reconsidered: Strategies of Education and Learning in Rural Russia Before the Revolution” *Journal of Social History* 14 no. 3 (Spring 1981), 357.

Kazakh children also took this divide between the classroom and the school to heart and were often quite uninterested in what was being taught at the school farms during the summer months. This was probably in part because it was less useful to them, but also because the schools often did a poor job of incorporating farm work into an educational experience. Instead, it often seemed more like unpaid work.\textsuperscript{157} Bryukhavich recognized this feeling among the Kazakhs when he remarked that the reason it was difficult to get students to come to the school was because Kazakhs had a “hostile” attitude toward the school and believed, “At the school the students work more than they learn.” He went on to say how this attitude of the parents had infected the children. Especially at the beginning of the school year it was often necessary to argue with students to get them to the fields for “practical education.” When the students refused, he asked them why to, which they replied “I don’t want to, I am not a worker.” When students still refused, they were then punished, either by having tea or food taken away, or in extreme cases, the students were put in solitary confinement in the “bright locker” (\textit{svetlyi kartser}).\textsuperscript{158} While the idea of forcing any boys to work or have their supper taken away or put in a punishment cell is an uncomfortable thought, the fact that this was done to boys by people who held racist or chauvinistic ideas about them is a reminder of how the context of the settler colony changes what was a relatively widespread form of punishment across all Russian schools.

At Semipalatinsk, in spite of Bryukhavich’s belief that the school was too soft on the boys, such harsh punishments were not only limited to when they refused to work. In fact, he did not think that a refusal to work was even the most serious offense a student might commit. Instead, he believed “lying, secrecy, and perhaps theft” were the biggest obstacles the school

\textsuperscript{157} For discussion of how Indian Boarding Schools often neglected their educational aspects in favor of “industrial training” that was often code for labor to support the school economically see Gram, \textit{Education at the Edge of Empire}, 118-126.

\textsuperscript{158} TsGARK f. 64., op.1, d. 60846, l. 24.
faced. However, Bryukhavich was uncertain if punishments could cure a student of their misbehavior, and he believed the students acted this way because their parents and culture encouraged them to lie and steal. He went on to say that, “This evil [lying, secretiveness, and thievery] exists among almost all of the Kazakh population, at least in the surrounding volosts. There are exceptions, but very few.” These words were written by the man who was the one who decided whether or not the students were fed or if they were punished in solitary confinement, and they stand as a powerful reminder that whether the attitude was driven by racism or “just” cultural chauvinism, the effect on the students was the same.

Bryukavich’s damning assessment of Kazakh culture to explain the behavior of the Kazakh boys is certainly not the most likely explanation behind student misbehavior and the general low opinion of the schools among the Kazakhs. First, it was clear that the schools sought to encourage sedentary agriculture, and this type of labor was considered below the station of most Kazakhs. Traditionally, only the poorest and ill were left behind in encampments to cut hay while the rest of the family nomadized. What is more, the schools were not successful at placing students on profitable farms, even after Saenko’s program. Additionally, the schools typically lacked adequate financial support and many of the buildings were in a poor state. In 1897 a government inspector for example found that the health of the students at Zaisan was poor with half of them ill, two of them seriously with cholera. Similarly, in 1898, problems at

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159 On similar ways that officials at an earlier period on the steppe officials connected thievery as endemic to Kazakh culture see Virginia Martin, “Barimta: Nomadic Custom, Imperial Crime” in Russia’s Orient: Imperial Borderlands and Peoples, 1700-1917 eds. Daniel Brower and Edward J. Lazzerini (Bloomington: Indiana University Press, 1997), 249-270.
160 TsGARK f. 64., op.1, d. 60846, l. 24.
161 Although this began to change with increased Russian settlement, Galuzov, “Colonization and Changing Social Structure” 2-5.
162 TsGARK f. 64, op.1 d. 6088, l. 222, “Materialsky Zaisansko,” 5 February 1897. While sickness was often an issue at the schools, they were nowhere near as deadly as American Indian Boarding Schools whose death rates can only be guessed at but are surely in the thousands.
Zaisan became so notorious that a newspaper published a long expose on the school pointing out that in addition to the school being the site of a plague infestation, it resembled a home for juvenile delinquents more than an agricultural school, because as far as could be seen, there was no farming taking place.\textsuperscript{163}

For all of the above reasons, the schools like Zaisan and Semipalatinsk failed to attract enough Kazakh students to keep officials happy, and they were forced to look elsewhere for students. The resistance of Kazakh students and their parents to the ideas and ideology being espoused at the schools were therefore a primary reason that Zaisan and Semipalatinsk eventually changed their status as schools only for Kazakhs and began admitting Russian peasant children as well. Already in 1890, just three years after the school’s opening, officials in Zaisan had decided to admit some Cossack children. They argued that this was good for both groups, as the Kazakhs would benefit from the Russian language skills of the Cossacks, and they believed that the Cossacks were also in need of training in proper agriculture, because improved agricultural knowledge among the Cossacks was “no less necessary than for the Kazakhs.”\textsuperscript{164}

Several years after admitting the Cossack students, school officials were already discussing admitting Russian students as well. Eventually, the arguments in favor of admitting Russians won out, and at the end of the exam period in 1894, seven years after opening as the Kazakh Agricultural School, Zaisan began admitting Russian students. Within a few years Russian students outnumbered the Kazakhs significantly.\textsuperscript{165}

\textsuperscript{163} Sibirskiaia Zhizn (Omsk), March 11, 1898.
\textsuperscript{164} Ts GARK f.64, op.1 d. 6083a, l. 22, “Ochet o Zaisanskoii.”
\textsuperscript{165} Ibid., l. 145
Conclusion

While lower agricultural schools on the steppe were in many ways simply schools with classrooms, teachers, and students, they were also much more. In addition to being some of the earliest sites of agronomic knowledge creation and experimentation, they were also sites of an attempted remaking of Kazakhs into sedentary farmers. Therefore, categorizing these schools is somewhat difficult, because they were filling many roles at once. However, that does not mean that it is necessarily appropriate only to examine them in their separate aspects. The schools were all of these at once, and they need to be considered as holistic entities that advanced scientific knowledge about the world while simultaneously denying Kazakh boys food and locking them in a room when they refused to work. The one was not an unfortunate side effect of the other, but needs to be considered as part of the process of the history of scientific inquiry in a settler colonial environment. If we are to in Bruno Latour’s words, “retie the Gordian knot by crisscrossing, as often as we have to, the divide that separates exact knowledge and the exercise of power,” we must recognize that the seizure of Kazakh land and the mistreatment of Kazakh youth was part of the work of agriculture science just as much as crop-breeding or global agronomy conferences.166

In spite of their dark side, the school farms were also important early sites of experimentation and knowledge gathering about a particular steppe locale. At a time when agricultural scientists were still arguing about the suitability of the steppe to sedentary agriculture, they represented one of the few sites of government sponsored and supervised agriculture. As institutions of scientific practice, agricultural schools, and especially their farms, powerfully showcase one of the main contradictions of science on the steppe discussed

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throughout this dissertation: scientists are supposed to be experts, but in the Kazakh steppe, they were not experienced experts in this particular environmental and social context. Many of the difficulties the schools and the scientists faced were due to this contradiction.

In addition, the school farms were also important first attempts at scientist-led farming on the steppe. As such, they would set the tone for—and showcase many of the continuing failures, biases, and successes—of applied agronomy on the steppe. In the plans and communications of agronomists and heads of steppe schools, we can see their Platonic ideal of what these agronomists hoped to create. Sometimes this was in keeping with what agronomists in St. Petersburg or Omsk hoped to see, but often it was different. As the first attempt at scientist-led agriculture on the steppe, the resulting hardships faced by school farms were somewhat predictable. However, in spite of these difficulties, agricultural scientists continued their work and in the course of that work gained useful knowledge about the steppe environment and its potential and limitations. In the process, lower agricultural schools and school farms illustrate another important aspect of this dissertation: agronomists and officials continued with their project of remaking the steppe and its people in spite of frequent failures, which rarely caused them to question their basic assumptions about the correctness of sedentary grain agriculture and increased Russian settlement on the steppe. Additionally, the knowledge they acquired would serve as the bedrock of the later growth of agronomic institutions under the Resettlement Administration and subsequent developments.

However, this research does not seek to over-emphasize the “foreign” nature of the ideas and goals of steppe agronomy. It also attempts to problematize and complicate the notion that institutions like agricultural school farms were fully foreign structures dropped down in the middle of the steppe. While the ideas, plans, and assumptions often fit that description, the
schools and farms along with the ideas behind them developed and changed over time on the steppe due to environmental and social realities. Therefore, the knowledge that was created at these colonial sites is best understood as the product of the steppe itself, and as settler colonial science rather than simply colonial science.

Nevertheless, it was not only settler colonial science because it was created in the settler colony, it was also deeply imbued with the assumptions of civilizational hierarchy and the destruction of the native that is central to settler colonial thought. That these ideas infected the process of science on the steppe should perhaps come as little surprise. Scott Lauria Morgensen pointed to just how influential settler colonialism as an ideological influence could be when he wrote, “Settler colonialism has conditioned not only Indigenous peoples and their lands and the settler societies that occupy them, but all political, economic, and cultural processes that those societies touch.” However, science is able to hide this influence in unique ways such as behind notions of objectivity and expertise. Therefore, it is necessary to probe at the assumptions that underlay the most basic questions and frameworks that school officials were working with. For example, Lisovskii was not tasked with figuring out what kind of sheep made the most effective yurts, how many horses on average could graze on a piece of land, or how many years millet could be grown in a single spot without damaging yields. All of these questions would have been useful to the vast majority of steppe inhabitants in 1889, whether they were Kazakhs or Russians. Instead, the questions he and his superiors as settler colonial scientists believed needed answered centered around wheat varieties that could support peasant settlers in the region, or how to grow fruit to help support settlement in Siberia.

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In some ways these were priorities driven by the directives he received from his superiors in the Governor Generalship agronomic section and even from the assumptions behind the founding lower agricultural schools throughout the empire. However, it is also clear that in spite of these directives and structures, Lisovskii showed he still had significant freedom in how to run and organize the farm, and in what questions to ask. Nevertheless, he did not use that flexibility either to work in the interest of objective scientific curiosity or of helping indigenous Kazakhs. Instead, the settler colonial environment with its assumptions about who was deserving of help, and of what the steppe should look like, drove the decisions and research at these earliest sites of agronomic experimentation and knowledge gathering on the steppe. As this dissertation will continue to show, this process did not stop with lower agricultural schools whether they were specifically built for Kazakhs like at Zaisan, or if they accepted Russian students like in Pavlodar. Instead, the entire scientific apparatus, root to bud, was infected with the assumptions of settler colonialism, and no amount of scientific objectivity could fully undo it.

Intertwined with this power of the schools as sites of settler colonial science was their role as sites of remaking. Some scholars have focused on a policy of religious toleration, and how a relatively weak state was easier on indigenous peoples than other settler colonial empires. However, the schools as sites of remaking illustrate how an interventionist Russian state had a deep interest in “killing the nomad to save the man” and even acted on this impulse. While many believed nomadism would die out, or was already dying out, agricultural schools represent a real attempt to speed that process along. Even after these schools were integrated, they would continue to educate Kazakh students and try to win them over to sedentary agriculture. This policy change was not an indication that officials had given up on the goal of Kazakh assimilation. Rather, schools brought in Russian peasant boys both to help with Kazakh
assimilation and to encourage peasant settlers to be more efficient and effective farmers on the steppe, a process that they believed would lead to the domination of sedentary agriculture in the region, which would further erode the possibilities of nomadism.

While some might see the willingness of school officials to integrate lower agricultural schools as an indication of the less racist or more progressive nature of Russian colonization, this is not entirely the case. In fact it is not even an indication of the uniqueness of Russian settler colonialism on the Kazakh Steppe. Other settler colonial empires were not always so different. While U.S. Indian Boarding Schools never educated white children alongside American Indians, the founder of these schools, Richard Pratt, made this exact suggestion and was an outspoken critic of segregating American Indian children from whites.

Nevertheless, the ease of integration, and the fact that schools meant to remake Kazakh children could easily fit into a framework of schools that had been in part created in European Russia for peasant children, is somewhat of an indication of a unique aspect of Russian settler colonialism. Peasants were also deemed in many ways uncivilized, and while they were not as uncivilized as nomads, the ambiguous nature of these peasant settlers as at once problematic and as bringers of culture is a particularity of the steppe. This was in keeping with Russian society’s ambiguous relationship with the peasantry that could see them simultaneously as paragons of virtue and practitioners of true socialism and orthodoxy, and also degenerate and backward drunks. This adds another layer to the insights of Scott Seregny. In addition to Seregny’s notion that programs like adult education went a long way towards imbuing peasants with civic

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168 For an example of an apologist approach to Russian colonization see Grachev Rykin, “A European View of Asiatic History.”
identity (although they fell short) through things like education, the settler context offers even more complexity. Beyond simply citizens, these steppe schools could turn the peasants into citizen-settlers who might identify with the Russian state as a grantor of largesse (in land and technical assistance). That was in addition to the moral support given to peasant ways of life by their privileging sedentary agriculture, the Russian language, and if they identified with it, “Russian” science. This is not to say that Kazakhs were left out of this program. Indeed, for those Kazakhs who adapted, they too could be offered free land as well as financial and agronomic support, however, the price paid for this state support (cultural suicide) was much greater than that which was asked of peasant settlers.

Nevertheless, while the Russian case is clearly different in some respects, all settler colonies have faced a similar problem of the multifaceted nature of peasant settlers. Whether it was tropes about wasteful farmers in the American West, lower class white settlers in Rhodesia, or unsophisticated *pied noir* in French Algeria, the settler is often at once uncultured and noble.\(^\text{171}\) Therefore, while there were unique aspects to Kazakh lower agricultural schools on the steppe, they are also simply another example of a global phenomenon rooted in chauvinistic and racist ideas about the inferiority of indigenous peoples especially nomadic ones. As such, their example further ties the Kazakh Steppe into the global story of grain-driven settler colonialism. On the other hand, the ability of these schools to serve as sites of remaking for both Kazakhs and peasants also illustrates how they were a tool through which Russian agronomy spread cultural

dominance under the guise of an ill-defined idea of scientific hegemony. As such they were as important for their role in settler colonialism as they were in broader issues of science as power.
CHAPTER THREE: EXPERIMENTAL FIELDS

In the early twentieth century, the size of the agronomic bureaucracy expanded across the entire Russian Empire, and also across the grain settler states of the world. Domestically, Russia was attempting to industrialize and also deal with pressing land scarcity in European Russia. Internationally, the grain settler states were engaged in cutthroat competition to corner the world’s grain markets to feed rapidly expanding cities. The Kazakh steppe, previously a rather unimportant part of the Russian Empire, especially its northern regions, became ground zero for both of these stories in the early twentieth century. However, extensive peasant settlement in these areas was a relatively new phenomenon and the process of settlement was marred by significant failures because both agricultural scientists and peasant settlers still had much to learn about how to farm in this new arid environment.

The development of lower agricultural schools with their experimental farms made significant inroads in gaining a general idea of the challenges and even some solutions to steppe agriculture. However, in spite of this and the vision of school heads like Saenko that reflected many of the eventual developments of the agricultural bureaucracy on the steppe, agricultural schools were replaced as the primary method of popularizing scientific approaches to agriculture on the steppe in the early twentieth century. The problem of lack of funds, the challenges of running a successful farm and a school with somewhat unclear and sometimes contradictory expectations coupled with the resistance of students (especially Kazakhs) to the ideas behind the

schools led to many shortcomings at the schools. These failings were eventually used against the
schools by another group interested in the environmental and economic transformation of the
steppe. Agronomists put forward a new vision for how to transform the steppe, this one relied on
expertise and leadership that was not dispersed in the local community. Instead it was limited to
those trained in agronomy and fully convinced of the power of science and rationality to change
the world in ways they had envisioned. However, this expertise still required a popularization
aspect if it was ever to be successful in transforming steppe agriculture.

Ironically, the expertise this new group cultivated rested in part on the very institutions
that they hoped to replace. For over a decade, the agricultural schools were important outposts of
information gathering and experimentation that sent reports back to the agronomists of the
Governor Generalship. Additionally, some of those who had earlier worked in agricultural
schools like Saenko, the one-time head of the Zaisan school, eventually worked for the
agronomy section of the Governor Generalship or the Resettlement Administration.173

In spite of this background, agronomists eventually recognized that the cost of the nine
agricultural schools could perhaps be better spent on hiring local agronomists instead of
operating the schools. Therefore, in 1907, as mentioned in chapter one, the agronomy section of
the Governor Generalship of the Steppes ordered N. Krishtofovich on his inspection tour. On his
tour, he found a wide array of problems and poor infrastructure among the steppe schools. Many
of the school buildings were in disrepair, and the farms were often overcome with weeds or lack
of water. However, most upsetting to him was that many of the schools did not let the students
farm, instead much of the farm work was carried out by local laborers, and the students only

173 Центральный государственный архив Республики Казахстан [Central State Archive of the Republic of
Kazakhstan] hereafter referred to as, TsGARK. TsGARK f. 64, op. 1, d. 6083а, l. 46, “Отчет о Зайсанской
Киргизской сельскохозяйственной школе 1889.”
sometimes watched or helped with simple tasks. Instead of practical experience, students finished their studies without knowing how to undertake all the jobs required for a farm. At one school, that had acquired a mower that was only six year old, the mower sat unused and students had to cut hay by hand. When Krishtofovich asked why, he was told the mower did not work, however, upon inspection he found that it did, but the school head did not know he had to sharpen the cutting teeth. Such problems were common, and the schools eventually gained a reputation for laziness and bad farming. Due to the poor state of some of the schools, Krishtofovich recommended in his report that the government withdraw funding from their agricultural side and only support the schools in their handicraft programs that taught students skilled trades like leatherwork and boot making.

However, Krishtofovich’s criticisms apparently also might have had an ulterior motive. He himself commented on how the government was spending 50,000 rubles a year on the schools. Instead of the schools, Krishtofovich and other agronomists felt that money would be better spent paying two agronomist technicians per oblast, with the intention of hiring more. Krishtofovich’s recommendations were largely taken up, and much (though not all the funding) for the agricultural schools was withdrawn. The year following Krishtofovich’s report, the agronomy section of the Governor Generalship had already proposed the establishment of seven _uezd_ level agronomist instructors to teach locals and new arrivals about proper agricultural techniques and notify the oblast agronomists of problems such as famine, bad weather, or locusts. Additionally, it called for establishing experimental fields in the areas already populated by new settlers to test and showcase new crop varieties. Ironically, these were the same roles that

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174 Ts GARK f. 64, op. 1, d. 6138, l. 23, “Otchet agronoma pri Stepnom General gubernatore Krishtofovicha o sostoianii nizshii sel’skokhoziastvennykh shkol Stepnogo kraia v 1907” January 7- July 28, 1908.
175 Ibid., l. 43.
the schools were already undertaking, though with much less funding and the added burden of educating students.\textsuperscript{176}

The criticisms of Kristofovich and others were nothing new, however, they came at an opportune time for those in the agronomic bureaucracy which was growing in influence. Especially powerful within the Ministry of State Domains was the Resettlement Administration which Willard Sunderland has described as a “state within a state for the colonists and their settlement zones.”\textsuperscript{177} Similarly, Peter Holquist identified a particular technocratic ethos within the Resettlement Administration which is in line with the impulse for agronomists to seek funding for more agronomists.\textsuperscript{178} All of which fits neatly within Sunderland’s notion of this era falling under a periodization of “correct colonizing.”\textsuperscript{179} These changes were not only bureaucratic, however, they were driven by a combination of bureaucratic ideas and developments as well as the reality of thousands of settlers arriving on the steppe, often ill-prepared to meet the demands of the new environment.

Although the agronomic bureaucracy had already learned a great deal through lower agricultural schools, in order to help facilitate and aid the massive waves of settlers to the steppe, the burgeoning agricultural bureaucracy needed to gather more information about the steppe environment. Some of that work was carried out during the Shcherbina Expedition of 1896-1903. However, this study focused on what was already there and was especially focused on understanding Kazakh land usage. The agronomists on the expedition were not focused on experimental agriculture and as such were more focused on observing rather than testing

\textsuperscript{176} Ts GARK f. 64 op.1 d. 6128 l. 21-25, “Dokladi i dokladnye zapiski Upravliayushhego kantselariiei i agronoma Stepnogo General Gubernatora, Omskoi Kazakhskoi i Pavlodarskoi sel’sko-khoziastvennikh shkol” November 2, 1908.
\textsuperscript{177} Sunderland, “The Ministry of Asiatic Russia,” 142.
\textsuperscript{178} Peter Holquist, “‘In Accordance with State Interests and the People’s Wishes’: The Technocratic Ideology of Imperial Russia’s Resettlement Administration” \textit{Slavic Review} 69 no. 1 (Spring 2010): 151-179.
\textsuperscript{179} Sunderland, \textit{Taming the Wild Field}, 177-222.
In order to supply a place where agricultural scientists could test things on the steppe, in 1907, the Resettlement Administration, and the Ministry of State Domains, established an experimental field at Temir in Aktobe oblast with the express purpose of testing varieties and methods of practicing agriculture in the arid steppe. However, it was not the only experimental field established on the steppe. Other smaller, more temporary fields were also planted under the supervision of agronomists in other steppe regions, mostly to test new crop varieties, and as a method of popularizing agricultural science in the area to settlers and potentially any interested Kazakhs. Therefore, Temirskii and the other experimental fields and plantings always had a dual purpose, they were meant both to do “hard” scientific investigation while also serving as sites of popularization. Just like the earlier agricultural schools that played a similar role, the experimental fields and plantings never fully reconciled these two purposes, and were often conflicted about what aspects to emphasize.

In 1891, while the empire was in the grip of a famine that would kill hundreds of thousands and affect millions, a special commission of the Scientific Committee of the Ministry of State Domains was tasked with creating regulations to establish a central agronomic institute, agricultural experiment stations, and experimental fields. Many in educated Russian society including disparate figures like the Marxist G. Plekhanov, philosopher Vladimir Solov’ev, and the Populist statistician Nikolai Karyshev all believed the famine was not only caused by the weather, but also by the “backward” state of Russian agriculture. Indeed, even the American

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180 See: Campbell, “Settlement Promoted, Settlement Contested.”
181 Rossiiskii Gosudarstvennyi Istoricheskii Arkhiv [Russian State Historical Archive] hereafter referred to as RGIA. RGIA, f. 392, op.9, d.2, l. 8. RGIA, f. 392, op.9, d. 2, l.1, “Proekty polozhenii o tsentral’nom agronomicheskom institute, opytnia stantsiaia i polia 1891-1903.”
ambassador believed the famine was due at least in part to “primitive” peasant agriculture.¹⁸²

This experimental and popularizing infrastructure—it was hoped—would remedy this problem.

The officials who worked on the project believed that Russia needed to play significant catch up with Europe and the United States with regard to its level of agricultural development both in terms of the science it was creating and in its more widespread popularization. Although the plan they created to try and jump start the empire’s agricultural development was hierarchical (it created a clear division between agricultural institutes, stations, and fields and laid out how the lower rungs were to serve those higher up the ladder), it also adhered to an ideology that believed the science being created needed to be in close conversation with peasant farmers if it was ever going to be effective. In the words of the report, “Hence it is necessary to establish the closest possible connection between science on the one hand and agricultural life on the other.”¹⁸³

This was only one of the many contradictions that underlay agricultural science in the Russian empire as a whole and on the Kazakh steppe more specifically. Just as in the earlier case of agricultural schools, the agronomists working on these projects on the steppe were to simultaneously act as experts and also information gatherers and knowledge creators about the new steppe environments. This contradiction contributed to a larger instability at the root of the technoscience being created on the steppe, because agronomists’ position as experts was always in need of maintaining their authority as experts. An authority that was built on rather scant foundation. However, their authority was not only frequently in question, what authority they did have was often built out of a hybrid of typical notions of authority (their status as government

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¹⁸³ RGIA, f. 392, op.9, d.2, l. 8.
officials and educated experts), and of their real effectiveness of their advice. This effectiveness was, however, often built out of a network of knowledge that was not created or deployed exclusively by trained experts. Instead, many of their most effective pieces of advice and successes relied on peasant and Kazakh knowledge, practices, and technologies.

**Experimental Plantings, Expanding the “Technopolitical Network”**

As previously stated, experimental fields were not stand-alone entities. Instead, they were meant to fit into a hierarchical network of experimental fields that developed “good science” coupled with outreach by agronomists and technicians who could help demonstrate and encourage peasants to take up these new forms of agriculture. In the pursuit of these goals, agronomists established on the steppe experimental plantings as part of their attempts to remake steppe agriculture. These plantings were to serve the dual purpose of testing and gathering information while still showcasing proper practices. This dual purpose led to a tension in the work of experimental plantings as they had to balance showcasing effective growing techniques while not failing and thereby discrediting agronomy to the wider public.

In the process these experimental plantings also began to show agronomists the need to blur the lines between hard field science and soft social sciences (what might better be termed the observation of peasant agricultural practices) because, agronomists were required to become more and more interested in the practices and pursuits of peasant agriculturalists. This further broke down the category of strict field crop science and allowed other influences to creep into the “laboratory.” It also put agronomists in an uncomfortable position where they were both experts and also attempting to serve as science popularizers. The need to discuss the topic of popularization separately from the practices of science in the field should not be misunderstood as an attempt to recognize these two categories as inherently separate. Instead, the experimental
plantings and outreach work were in constant contact and iterative conversation (and indeed often shared staff) with experimental fields. Therefore, these experimental plantings and popularization were understood then, and should be understood now, as part of the same impulse.

In order to improve peasant farming, agronomists first needed to identify what was wrong with peasant farming on the steppe. However, in exploring this question, opinion was sometimes divided on exactly what was wrong with peasant farming, or indeed if very much was wrong with it at all. In 1911, the Resettlement Administration ordered a review of agriculture in the Akmola region. The report, completed in 1913 gave the impression that resettlement had been a boon for peasants and for the region. In spite of the “imperfect cultivation” practiced by peasants, the report was rather optimistic about their agriculture. While it acknowledged challenges, the authors blamed them mostly on climactic conditions of frosts and droughts. Although it mentioned the increase in land scarcity the report stated that peasants were already beginning to recognize this and had begun “striving to improve their farming methods.” The report however, did not give peasants all the credit for this, instead they pointed to the role of government in meeting peasant desires for warehouses to supply seeds and farm machinery. However, according to the report, the most important thing the government did to improve peasant farming was its encouragement of individual farmsteads (otruba and khutor). As such, the authors of the report believed that finally, almost a decade after the reforms had begun, the Stolypin reforms were succeeding and peasants were creating independent homesteads and practicing more modern productive agriculture.\footnote{RGIA, f. 391, op.5, d. 1613, ll. 119-120. “Materialy k obzoru sel’skogo khoziastva Akmolinskoi oblasti za 1911-1913 gody i opisanie Akmolinskoi pereslencheskago raiona s prilozheniiam fotosnimkov” 1913.}

\footnote{For discussion of the ideas behind the Stolypin reforms and attempts to turn peasants into independent farmers see: Yaney, \textit{The Urge to Mobilize}.}
The report was enthusiastic about how peasants arrived in the region and how they quickly developed the land into productive farms. It stated that in the first year the farms were small, but that the average farm after 2-3 years had already grown to 3.3 desiatins, in 6-7 years that farm had grown to 5.5 desiatins, and after 10 years, the average farm was over 10.5 desiatins. However, the expansion of farms was not limited to acreage. The report also claimed that in comparison to European Russia peasant farms in Akmola averaged 3-4 draft animals, and 8-9 non-working livestock (cows, sheep, etc.). Additionally, it claimed that on average farms in Akmola were technologically advanced commenting that, “sokha (wooden plows), sickles, scythes, which are widely used across many places in European Russia have here long been replaced by the newest type of agricultural implements.” The authors were also particularly enthusiastic about the number of credit coops (127) in the region that had issued loans of 1.8 million rubles, and had 46,000 shareholders. They found this essential because the price of grain rose and fell dramatically because the grain markets were very localized, and this credit helped them weather the storms. While the report said that there was more work to be done, overall it painted a healthy picture of agriculture in Akmola oblast.

However, the oblast was a large area that was just one part of an even more massive steppe region, and it appears that much of the progress described by the authors was limited to the northern edges of the oblast. Additionally, the connection between the creation of independent farms with prosperity without any supporting evidence indicates that the authors may have had a more political than scientific agenda in mind. Furthermore, the authors also acknowledged, that the most successful farmers and villages in the region did not necessarily thrive because of their independent farms and increasing acreage. Rather, they admitted that,

186 RGIA, f. 391, op.5, d. 1613, l.120.
especially in the southern parts of the oblast, prosperity was driven by large cattle breeding operations that relied on large areas of open steppe typically rented from Kazakhs.\textsuperscript{187} Therefore, it was the cheap and available land of settler colonialism more than individual initiative that was generating capital for agriculture in at least part of the region.\textsuperscript{188}

Other officials both in Akmola and especially in more arid regions had much less glowing things to say about the environment and peasant agriculture than the authors of the 1913 report. Earlier in 1907, a similar report on the state of agronomic work in the oblast was much less glowing. Although the situation on the steppe changed radically year from year, the later more glowing report did not necessarily contradict or indicate the problems identified in this earlier report had been addressed. Just as the 1913 report described how cattle farming and extensive farming were the main methods peasants used to grow their crops, the 1907 report indicated a similar problem. The authors believed peasants were too focused on what they termed an “exaggerated grain system” (utrirovanno zernovoi sistemy) that quickly used up land, and needed to be addressed by crop rotation.\textsuperscript{189}

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\textsuperscript{187} Ibid., l. 120.
\textsuperscript{188} For a similar process in North America see: Nathan B. Sanderson, “‘We Were All Trespassers: George Edward Lemmon, Anglo-American Cattle Ranching, and the Great Sioux Reservation” Agricultural History 85 no.1 (Winter 2011): 50-71.
\textsuperscript{189} TsGARK, f. 64, op. 1, d. 6133, l. 10 “Otchet po agronomicheskim rabotami v Akmolinskoj pereslancheskom raioni za 1907 g.” 1907.
\end{flushright}
Instead of successful independent farmers, the author of this report saw peasant agriculture in Akmola thus:

Thanks to the great amount of land in Siberia, peasants are engaged in an exceptionally predatory system of farming: peasants sow spring grains like wheat, oats, barley, and some millet year after year in the same field until it is exhausted. Such a practice usually lasts 5-6 years and on the best soils 12. When the harvest at that site ceases to cover the costs, it is dispensed with and a new site is plowed up. The above-mentioned agriculture practiced by Siberian peasants is doomed to failure, due to strong colonization and population growth, it is doomed to complete failure in the near future and one can confidently say that if Akmola oblast does not move to crop rotations in a timely manner, then there will be agricultural crises worse than those observed in European Russia…

This “predatory” system was observed by most agronomists who blamed it largely on the easy availability of cheap land nearby that could be rented from Kazakhs, and on the challenges of growing grain in a very arid region, and helped convince officials that experimental fields were necessary in the steppe region. The peasants faced a challenge of an unfamiliar environment coupled with cheap and easy excess land, and if nothing else was done, settlement would continue and eventually the system would break due to drought or some other environmental challenge.

Agronomists believed part of the problem was that there were few good examples that even well-meaning peasants could turn to. For example in 1906, officials in the Resettlement Administration in an effort to explain why experimental fields were needed commented on how “old settlers” practiced a “low state” of agriculture and the nomads practiced almost no agriculture, so they believed there was no one to teach new settlers how to properly farm. This meant, the agronomists needed to take it upon themselves. Having failed to create a mass of educated Kazakhs and peasants through the earlier work of lower agricultural schools, the

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190 Ibid., l.8
agronomists of the quickly developing Resettlement Administration took on the task. However, experimental fields were not necessarily the primary method officials hoped to use to teach peasants to farm.

While experimental fields played an important role in this work, much of the outreach that agronomists conducted fell under a category they called, “cultural-agronomic” work. Although agronomists often felt this work was under-funded, it was in fact one of the larger expenses in an oblast budget for agronomy. For example in 1907 cultural-agronomic work accounted for 1,660 rubles of the 11,816 rubles spent on agronomy that year. While personnel was a larger category as a whole at 4,848 rubles, this included 1,990 rubles of staffing for technicians who were the ones primarily responsible for this work. Combined technicians accounted for the highest salary outlay coming in ahead of laboratory soil scientists who were budgeted only 1,024 rubles.\footnote{TsGARK f.64, op.1, d. 6133, l. 2}

In 1907 in Akmola oblast, the head agronomist described the duties of the work of the technician working on cultural agronomy:

The role of the technician can be boiled down thus, present orally in an understandable form on the [agronomic] brochures with additional commentary on this or that action, and then to direct the debate that arises among the peasants which is usually very lively. Usually there were opponents and defenders of a proposed action among the discussants. In the first settlement I visited, I was convinced that such discussions arouse a great interest among the peasants. However, upon further travel, both myself and the technicians became convinced that not all topics were as interesting to settlers in every village to the same degree, in one village they are particularly interested in cover crops, in another they are interested in vegetable farming.\footnote{Ibid., l. 4.}

This is one of the few descriptions of what it was actually like for technicians and agronomists to carry out agronomic popularization work in the steppe region. Most descriptions simply stated
how many villages were visited, what topics were discussed, and how many brochures were
distributed. Sometimes they would even describe how sympathetic or averse peasants were to the
message. This particular description is interesting because it indicates that the topics were often
of great interest to peasants and quite contentious. Simply painting settler peasants as either stuck
in their old ways or as passive actors waiting to be “saved” by information from agronomists is
too simple. Instead, it seems peasant opinion about agronomists was diverse with some agreeing
and others uncertain of the usefulness of the message.

However, peasant interest indicates that many peasants were interested in good
production methods. Exactly why some peasants were opposed to the agronomists could have
many meanings. They might be suspect because they were outsiders, they might also have seen
other experiments go awry, or they might simply be rather conservative in their outlook.
However, it appears that the fact that peasants showed up to these discussions, whatever their
feelings on the advice given, means that they were thinking about how to farm in a new
environment. This description indicates that peasants were not at all passive or thoughtless in
these questions, instead (given the heated nature of the debates) they no doubt thought and
worried about them just as would be expected for people trying to survive in a new difficult
environment who had spent their lives up to this point farming and already had a wealth of
experience to draw on.

What is more, it is significant that in a non-democratic state like the tsarist empire,
discussion and even arguing with a government official was something that government officials
were encouraging. While in many ways the expertise that was developing on the steppe in this
period often shut out voices, and closed down the public sphere and a diversity of opinions and
ways of doing things, cultural agronomic work was in fact creating a public sphere of sorts
where everyone was given a chance to speak and bring their own experience and expertise to the table.\textsuperscript{193}

Upon first impression, experts encouraging public discussion and debate about farming practices is in some ways surprising. However, it gets to the root of one of the major contradictions of technopolitics broadly and specifically of agronomy on the steppe. In order to expand the technopolitical network, new actors need to be included. Arunas Juska and Lawrence Busch described how in the process of creating a technoscience of rapeseed oil production in the twentieth century that could engage farmers, as well as industry and science, the power dynamics that made up expertise would shift and power could be allocated in different ways.\textsuperscript{194} As part of this process steppe agronomists were attempting a similar project. They were giving some power to peasants, which was meant to secure their inclusion in the technoscience of steppe agronomy. While the agronomists no doubt hoped to keep their position of power in this technoscience, popularization does lead to a kind of instability that is found in technopolitics.\textsuperscript{195}

Brochures and debates were not the only method by which agronomists and technicians carried out their cultural agronomic work, and the creation of a kind of “public sphere” on the steppe. Agronomists relied on other technology to popularize agronomic science like magic lanterns which could project images of healthy plants, fields, and improved livestock as part of their work. These machines were not only used in the areas closest to railways or the best

\textsuperscript{193} For discussion on earlier period of science and civil society see: Elizabeth A. Hatches, “In Service to Science and Society: Scientists and the Public in Late-Nineteenth-Century Russia” Osiris 17 (2002): 171-209.


agricultural land, but as relatively portable equipment, they were also used in less fertile regions like near the Temirskii field and in Seimipalatinsk oblast.\textsuperscript{196}

This type of cultural-agronomic work meant that agronomists and agronomist technicians were very frequently on the move and were forced to work on a wide array of projects that might lie outside of their specialization. While these technicians often had less training than agronomists, they required no less knowledge, and since they were often in the field away from museums and libraries unlike oblast agronomists, they had to have a working knowledge of an array of topics. A good example of the work of a technician was the technician Shinarenko who arrived in Turgai oblast in March 1910. His ostensible duty was to assist in the work at the Temirskii and L’voyskii experimental fields (themselves hundreds of miles apart), he was dispatched a month later to Kostanay uezd to supervise the planting of alfalfa fields among settlers. After his return to his post in Adamovskii district about half way between Kostanay and Orenburg, he was sent at the end of April to the far west of Aktobe region to help combat groundhogs using poison. Only after his return from Aktobe was he able to return to his post and “provide agronomic help” to settlers in the area.\textsuperscript{197}

Most cultural-agronomic work, especially in regions like Akmola that had better farmland and some water, focused on three main topics: encouraging peasants to sow cover crops, pest problems, and vegetable plants. Cover crops were viewed by agronomists as a key feature of improving peasant agriculture by 1906. While this did not mean they had entirely given up on growing wheat, the fact that they still had not solved the challenges of wheat growing, and the fact that peasants needed almost no encouragement to grow more wheat, meant

\textsuperscript{196} RGIA f. 391, op.3, d. 1891, l. 6 obo, Letter from the Head of Resettlement for Semipalatinsk to the Resettlement Administration, 12 November 1910.

\textsuperscript{197} RGIA, f. 391, op.4, d. 850, l. 1 obo “Otchet zavedyvayuschego Turgaisko-Ural’skom raionam po agronomicheskoi chasti za 1910 god. Chast’ 1-e,” 1910.
that very little outreach was undertaken to encouraging grain growing. However, cover crops were believed to offer a solution to the problem of increasing peasant settlement and growing land scarcity. They also fit within a general cultural dislike of the waste agronomists associated with the extensive grain farming peasant practices.

Peasant agriculture usually relied on monocropping grains on the same field year after year until the land was tired out and then the peasant moved to a different spot or field. Additionally, the hay that peasants needed to feed their livestock (whether dairy, meat, or draft animal) was often the last priority of peasants who could rent land on the open steppe from Kazakhs and cut hay on it. This was also notably the practice of many agricultural schools as was discussed in the previous chapter.

Cover crops, especially nitrogen fixing cover crops like alfalfa, became a favored technology of agronomists and technicians, and this interest eventually led to large scale cooperatives, experimental plantings, and other work to encourage their planting. One of the main reasons beyond land scarcity and nitrogen fixation that agronomists wanted more pasture and cover crops was because they were often trying to encourage a mixed farm that included livestock, field crops and vegetable gardens, which agronomists believed was found in places like Denmark, Belgium, or Iowa. Therefore, it was in keeping with notions about a yeoman peasantry of the Stolypin dream, but it was also in keeping with other strains of agronomic thought in Russia.

In addition to pasture, agronomists also sought to encourage settlers to create diversified farms by helping them grow vegetables. This was required both from a health perspective that sought to make sure settlers got enough vitamins, but also was driven by the realities of a steppe with wide distances. What is noteworthy, however, is the environmental challenges of growing
vegetables were at times even greater than grains. Peasants struggled to get enough water and often faced pests like locusts and others they had not faced before. In order to strengthen peasant abilities to stay in the steppe, agronomists cultural work spent a great deal of time discussing and answering questions about vegetable growing. While sometimes this was driven by a desire on the part of peasants to grow vegetables for sale on the market, it was also often viewed as a means of survival. For example in 1907, the head of resettlement in Semipalatinsk oblast, Shtein requested funds to buy garden seeds for settlers because so many had gardens that failed the previous year and had no seeds to plant the following year. He also remarked that a lack of gardens made it difficult for peasants to even buy quality garden seeds.

While improved pasture and gardens might appear to be contradictions to the agrarian ethos that sought to make the steppe into a bulwark of grain farming for the empire, the other primary concern of cultural agronomic work—pests—fit firmly within the grain farming ethos. In addition to locusts (which are the subject of a later chapter of this dissertation), the main pest problems technicians faced were weeds, smut, and groundhogs. Weeds were typically blamed on poor soil preparation by peasants. Groundhogs were another pest problem that took up significant amount of agronomists time, and like locusts, agronomists did not have a good solution to the problem. Groundhogs ate crops, dug holes that tripped up livestock and as such were real pests, in both regions where grain growing was planned and in livestock regions. The main defense against groundhogs was to try and exterminate them with poison: carbon disulfide being the most popular. However, even according to agronomists themselves, the spreading of

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198 In spite of high hopes, in 1907 even in the more settled regions of Akmola Oblast agronomists still said that vegetable truck farming was still in its infancy in part because agronomists had not developed new techniques for the shorter growing season that peasants were not used to. See TsGARK f. 64, op.1, d. 6133, ll. 8-9.
199 RGIA f. 391, op. 3, d. 448, l. 2 Communication from Shtei, head of Resettlement Affairs Seimpalatinsk Oblast, 13 November 1907.
200 TsGARK f. 64, op.1, d. 6133, l.10.
poison was not welcomed by settlers or Kazakhs because of fears livestock would fall victim to it. However, this did not stop agronomists and technicians from spreading this poison across the steppe.201

The other major pest problem agronomists faced was smut, which is the broad name for a large group of pathogenic fungi that damage crops and lower yields. They are especially prevalent among grain crops and forage grasses. In 1907 in Akmola oblast alone, agronomists estimated that smut cost over 127,000 rubles in lost grain productivity. Smut was identified in grain crops in 85% of settlements and affected 15-30% of the wheat crops in those regions. In fact, agronomists reported that the dual problems of smut and weeds especially wild foxtail millet (setaria virdis), field milk thistle (sonchus arvensis), and spurge (euphorbia) caused losses that would easily pay for 100 agronomic instructors for the oblast.202 This challenge caused the agronomy section to distribute 2,000 copies of a brochure on smut and also distribute low cost seeds to offset losses. This was in addition to meetings and discussions in the villages as described above. The most common advice for dealing with smut however was the use of expensive copper sprays that many peasants could not afford.203 Nevertheless, it continued to be a problem throughout the late imperial period. Although cultural-agronomic work represented significant outlays of labor and money being spent on outreach to peasants it was not without its share of failures. Agronomists were forced to cover huge swathes of territory, face a wide array of challenges to agriculture, and had to be aware of environmental differences in different territories. Nevertheless, agronomists and technicians like Shinarenko did accomplish quite a lot.

201 RGIA f. 391, op.4 d. 850, l. 4.
202 RGIA, f. 391, op.1, d. 6133, l.9-10.
203 TsGARK f. 64, op.1, d. 6133, l. 8-9.
However, they did so with the constant knowledge that they did not always have exactly the information they needed since they—and the entire agronomic apparatus—was still learning about the region and how to grow crops in it. There was also the challenge that peasants did not always trust agronomists as illustrated by rowdy meetings. Some agronomists were well aware of their precarious position and how hard they would have to work to gain the trust of peasants if they were ever to get them to take up new practices. Officials in the Resettlement Administration were very weary of this challenge, and they openly worried that failures of agronomy could “discredit both science and its agents in the eyes of the population.” They went on to say that efforts should be focused on supporting their “authority in improving the improvement of peasant specifically settler agriculture.” This concern with “authority” reflects how agronomists understood their role as experts as being precarious which is not a unique experience for the steppe. However, what made the steppe experience unique was the fact that the agronomists were actually creating the knowledge they sought to popularize simultaneous to its popularization, because they still had so many unanswered questions about growing the steppe environment.

**Public Experimental-Demonstration Fields**

Worry about failure was a major force driving the establishment of “public experimental-demonstration fields.” These were included in the original ideas of the Ministry of Agriculture; however, on the steppe, they became especially important as they allowed agronomists to gather information about a wider array of environments spread across their massive areas of responsibility. Ultimately, they were also simultaneously creating more more sites of demonstration which meant peasants had to travel shorter distances to see scientific agriculture at

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204 RGIA f. 391, op.3, d. 102, l. 16 obo, Communication from the Head of the Resettlement Administration to A.N. Velitskomii, 14 March 1906.
work. Finally, they also played an important part in continuing to expand the technopolitical network by including some members of the peasant community who were the hosts of the experimental plantings.

By 1910 in the Turgai-Uralsk Resettlement district, in addition to demonstration fields at Temir and L’vov, agronomists and technicians had established another five public experimental-demonstration fields in the villages of Novorossiskii, Troitsk, Dzhusalinski, and Kherson totaling nearly 50 desiatins. These fields were housed on land owned by peasants who pooled their land to assist in the planting and care of certain crops under the direction of an agronomist or technician. In Novorossiskii, the 8 desiatin field was owned by two peasants, Grigorii and Peter Marchenko. In Troitsk, the 6 desiatin field was owned by five peasants: Shevchuk, Kolontaveskii, Kovalev, Golovchanski, and Yudin. In addition to serving as places where peasants could farm under the direction of agronomists and technicians on their own land, the farms also played an important role in producing seed crops to help distribute improved seeds to other interested farmers.205

While by 1910 there were plenty of peasants in the region who wanted to be part of the public experimental-demonstration fields, just a few years earlier this was not the case. The establishment of a similar project was attempted in the summer of 1904 with the expressed goal of determining if the area was appropriate for colonization, the agronomist Skaiov sought out areas for what were termed “experimental sowings.” After examining an area of over 3.5 million desiatins in the northern part of Aktobe uezd, he was forced to settle on four sites that had appropriate oversight. The fact that no peasants were entrusted with the supervision of these

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205 RGIA f.391, op. 4, d. 850, l. 4. This method was similar to the cooperative extension approach pioneered in the US under Seaman Knapp, see: Seaman Knapp, “The Farmer’s Cooperative Demonstration Work” in Yearbook of United States Agriculture (Washington: US Department of Agriculture, 1910).
plantings speaks both to the low settler population and also represents a different approach to agronomy on the steppe, one that focused entirely on research instead of popularization. Skaiov eventually established plantings at a Russian-Kazakh school headed by I. Shabanov, a second site was under the supervision of the Temir uezd forester V. Kiyuts, and two other spots were located at the railroad station near Dzhurin. The final location of Skaiov’s experimental sowing was under the supervision of the policeman F. Grechushkin. The total reliance on government entities is a significant difference from the later public experimental-demonstration fields. Even the name indicates a modification of purpose, although the goal of experimentation and knowledge gathering was not lost, it was now coupled with a popularization goal as well.

The popularization approach of public experimental-demonstration fields was much more successful in engaging peasants even in regions other than Turgai. Similar programs were underway in Akmola and Semipalatinsk. In Akmola work had begun even earlier, no doubt driven in part by the fact that the region faced the problem of settlement density earlier. In keeping with the focus of agronomists in Akmola who were concerned with soil depletion, public experimental fields were focused on sowing grasses for pasture. In Akmola, the agronomists created a sample agreement that they sent out to the villages in Omsk uezd to be signed by those farmers who wanted to take part in the program. In the agreement (written by the agronomist) the peasants claimed that they recognized they did not have enough fodder for livestock, that the meadows were of poor quality, and the hay cut in the steppe was of low quality. They were also supposed to agree that it was getting more and more difficult to lease land for hay from the Kazakhs. The peasants themselves never said any of this, but it clearly

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206 RGIA f. 391, op.3, d. 787, l.2 “Ob agronomicheskikh meropriiatiakh v Turgaisko-Ural’skom raione. Chast. 1” 1908-1909.
207 RGIA, f. 391, op.3, d. 1891, l.6, 12 Nov. 1910.
includes the major criticisms by agronomists about peasant agriculture. This tendency to “speak” for the peasants unabashedly indicates a potential ambiguity in the popularization approach. The project still put the growing of the crops in the hands of peasants for demonstration and seed sharing, but the agronomists were still at times patronizing and didactic in their attitude towards those peasants.

The agreement went on to say that to address these problems, “we decided to start fodder grass cultivation, but recognizing that this is a new business in our locality, we want to test it first. Therefore, we asked the Akmola Resettlement Administration to send us a technician.” They pledged to select a suitable piece of land one desiatin in area and sow the area under the advice of the technician. They would then harvest the hay and give all information about the size of the harvest to the Resettlement Administration. In exchange, they would be given the seeds without cost, however, they would pay the Resettlement Administration 15 rubles. In spite of the odd nature of the agreement, that was both an agreement and a kind of didactic tool apparently directed at the peasants, agronomists were able to collect 29 signed agreements. Of these about half had a successful crop, however many did not because the seed arrived late; and while the technicians were waiting for the seeds, the peasants began prepping the fields, but did so poorly. Of the plantings, alfalfa was the most successful crop.\textsuperscript{208} Popularity in spite of setbacks was not limited to Akmola, in Kostanay uezd after beginning demonstration planting in 1910 over 400 households requested alfalfa seed. This was in spite of the fact that many plantings did quite poorly, which was blamed mostly on a lack of proper machinery and too little water. Similar demonstration plantings were organized in a dozen villages in Turgai-Uralsk in 1909, but in 1910, the funding was cut and the program was stopped.\textsuperscript{209}

\begin{footnotes}
\item[208] TsGARK f. 64, op.1, d.6133 ll.5-6.
\item[209] RGIA f. 391, op.4, d.850, ll. 2-4.
\end{footnotes}
In spite of the preference among both settlers and certain segments of the agronomy bureaucracy for grain, pasture grasses, especially alfalfa, were often the crops that appeared to hold the most promise to many agronomists in the steppe, and especially for public experimental fields. This was in part because the fields were meant to be demonstration sites to encourage new crops. While agronomists were enthusiastic about pasture planting, they were not alone, and many peasants shared their aims. Even in the Akmola experiments where half the alfalfa crop failed in 1907, agronomists could not keep up with the demand for seed and assistance. Similarly, in Turgai-Uralsk, agronomists stopped all cultural-agronomic work that was not related to pasture in 1910 due to high settler demand for agronomic aid. Whether peasant involvement in this program was genuine is difficult to tell. Peasants may genuinely have wanted to be involved, or, just as likely, they may simply have wanted free assistance from the Russian government.

Although this only represented a small percentage of settlers engaged in cooperative extension type work (around 70 families in Kostanay uezd for example in 1910 were part of cooperative sowings), it still fit within agronomists ideas about technology transfer. They believed that if they could get a segment of “progressive elements” on their side to adopt the new technologies, other peasants would see their success and also adopt those practices. This was an interesting parallel to the project of Saenko (at the Zaisan Kazakh agricultural school) who sought to give graduates farms in their home communities to spread sedentary farming among

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210 RGIA, f. 391, op.4, d. 850, l. 3 obo.
211 In his 1927 work on experiment stations and how they help peasants, Sokrat Chaianov described a similar process describing how the stations tested things and then spread them among the “advanced peasants” of the region. S.K. Chaianov, *Chto Dayut krest’ianam opytnye stancii tsentral’noi chernozemnoi oblasti* (Moskva: Gos. Izdatel’stvo Krasnye proletarii, 1927), 6.
the Kazakhs and indicates again the similarities of the tactics of remaking peasants and colonized peoples.

In spite of the growing popularity and success of the demonstration plantings, they only reached a small segment of the population. Therefore, some agronomists in Akmola felt that they perhaps needed to be supplemented with other work to more quickly address the wastefulness of peasant farming. In 1907 after studying the program of experimental sowings by travelling to several villages, one agronomist remarked that “In a word, experience with settler agriculture during my visits to settlements last summer, even more than last year, has totally convinced me of the need for agronomic assistance to the population.” This was in spite of the fact that the experimental plantings were already taking place.

However, implementing programs for agronomic aid was difficult considering agronomists sometimes knew relatively little about the peasants in the region and how they farmed given the vast distances in the steppe. Therefore, the Akmola administration recommended studying them via a survey of peasant households to be conducted with the aim of developing a system of crop rotation that could replace the peasants’ “exaggerated grain system.” The proposal called for a statistical study of two villages in Omsk uezd and another in a “southern uezd.” It is unclear if any such study actually occurred, or if this was simply a forgotten proposal. However, once again, there was a powerful parallel to the need to study peasants with the need to remake them similar to the imperial impulse to “know” colonized people to better control and change them.

In the technoscience of the settler colony, peasants could be invited to play a role in creation of the new steppe, they could play a role as part of the

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212 TsGARK, f. 64, op.4, d. 6133, ll.10-11.
213 For discussion of this elsewhere in the Russian Empire see: Knight, “Science, Empire, and Nationality”.
creation and popularization of steppe agricultural technoscience, but to do so required sometimes viewing them similarly to a colonized people.

However much agronomists tried to make public experimental-demonstration fields play a dual role as sites of information gathering and popularization, they frequently fell short of this ideal because the steppe did not have enough technicians to oversee all plantings thoroughly enough.\textsuperscript{214} This led to several failures and threatened the authority of agronomy. However, this was not the only problem these failures caused. The lack of control and consistency in planting practices and cultivation meant that the fields lacked a base line of information. In order to address this challenge in Akmola oblast, agronomists established a kind of control experimental planting near Omsk which could be supervised and cared for by trained agronomists and technicians who were tasked with gathering correct data. By 1905 there was already an experimental farm near Omsk called the Omsk Experimental Field. However, it was actually located in Tobolsk oblast in an environment quite atypical for the rest of the steppe because it was situated in a forest glade protected on all sides by trees. While this field had good plantings of alfalfa in its first years, agronomists felt it could not serve as a control to test what was a reasonable productivity for steppe agriculture. Therefore, the agronomy section secured land from Cossack lands and established a field (No. 120) on land on the Irtysh plateau in 1907. This land had average soil, a mix of chernozem and sandy loam with some salt pans.\textsuperscript{215} It also had a vegetative cover of “forest steppe” type with the typical grasses making it rather characteristic of the northern Akmola region.\textsuperscript{216}

\textsuperscript{214} TsGARK, f. 64, op.4, d. 6133, l. 11.
\textsuperscript{215} Chernozem, though now a universal classification of soil types due to the pioneering work of Vasily Dokuchaev, is a Russian term that literally means “black earth.” This soil type is identified by its black color which is due high percentage of humus (organic material) and very high fertility as well as superior water storage capacity. Loam is another soil type that still contains significant organic matter (though less than chernozem) and its sandy quality allows for good drainage, but less water carrying capacity than chernozem.
\textsuperscript{216} Ibid., ll.11-12.
A similar need for a field that could serve as a kind of control to test the limits of what scientific agriculture could do was located in Kostanay uezd starting in 1908. The L’vov experimental field began as a single plot of winter rye sown in an area where agronomists were undertaking a large scale soil survey. The following year alfalfa was planted and that spring experiments were begun on growing spring grains and on fallow.217 By 1911, the area under study had grown to 752 desiatins of which 109 was cultivated in field crops, pasture, and orchards, and following hydrotechnical investigation, a source of potable water from a well.218 By this time, the field was taking shape and it had a work plan and a head N. I. Kurbatov.

The establishment of the L’vovskii field did not arise simply out of an expansion of a few test plots, instead, just like the establishment of experimental institutes across the empire in 1891, the L’vovskii field was established in response to widespread crop failures across the southern part of Kostanay uezd, which agronomists blamed primarily on weather. However, the establishment of the field in this location was apparently requested by peasants in the region who in 1907 volunteered to give 286 desiatins to establish the field. The primary focus of the field was therefore tied to ideas about the irrationality of peasant agriculture that lacked “scientifically educated farmers” which meant the region had not “worked out any rational methods of agriculture for these [environmental] conditions.” Yet, it was apparently the peasants who requested the establishment of the field and gave the land from their own holdings for its creation.219

This role of the field as something requested by the peasants, who agronomists thought were irrational and averse to scientific farming, is a further illustration of the ambiguous views of

217 RGIA f. 391, op.4, d. 850, l. 12.
218 Ibid., l. 2.
219 Ibid., ll.10-11.
agricultural scientists toward peasants. However, it is also a clear illustration of the instability of creating technoscience. As the scientists sought to work with progressive elements, and expand the actors involved in the creation and maintenance of technoscience on the steppe, their motives at times could appear contradictory. On the one hand they treated the peasants as a project in need of remaking, and yet they also needed the peasantry if they were to engage them in order to popularize their science.

In spite of this contradiction, the L’vovskii field became a huge and rather important site of information gathering and science popularization among a largely illiterate population. Nevertheless, the goals of the L’vovskii field reflect both an interest in settlement and reflect its history as a place founded in part out of a crisis of crop failure. The goals as laid out in the workplan by Kurbatov were as follows: 1) study the meteorology of the region especially with a focus on soil moisture and its connection to the growth of wild and cultivated plants; 2) studying the methods of soil cultivation that preserve water, especially ones that involve different fallowing practices; 3) examine the possibility of growing grain in the region; 4) study different crop varieties and test their success under different planting times; 5) ascertain the meaning and economic suitability of crop rotation by testing different types; 6) ascertain the best approach to fertility improvement testing whether it is artificial fertilizers or sowing cover crops. These focuses of the L’vovskii field indicate how settlement and previous crop failures were driving the research agenda of the field. Additionally, they show that the focus on water, fallow, and variety trials were not only the focus of the experimental field at Temir as is described below.

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220 Ibid., l. 39.
The Temirskii Experimental Field and Sokrat’ Chaianov’s “Settler Ecology”

While the archival material documenting the L’vovskii experimental field is enough to give an idea of what was going on at the field, the experimental field at Temir is much better documented both in archival and in published sources. The Temirskii field is also a unique example of experimental fields in the steppe. This is due to the fact that it was first established under the supervision of the Temir Temporary Commission earlier in 1906 as a direct response to study the “agricultural conditions” of the region because increasing settlement made it a matter of the “upmost urgency.” However, the reports of the field themselves indicate that in fact at the time of settlement, there were only around 2,000 Russian settlers in the Turgai region (roughly 300 families). In fact, most of the population of the region was made up of Kazakhs who officials said accounted for over 146,000 persons. Therefore, the field was explicitly established with a goal not of understanding the current agricultural conditions. Instead, the purpose was first and foremost to aid in settling peasant farmers in the region.

The first complete plan of work for the field was created by a commission of agronomists working for the Turgai-Ural’sk district in March 1907 with the understanding that future directives would be handled by a commission made up of the agronomists: Tsavelya, Skalov, Bogdan, and Chaianov who was also appointed head of the field. Sokrat Chaianov was in many ways well-suited to the job, although at this point he was just beginning his career. However, eventually he would become known as one of the founders of Russian experimental agriculture. Chaianov had completed his education at the Moscow Agricultural Institute as an

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222 Chaianov, *Otchet po Temirskomu 1907-8*, 54.
223 RGIA f. 382, op.9, d. 145, l.5, “Kratki otchet Timirskogo opytnogo polia raspoloxennogo v Turgaisko-Ural’skom raione za 1907.”
agronomist in the first category. He then worked as a local zemstvo agent in Starobelsky in Kharvkov gubernia. Previous to his appointment as head of the Temir field he was working for the Turgai-Uralsk Interim Party. Chaianov was to be assisted at the field by Koloskov who had finished the Kon’-Kolodezskii lower agricultural school in Voronezh gubernia and then worked at the Kostycheshsky experimental station. While Chaianov did have some experience working in the steppe prior to his appointment, neither had spent a large amount of time in the region before their appointments.

Although the land and plans had been made by the temporary commission to establish a field, they still had to wait on confirmation from the local administration, which was held up by Kazakh resistance to the idea. Although the temporary commission had approved the establishment of the site in February of 1907, local Kazakhs appealed the decision. Meanwhile, Chaianov and his team continued to work at the site completing soil and botanical surveys that spring. They also demarcated the land into test plots. All of this work continued in spite of the fact that the Kazakhs were appealing the decision to the Ural oblast administration who eventually approved the plan and overruled the Kazakhs in June. Even though settlers accounted for around 2,000 of the nearly 150,000 population of the region, and although the vast majority of Kazakhs probably opposed the idea, several hundred acres of land was taken from the Kazakhs and handed over to government scientists whose studies were aimed at helping increase the number of peasant settlers into the region and put further land pressure on the Kazakhs. This colonization and land expropriation was the material basis of the settler colonial science that was about to be created at Temirskii.

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225 This institution was established to create settlement districts in the steppe regions.
226 Chaianov, Otchet po Temirskomu 1907-8, 2.
227 Ibid., 1.
With work delayed until summer, the first experimental sowings at Temirskii did not occur until the fall during which about 64 desiatins were plowed and planted.\textsuperscript{228} In addition to the plantings, several buildings were completed during the first year: a laboratory, museum, ice house, a canopy for agricultural equipment and a temporary barracks for workers. Additionally, a house for the director along with a banya was also completed in addition to a stable and a warehouse.\textsuperscript{229} By the following autumn several more buildings were completed including a house for the field manager with rooms for the lab assistant and museum, an apartment for the assistant, a workers hut, a kitchen and shed, and a machine barn.\textsuperscript{230}

However, Chaianov was not present at the field for much of the first year, as he had been directed to travel to other experimental fields and stations in Odessa, Samara, Kherson, Poltava, and the Don Region to speak with field heads and see their work first hand. Therefore, for nearly two months during the summer of 1907, Chaianov was absent. He was also often away from the field supervising experimental plantings in other places in Turgai oblast. Although most of the seed trial sites (like Temirskii itself) were close to the rail line Chaianov was often away visiting plantings at Jurun, Izembat, Emba, Akdar, Aman sai, and Ashe sai. This was a frequent source of worry for Chaianov, and it only got worse when his assistant Koloskov who was had primary responsibility for collecting meteorological data fell ill the following winter, and his replacement F.T. Yakovenko was late in arriving.\textsuperscript{231}

In spite of these problems, Chaianov was overall optimistic about the first seasons at Temirskii. The weather station was established with new instruments, and experiments had begun on the effects of weather on grain varieties. Additionally, the mapping of soils and other

\textsuperscript{228} RGIA, f. 382, op.9, d. 145, l. 9.
\textsuperscript{229} Ibid., l.11.
\textsuperscript{230} Chaianov, \textit{Otchet po Temirskomu 1907-8}, 2.
\textsuperscript{231} RGIA, f. 382, op.9, d. 145, l.1-12.
soil work along with experiments to test different cultivation techniques that preserved moisture were underway.\textsuperscript{232} However, these first years of research were about more than simply gathering information on the steppe and helping locals with their agricultural questions. Chaianov himself had this to say about his purpose at Temirskii: “The study of soil and vegetation is especially important for the Resettlement Administration. Soil scientists cannot so thoroughly and systematically carry out observations of the soil moisture of virgin soil with its many detours as can be done by a permanent experimental station.”\textsuperscript{233} From the outset, Chaianov’s scientific inquiry was imbued with the goal of settlement.

One of the primary ways Chaianov’s work was innately linked to settlement was in his focus and study of grains. However, as was typically the case elsewhere with grains, not all grains were considered equal. The one grain that grew quite well in the environment of Temirskii was millet. Chaianov himself called it “the only crop of real importance” in the region. However, it was also a crop that was grown by Kazakhs. He believed that millet was the only crop that could “endure” the poor cultivation practices of the Kazakhs. He commented on how they sowed it too late, plowed the fields poorly and do little cultivation to control weeds. He also complained that they stored the harvest in pits in the ground. Even with this primitive cultivation practice, he reported that Kazakhs averaged 23 puds of millet per desiatin yield, compared with 16 of wheat or 15 of oats. Even still, he reported that with the railroad coming into the region it had already changed the market and millet was one of the crops being exported. Nevertheless, Chaianov recognized that millet was a plant that had an advantage of being “acclimatized” to the region and he even decided to carry out some experiments on local varieties.\textsuperscript{234}

\textsuperscript{233} Chaianov, \textit{Otchet po Temirskomu 1913}, 2.
\textsuperscript{234} Chaianov, \textit{Otchet po Temirskomu 1907-8}, 55, 61, 115.
Chaianov and the others who made the plans for the field did not have much hope that the region could produce much wheat. However, they still spent a lot of time researching the possibility and trying to discover ways of making at least some grain crops grow. By way of explanation he wrote, “the compliers of the organizational plan [of the field] nevertheless had to take into account the agriculture of the settler” which did not include millet and it was the job of the field to anticipate future concerns, i.e. settler concerns.\footnote{Ibid., 55.} After several failed attempts, Chaianov was still uncertain if wheat would grow in the region, but still felt it needed to be grown not only because peasants wanted it, but also because it helped create a “balanced agriculture.”\footnote{Ibid., 59.} However, it was becoming clear to Chaianov that spring wheat would not grow well and he focused his attention on winter wheat and rye because of their earlier harvest time, believing they allowed time to harvest the crops before summer drought. Nevertheless, winter wheat and rye still required variety trials and Chaianov wrote that it was not enough to assume that wheat varieties like Poltava or Ekaterininsky would grow here even though these regions often suffered from similar dry climatic conditions.\footnote{RGIA f. 382, op.9, d. 145, l.10.} After several frustrating seasons of experiments, Chainov’s intuition was largely proved correct. However, instead of focusing only on varietal trials, he believed the problem of aridity could only be answered if it was coupled with work on fallowing and cultivation techniques that could preserve moisture. Therefore, Chaianov’s work began to focus much more on attempts of fallowing that could preserve moisture.

Chaianov believed if grain agriculture were to take root in the region it would be necessary for settlers to engage in some type of fallowing that would preserve moisture and soil
fertility. In many ways this was the same conclusion agronomists were coming to in other regions like Akmola, but in the area near Turgai, the aridity and soil fertility questions were more severe. Chaianov also made an important contribution in that he understood this project as trying to solve two different problems with a single solution. He hoped to develop a system of fallow that would solve both the aridity problem, and improve soil fertility not only on marginal lands but on nearly totally infertile lands too.

Chaianov recognized that the need to solve the fertility issue was driven by the demands of settler agriculture that he was there to fix writing, “lands in this region with the inclination of settlers to expand the tilled grain lands, and sow grain year after year in one place, will exhaust the soil relatively quickly.” The only fix he saw to this was either through a long fallow period or sowing grasses. He believed it was not possible to solve the fertility problem with artificial fertilizer or manure—and even refused to do experiments using either—because low moisture meant the chances of crop losses due to drought made it too costly to risk expensive chemical fertilizer and a lack of moisture might even make it impossible for plants to utilize the phosphorus. Manure was deemed out of the question because with so few trees on the steppe, manure was too valuable as a source of fuel. Therefore, Chaianov focused on crop rotation and cover crops as a means of improving soil fertility. However, he also recognized that he could use his investigations into soil fertility to address the water issue. Therefore, in his work that was focused on crop rotation, the three areas of investigation the farm focused on were plowing, influence of fallow on depleted soils, and the comparisons of natural fallow with planting grasses and legumes.

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238 RGIA f. 382, op.9, d. 145, l. 9.
239 Chaianov, Otchet po Temirskomu 1907-8, 59.
240 RGIA f. 382, op.9, d. 15, l.7.
Chaianov believed that fallow and sowing nitrogen fixing crops and grasses could serve as a way of solving both problems which he believed would be an even bigger challenge than what he had observed in Ukraine which also faced soil depletion and lack of moisture, albeit less extremely than in Turgai. However, he was not only attracted to this solution because it would address the two most pressing issues. He also believed like nearly all other agronomists in the region that peasants were missing an opportunity by not planting more pasture. Like others, the fact that peasants were renting land from the Kazakhs to cut hay on rankled Chaianov. Rather than view this relationship as symbiotic, or as a way for Kazakhs to continue to survive in the face of increased peasant settlement, Chaianov like others found this practice to run counter to how he imagined settler agriculture should be practiced. The fact that Kazakhs were never addressed, except in this problematic light, in almost all of Chaianov’s writings raises the unanswered question of what he thought the Kazakhs were supposed to do to survive. In true settler colonial fashion, when Kazakhs were not a problem, they were ignored with the hope that they would simply disappear.

In his vision for addressing moisture through fallow and planting, Chaianov began experiments on different types of fallowing April, Kherson, and black. In Russian agriculture, there were two different types of fallow one, “par,” meant plowing the land at the end of a harvest and then leaving it for less than a year without crops. If it was left for over a year it was called “zalezhi.” One advantage of par was that it could sometimes be used as pasture in the early spring when small green plants began to grow on it, and if done properly only required a light harrow rather than a deep plowing in spring to remove the surface weeds and prepare the seed bed. Some farmers would even plant short term cover crops to feed livestock or to improve

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241 Chaianov, Otchet po Temirskomu 1907-8, 56.
242 Chaianov, Otchet po Temirskomu 1910, 57.
the soil, either nitrogen fixing legumes or deep root crops like turnips to break up the soil. However, other versions included methods that continuously kept the field weed free through frequent cultivation. This process is called black fallow or “black par.” Chaianov carried out a number of tests on black par but he found it to be less effective at maintaining soil moisture. Instead, similar to experiment farms in Ukraine, he believed that a single harrowing in spring before planting (so-called April par) was the preferred method, which was less familiar than the later June par that he also tested for settlers to the region from places like Poltava and Kharkov. However, Chaianov wanted settlers to go further and practice active fallow, which would involve sowing cover crops of nitrogen fixing legumes and grasses writing, “good par and grass sowing it seems are the only foundations on which it is possible to build a good and lasting agriculture in this region.”

After his first years at Temirskii, Chaianov had developed a particularly suitable regimen. This involved using early par and combined it with expanding improved pasture not only on those lands that were fallow, but also to sowing pasture lands that would be kept for several seasons and upon which hay could be cut and animals pastured. However, he recognized that this would require significant increase in the amount of machinery available to peasants. Nevertheless, he believed he had a viable system for the new environment that involved par and a four plant seed mix for pastures that included two legumes sainfoin and alfalfa and two cereal grains wheat grass (zhitiak) and brome grass (koster). However, these plants were not plants that Chaianov had imported and improved upon, they were plants that were available growing

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244 Chaianov, *Otchet po Temirskomu 1907-8*, 57-8.
245 Ibid., 61.
right in the middle of the steppe. While Chaianov believed these grasses should be planted on prepared ground, the actual plant combination he was recommending differed little from the open steppe that the Kazakhs were renting to peasants for the cutting of hay. While these pastures were maximized for nutrition and based on what crops he observed growing best in the region, they were in many ways a difference in degree not in fundamental quality. However, with Chaianov’s seal of approval, these plants were now part of the agronomic technoscience that was being deployed to help settle the steppe.

However, the idea that Chaianov was modifying and perfecting a new system does not fully hold up to scrutiny. Instead, Chaianov and other agronomists themselves acknowledged that peasant settlers in the region already had a fallow system. This involved a first sowing of valuable spring grain a hard wheat and usually a millet, then they sowed soft wheat and less valuable grains until the land gave out. They moved onto a new field and left the old one until they noticed that feather grasses grew on the field and then plowed it again. The feather grasses were a sign that fertility had returned to such an extent that the field could again support a valuable spring grain. In many ways, this mirrored Chaianov’s own observational approach of the ecology of the region.

However, Chaianov did not only believe his best practices could solve the dual challenges of too little rainfall and protect against exploitative peasant agriculture destroying soil fertility. He also believed that his work could help rehabilitate lands that were unsuitable for agriculture, specifically those lands that had very high levels of salts due to a lack of rainfall. These soils are called solonchaks and make up a large percentage of the world’s surface

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246 Chaianov, Otchet po Temirskomu 1907-8, 60.
especially around the equatorial regions. Solonchaks are created when there is poor drainage and salts that come to the surface cannot be washed away, leaving the soils inundated with salt and unsuitable for agriculture. Chaianov believed that Russia faced a crisis of solonchaks and that large areas were impacted by them.

Chaianov was interested in studying how to ameliorate solonchaks which were quite prevalent at Temirskii. He found this to be another aspect of his study of the plants and soils holistically, a process described later in this chapter. He believed that nature naturally dealt with solonchaks, and he sought to mimick those methods by developing artificial methods to combat solonchaks, “which could be called a continuation of natural processes improved by the intervention of man.” Therefore, Chaianov connected his study of local plants to rehabilitating solonchaks by planting more salt-loving vegetation that would collect and preserve snow cover and help flush out the soils. Specifically, he hoped that tamarisk which grew well in salt areas could serve such an end. Here we can see one of the several aspects of what could be termed Chaianov’s settler ecology. He was not thinking and working in a kind of “high modernist” mindset that sought to ignore nature and control the environment in clunky, overpowering ways that viewed things as a battle between man and nature. He was still seeking a longer term domination of the landscape, and by extension of the people—Kazakhs—who had lived there previously. While his ecology could be viewed by some today as a kind of answer to dominating modes of thinking, the values embedded in his assumptions and the goals of his work make the

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248 RGIA f. 382, op.9, d. 145, l.2.
249 Ibid., l.1.
250 Chaianov, Otchet po Temirskomu 1907-8, 63.
picture more complicated and implicated in a project of settler colonialism which in many ways is simply domination by another means.

The fullest example of Chaianov’s settler ecology is perhaps his work on soil classification. Chaianov developed a simple yet incisive method for evaluating soils and their suitability that looked toward connecting plant cover with the underlying soil type. The implications of this were obvious. Now even untrained surveyors, who would not have to send a sample back to a laboratory and wait on results, could simply look at the types of plant ecosystems present and know how suitable the land was for agriculture. Even simple methods like morphology, that could be completed in the field without a laboratory, still required specialized training. In the very notion of this research there was an implied support for the settlement project that reveals how even an ecological perspective, if imbued with the values of settler colonialism, can well serve the aims of empire.

Chaianov’s method was not only meant to replace established soil classifications, instead it was meant to complement them and give clearer subtypes of soil. However, the method he developed was not without its precursors. Chaianov wrote that science had long recognized a connection between plants and soil, and he cited the earlier work of Dima and Keller who worked on a similar question. He believed that previous investigations did not go far enough because they were too focused on pure science rather than researching it for “practical purposes.” In taking up this focus, Chaianov was both associating himself with the field of experimental agriculture that was developing under him and other scientists, and also is aligning himself with the goals of settlement by addressing this question in the steppe.

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252 RGIA f. 382, op.9, d. 146, “Doklad zavedevayuschego Temirskim opytnom polem S. K. Chaianogo o pochvakh” 1908.
In investigating this connection Chaianov phrased his main research question thus:

The mutual dependence between soil and flora, the dependence of flora and soil on the relief (topography) is so clearly expressed, that for the correct understanding of the processes taking place in soils and vegetation, it is necessary to track this relationship. This is not only necessary for studying this locality [Turgai] in regards to agriculture, but also for purely practical aims since, depending on the direction of activity of the natural forces, it is necessary to combine not only plowing, but also the composition of agricultural plants, for example in obtaining new types of grasses from wild ones, the acclimatization of imported grasses, etc.  

Here we see that Chaianov was still somewhat skeptical about whether or not grains could be grown here, but he fully believed that the region had something to offer the empire. Either the region could serve as a source of new plant material or itself it could become a region of improved pastures and increased livestock production, ideally perhaps both.

In pursuit of these aims, Chaianov set out to create a soil map of the region. As many other scholars of colonialism have commented, maps were key aspects of making a landscape “legible” to colonizers and also an important way of reordering things. However, Chaianov’s map went further. It was also meant to serve as a way of making other landscapes—that is those that had not yet been mapped—more legible even to an untrained eye. This new technology of soil classification could serve as a powerful tool in the hands even of those with little training. It was therefore even more powerful than a regular soil map. It was also, however, a source of potential instability; as the new way of looking at the steppe focused on plants as a way of knowing what lay beneath them, could potentially undercut the power of experts. Whereas previously identifying soil types required laboratory testing and training in slight variations of...
particle size and color, now anyone with a rudimentary understanding of plants could identify
plant clusters and have a good guess as to what type of soil supported those plants.

Chaianov’s soil mapping differed from a regular soil map in a relatively simple way. He
simply overlaid it with a second map of plant families. This plant mapping project was also
serving a dual purpose as he had been collecting plant varieties both to collect and put in the
Temirskii museum, but also to field test them in his pasture and fallow work. This plant or
“geobotanic” work consisted of him collecting over 130 varieties of forage grasses and other
crops. Chaianov noticed a clear connection in soil morphology in the field with changes in
plant families. However, he recognized that this observation was not enough commenting that
anyone who has seen a virgin steppe will immediately see the connection between changes in
plants and soils. Therefore, Chaianov simply laid his two maps on top of one another and made a
single map that illustrated how complexes of flora and soil types overlapped.

Chaianov drew three rules from his map: 1) each soil of virgin type has its own complex
of flora; 2) each complex of flora can be almost as variable as soil is; 3) if this is so, one can
classify (bonitize) the soils of these complexes of flora. He then established several rules for how
to create these new classifications. This framework gave Chaianov the confidence to spread
the word about his work to a wider circle. Eventually, it led him to being invited to the All
Russian Congress of Soil Scientists in January of 1908 to present his research. While in his
formal presentations he made some slight modifications and equivocations, his fundamental
point stood.

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255 Chaianov, Otchet po Temirskomu 1907-8, 2.
256 RGIA f. 382, op.9, d. 146, ll.1-2.
257 Ibid., l. 22.
258 RGIA f. 382, op.9, d. 145, l.2.
Chaianov said he was not attempting to determine the value of land based solely on plant groups, however, it is unclear how much he believed this and how much of this opinion was due to an attitude of scientific specificity. Just after stating that plants alone could not determine the value of land he wrote, “It must be remembered that in this region there is an economic break coming (the transition from animal husbandry to agriculture) and one plant mass doesn’t only have meaning for fodder but can also serve as an indication of its suitability for crops. It is not for nothing settlers, when speaking about this or that area, ask first of all “and what is growing there?” Therefore, while he did not believe that plant communities told everything there was to be known about a region, he himself admitted that in many ways they were a more useful way of knowing the landscape than having a scientifically organized system of soil classification and land valuation. In many ways Chaianov’s work on soil classification that recognized the relationship between soil and plants represented a kind of progressive scientific idea that avoided the pitfalls of atomistic approaches that science is often accused of in general. Chaianov was practicing a kind of ecology, similar to other Russian sciences like forestry and soil science described by Stephen Brain and David Moon. However, even this science was created and deployed in the service of settler colonialism and the destruction and displacement of Kazakh lifeways and ecologies on the steppe.

**Conclusion: Steppe Agronomy Across the 1917 Divide**

Following several years at the Temirskii field, Chaianov left his position in 1911 to establish a new experimental field in Voronezh until 1924 where he would also serve on the faculty of the Voronezh Agricultural Institute. In 1924, he served as the head of the Department

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259 RGIA f. 382, op. 9, d. 146, l. 23.
260 Ibid.
of Experimental Work for the People’s Commissariat for Agriculture until 1930 when he was arrested, though not convicted for involvement in the “Labor Peasants Party” show trial. By 1935, he had again found work as head of the Ivano-Voznesensky Agricultural Institute along with other academic posts. During this time he was treated as an expert in experimental fields publishing a short book for peasants and party activists in 1927 titled, *What Do Experimental Stations in the Central Black Earth Regions Offer Peasants?*. He also wrote another work which was translated into English for a global scientific and policy audience titled, *Experimental Farming of the People’s Commissariat for Agriculture of the RSFSR*. However, most significantly, Chaianov also literally “wrote the book” on the Virgin Lands Campaign. In 1958, though long past retirement, he published a book explaining what challenges and possibilities lay ahead for the campaign. His only experience living and working in the area of Virgin Lands activity were the five years he spent at Temirskii.

In addition to Chaianov, his assistant Koloskov went on to do important scientific work moving in the Far East Amur region, where he worked for the Resettlement Administration and was put in charge of his own experimental field at Pikanskii, and later headed the Amur Meteorological Bureau and other agronomic and meteorological bureaus after the revolution. In 1936, he earned his doctorate and worked at academic institutes in Vladivostok. During the war,

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262 The main target of this show trial was Sokrat’s cousin the more famous Alexander Chaianov who was a proponent of small-scale peasant agriculture and cooperatives and therefore a critic of large collective farming. No one was convicted as all participants maintained their innocence and the trial fell apart, however Alexander Chaianov was later secretly tried and shot in 1932, although he was later rehabilitated and his work was of major interest and influence during Perestroika. Sergei S. Demidov and Boris V. Levshin, *The Case of the Academician Nikolai Nikolaevich Luzin*, trans. Roger Cooke (Providence: American Mathematical Society, 2016), 360. Alexander Chaianov’s work on cooperatives also figures prominently in Kotsonis, *Making Peasants Backward*.


264 S.K. Chaianov, *Chto dayut krest’ianam?*.


he was evacuated to Alma-ata where he taught at the Kazakh Agricultural Institute, and led expeditions as part of the geographic institute which eventually led to his publication of *Agroclimatic Regions of Kazakhstan* in 1947. He then retired to Moscow where he consulted with agronomic institutes there and helped develop new ways of growing grain in arid regions.267

However, the individuals involved were not the only infrastructure that continued to have a lasting impact on Russian and later Soviet science. The Temirskii field itself continued in operation as an experimental field and is in operation even today as the Aktobe Agricultural Experimental Station. It still conducts research on many of the same questions such as moisture preserving cultivation, developing new seed varieites, and experimenting with new crops like its current trials of safflower, as a saffron substitute.268

The popularization work and the establishment of experimental fields like Temirskii were an integral part of the aid the tsarist government gave to settlers to help them survive in the new steppe environment. This work, however, required agronomists simultaneously researching the steppe and popularizing their new found knowledge. What is more, the work of popularization was not simply a passive process. It involved debates, pamphlets, and even involving peasants in the planting, care, and recording of harvests. This multi-faceted work meant that agronomists and technicians were never fully simply agricultural scientists, although that was central to their work and role. They were forced to wear many different hats including popularizers, social scientists, and facilitators.

Therefore, it is difficult to put them into simple categories or view them simply as agents of science and progress who sought to conquer both the steppe and the ignorance of peasants.

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267 Online Library, “Nauchnoe Naselenie Rossii” a project of the Russian Academy of Sciences, Entry for Koloskov, Pavel Ivanovich http://library.ruslan.cc/authors/колосков-павел-иванович/.
Instead, they were forced to navigate both the steppe environment and the peasants, and even the nomads who lived there. As such, although the agronomists like Chaianov came to the steppe having been trained in agricultural science in European Russia, they were forced to adapt and were not simply bringing a new way of agriculture to a new environment and transplanting it. What is more, they were not the only creators of this new knowledge. Chainov’s ideal cropping regimen was a mix of things he had learned in his schooling, visits to Ukraine, observations of peasant farming practices, and the plants available and thriving on the steppe around Temirskii. This complicates the picture of what makes this science “imperial” or even who is an actor and participant in its creation. Just as the work of popularization involved increasing the participants in creating the steppe agricultural technoscience that potentially destabilized the authority of experts like Chaianov, the creation of that technoscience obscures some of the realities of its creation. Given the role of agronomists as both scientists and administrators, and their mission as creators and aides to settler colonialism which is a political project, it is also possible to say that they were not only creating technoscience, but also technopolitics. The experience of steppe agronomy therefore fits neatly within Mitchell’s idea that:

Techno-politics is always a technical body, an alloy that must emerge from a process of manufacture whose ingredients are both human and nonhuman, both intentional and not, and in which the intentional or the human is always somewhat overrun by the unintended. But it is a particular form of manufacturing, a certain way of organizing the amalgam of human and nonhuman, things and ideas, so that the human, the intellectual, the realm of intentions and ideas seems to come first and the control and organize the nonhuman.\(^{269}\)

It is possible and useful to think of the large human and institutional agronomic infrastructure that developed on the steppe in the late imperial period as a kind of large-scale high modernism that was a precursor to Stalinist Collectivization and the Virgin Lands

Campaign. Indeed, as illustrated by the staying power of these individuals, their ideas, and physical institutions the two are clearly connected. However, if these imperial projects have at their root not only an ideology of settler colonialism, but also of a kind of “settler ecology” that is less about the domination of nature than about understanding it and using it towards human ends, this also should affect our notions of the nature of high modernism. For not only is it, as Mitchell states not always under human control, but it is also not only about an ideology of the domination of nature. While domination is a liking thread between these two periods, the domination is less about the domination of nature and more about the domination of humans, in this case, Kazakhs.
CHAPTER FOUR: GRAZING THE STEPPE

In his memoir recounting the massive changes that occurred in Kazakh society under the Bolsheviks, Mukhamet Shayakhmetov recalled how as a boy before Collectivization, one of his greatest joys was being put in charge of caring for his family’s flock of sheep. He wrote,

To begin with, I was really happy to do this work as it seemed so important and made me feel grown up: I used to stride boldly out into the steppe on my own with the 700 sheep in the flock and drive them back to the aul in good time, proud of myself for managing an adult’s job. But as I grew older, the only thing I enjoyed about grazing the sheep was that I could spend the whole day on horseback in the steppe. Pretending you were riding round the flock, you could gallop about as much as you liked.\(^\text{270}\)

Shayakhmetov was born after the Bolsheviks came to power. He never knew a steppe without Soviet rule, and yet his description of nomadic life in the 1920s is an important reminder that while Kazakh society was changing, for many Kazaks, life went on in ways that would be recognizable, though not identical, to the way it had before the conquest. In addition to a large herd of sheep that belonged to his family, that Shayakhmetov could “gallop all day” does not reflect a hemmed in, fully sedentary way of life. During the late imperial period, encroaching settlement did significantly change Kazakh livestock practices by shortening the length of migration routes, changing the makeup of herds, and increasing the amount of fodder Kazaks cut.

Nevertheless, these were often changes of degree, for most Kazaks their lives continued to revolve around livestock. However, the way nearly all Kazaks kept livestock would change. Not only were migration routes significantly shorter for nearly all Kazaks, the animals they took with them also changed. Instead of mostly sheep and horses, during the late imperial period, Kazakh herds began to contain significant numbers of cattle. What is more, while before this

period very few Kazaks led a sedentary life, more and more Kazakhs were forced (often through economic hardship) to give up nomadism. Even those Kazakhs who still nomadized now also often spent a significant part of their time and labor cutting hay which they stored for winter forage, a practice unheard of before this period. The intensity of these changes was not universal, and was especially dramatic for those Kazakhs in areas of more dense settlement where migration routes were blocked by farms and where traditional water and pasture sites were often taken from Kazakhs and allocated to peasant villages. While there are many reasons Kazakh animal husbandry changed less than it did for peasants, one of the main reasons was because Kazakhs were often excluded from the policies and programs implemented by the agronomic bureaucracy and Resettlement Administration who focused their efforts more and more on peasant settlers and less and less on Kazakhs regardless of the degree they were practicing nomadism.

On the other hand, the changes to peasant settler animal husbandry were much more significant. Overall, settler livestock numbers exploded. Between 1906 and 1916, livestock in the steppe oblasts increased by almost 80%, and while some of this growth was in Kazakh herds, the majority of it came from peasant settlers. In every steppe uezd in 1906, Kazakhs owned more livestock than peasants. By 1916, in a quarter of the uezds, Russian livestock outnumbered Kazakh livestock. Additionally, rather than keeping small herds of animals close on communal lands like most peasants in European Russia, peasant settlers rented out large tracts of land to feed and house their burgeoning herds. In some ways many peasant settlers came quite close to adopting a kind of extensive livestock agriculture that was in many ways more similar to Kazakh semi-nomadism than the peasant commune.

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Imperial officials and agronomists always believed that livestock would play some role in the agricultural economy of peasant settlers. However, they did not want peasants to focus exclusively on animal husbandry. This aim met with the environmental realities of the steppe especially in southern regions where aridity made grain agriculture totally or nearly impossible. Indeed, by the eve of the First World War, imperial officials had recognized this situation, and instead of creating peasant allotments that conformed to their notions of an ideal peasant farm based on raising grains, they began creating larger settlement plots specifically for settlers to engage exclusively in livestock raising. By 1915, they had created nearly 200 of these plots over an area that encompassed 687,000 desiatin of land.\(^{272}\)

In many ways agricultural scientists and officials were reacting to peasant, Kazakh, and environmental demands when they took on the work of trying to make the steppe produce more livestock for settlers. However, these actors and forces were not alone in encouraging this focus, it was also driven by the growing importance of livestock and butter exports from the steppe and Siberia to feed a rapidly expanding urban population in European Russia. In spite of their initial reluctance to focus on livestock and pasture, as they began to see the “wasteful” ways peasants were using the land, they changed tactics. Therefore, the agronomic bureaucracy on the steppe soon took on the project of improving the steppe along with its livestock and the husbandry practices of steppe residents with the same zeal and technocratic mindset— influenced by cultural ideals about “proper” agriculture—that they had with other aspects of steppe agriculture.

**Steppeland to Rangeland**

Writing about the American West, the geographer Nathan Sayre has pointed out that while rangeland existed before scientific range science, it was still necessary for scientists to

\(^{272}\) Ibid., 176.
“produce the range” through fences and the extermination of pests. This work, coupled with private property relations meant that in the American West, “range science would be a science of ranching, not of pastoralism.” On the Kazakh Steppe, in spite of the general lack of fences, there was a similar process. Agricultural scientists attempted to create and know the steppe as a site of livestock production in order to make their aspirations a reality.

New market relations were part of turning the steppe into a range, but also the extermination of pests was a central aim. The primary “pest” that needed to be destroyed were nomads. Nearly all agricultural scientists were waiting for an end of pastoral nomadism, although they might not actively seek the extermination of the nomad in the same way as other pests, they did seek the extermination of nomadic lifeways. As Willard Sunderland pointed out, this mindset was connected to it being, “an age permeated by the presumptions of social Darwinism,” where, “numerous educated Russians fully expected that nomads would “die out” (vymirat’), the regrettably necessary victims of a universal struggle for existence between higher and lower cultures.” The lack of racialized frameworks that existed in other settler colonies for this hope meant little in the end.

Additionally, there was another project of extermination that agronomists focused on that was especially germane to livestock: the extermination of groundhogs and wolves. These pests represented a threat to the aims of agronomists because the groundhogs were suspected carriers of disease that could harm animals and settlers. In the disease-paranoid environment of the late Russian empire, groundhogs as vectors of disease made them easy targets, and government sponsored campaigns of their extermination predated even the most intensive periods of

settlement. Wolves represented a much more familiar foe to Russians. Wolves played an important role in Russian folklore and rural life as they did in the folklore of most Northern European cultures. On the steppe, wolves continued to be a major concern and problem. In just one year, 1905, in Turgai oblast, wolves reportedly killed over 62,000 head of livestock. This number included over 6,000 cattle and more than 11,000 horses, which represented a significant loss of wealth for the region. In spite of attempts to hunt wolves by settlers, Kazakhs, and officials, the losses were so great that the government eventually began resorting to poison to deal with wolves like they had with groundhogs. Both of these campaigns would continue and are important precursors to later anti-locust campaigns which are discussed in Chapter 6 of this dissertation. The aim of extermination, whether of locusts, wolves, and groundhogs, as well as nomadic culture, fit into a “logic of extermination” that underpinned settler colonialism because it required a tabula rasa for the settler colonial project to thrive and create a new, better agriculture and civilization.

Part of the reason the extermination of groundhogs was an important issue was because they were viewed as carriers of diseases, especially plague. For a growing state apparatus worried about disease, the extermination of groundhogs fit easily within this ideology of clearing the steppe of its previous problematic inhabitants. However, in addition to turning the steppe into range by extermination, there were other less clearly physical aspects to this transformation. The

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275 Kostanaiskoe stepnoi khoziastvo (Kostanay), 20 April 1914; Turgaiskaia Gazeta (Orenburg) 28 March; 23 May 1910; Turgaiskaia oblastnaia vedomosti (Orenburg) 2 May 1915.
277 Obzor Turgaiskoi oblasti za 1905 god (Orenburg: Tipo-litografiia Turgaiskogo Oblastnogo Pravleniia, 1905), 5.
278 Turgaiskaia Gazeta (Orenburg), 7 May; 16 July; 23 July 1895; 21 February 1896. Kirgizhskai Stepnaia gazeta (Omsk), 1 August 1899, Turgaiskaia oblastnaia vedomosti (Orenburg) 6 January 1913; 18 August 1914.
279 Patrick Wolfe, “Settler Colonialism and the Elimination of the Native”.
land itself had to be incorporated into the economic and intellectual structures of the settler colony. In addition to making it legible through mapping and administrative division, it also needed to be given new monetary value.\textsuperscript{280}

Previous to Russian colonization, land was valued on the steppe, but not in the same capitalist ways that came with colonization. Instead, pre-conquest Kazakh land use was determined communally via kinship groups. Sarah Cameron described the interconnection between land use and kinship thus:

Kinship, Kazakhs’ allegiances to particular clans, was an important source of identity, in addition to governing crucial economic aspects of pastoral nomadic life. In a practice known as \textit{ata qonis}, individual clans claimed grazing rights over particular pastures, and these privileges were then passed down along genealogical lines. When nomads’ migration routes were disrupted or pressure on pastures increased, such as during the Zunghar invasion of the steppe in the eighteenth century, the leaders of a various clans would meet to reallocate the usage of pastures.\textsuperscript{281}

In such a system, there was little room for an economy that included monetary exchange for land purchase or renting.

However, this did not mean that there was not competition in such a society. As Virginia Martin pointed out,

The degree to which migration routes, destinations, land allocation and grazing rights among \textit{auls} of a certain clan or region had to be coordinated by its leaders depended on the relative stability or instability of her sizes and clan relations in a particular year. Competition was fiercest in periods of instability, when nomads were displaced from pastures because of war or disease’ at these times, clan leaders would gather in the spring to coordinate migrations to summer pastures.\textsuperscript{282}

\textsuperscript{280} In addition to creating peasant plots, the late imperial period was a time of frequent administrative reorganization on the steppe. For discussion of the changing reforms around one administrative unit on the steppe see, Gulmira Sultangalieva ed., \textit{Volosti I voistolnye upraviteli (xix-nachalo xx v.)} (Almaty: Kazak universiteti, 2018).
However, with the coming first of Cossacks, and later peasant settlers, this situation changed. Not only were Kazakh migration routes disrupted, which forced many to give up long migrations, but now lands held by the Cossacks or Kazakhs began to be rented out to land-hungry peasants.

In theory, before the 1906 Stolygin reforms, all land in the steppe belonged to the state with the exception of Cossack officer land grants. Peasant settlers only had the right to land use in perpetuity. However, this only applied to official peasant plots. Probably the majority of settlement lands were at one time occupied by illegal settlers, especially in the early days of settlement. George Demko described the early days of settlement as being marked by “freeholding” or “squating in the American sense.” In this context, “a settler family simply used as much land as they needed or could work. As the number of settlers increased and pressure on the land became more acute, land holdings were usually equalized” a process which, “bore a resemblance to the process of repartition in the Mirs of European Russia.” However, in the steppe and Siberia, once households were given land, it was usually theirs in “hereditary-household tenure” with only pasture land remaining in communal use.283

After 1906, while in the rest of the empire peasants had the right to own land, the same was not true in the steppe, in spite of the fact that those parts of the Stolygin Reforms that allowed peasants to leave the commune did apply. This led to a situation where officials recognized that “the sale and purchase of land occurred, although not sanctioned by law.”284 The 1906 reforms also led to the Resettlement Administration changing the ways it created settlement plots. Instead of organizing all settlement plots as communes as they had previously, they now created three different types of settlement plots: communes, otrub (where settlers had a house

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283 Demko, The Russian Colonization of Kazakhstan, 150-151.
284 Ibid., 151.
and small plot in the village and consolidated land outside the village), and *khutor* (which approximated individual farmsteads). New settlers could now choose what kind of farm they wanted. Simultaneously, like the reforms in European Russia, older communes organized before 1906 could now petition the government to have their land turned into either *otrub* or *khutor*. According to Demko, *otrub* and *khutor* accounted for the majority of new peasant settlements (84%) in most of the steppe by 1911, with *khutor* accounting for only a small percentage of this number. However, by 1914, the numbers of both had decreased to 41%.286

Although peasant settlers theoretically had communal and individual pasture lands, both were quickly felt to be inadequate by many peasants. There were two different reasons for this. In those regions to the north of the steppe that received adequate rainfall, peasant settlers often did very well economically. If they found themselves on good chernozem or even chestnut soils with adequate rainfall, peasants could achieve bountiful harvests. While recognizing the difficulties peasant settlers faced in Akmola oblast, especially in starting out, one official remarked how after 2-3 years a typical peasant sowed an average of 3 1/3 desiatin of grain, after 6-7 that area had increased to 5.5 and after 14 years to 10.5 desiatins of sown land. Accompanying those increases, their livestock also increased to an average of 3-4 head of draft animals (horses or bulls) and 8-9 head of cows, sheep, or calves.287 This meant that farms could quickly outgrow their initial allotment.

While this growth was common (although not universal) in areas with good soils and adequate rainfall, areas less suitable for growing crops also faced land pressure. In 1914, a

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286 Demko, *Russian Colonization of Kazakhstan*, 151-152.

287 Rossiiskii Gosudarstvennyi Istoricheskiy Arkhiv [Russian State Historical Archive] hereafter referred to as RGIA. RGIA f. 391, op.5, d. 1613, ll. 119-120, Materialy k obzoru sel’skogo khoziastva Akmolinskoi oblasti za 1911-1913 gody i opisanie Akmolinskogo perselencheskogo raione s prilozhenniem fotosnimkov.
commission on livestock raising in Turgai oblast reported how especially in southern regions, peasant allotments were too small because to survive settlers had to rely on animal husbandry nearly to the exclusion of other forms of agriculture. For example, they found that in one village that was home to 50 families 7 households each had 100 or more cattle, 20 families each had 30-50 cattle, and the remaining families each had at least 20 cattle (meaning the village altogether had around 2,000 cattle).288

Given that regions in the south provided less fodder per acre than lands that received more rainfall it is easy to see how these levels of livestock holding would require large amounts of land. In order to address this, many peasants cut hay in the steppe for additional fodder. Interestingly, while we might imagine these farmers on marginal lands to be scraping by without much capital or machinery, officials reported that most peasants used mechanized mowers and reapers for their hay harvest. This was apparently because the steppe had such low yields. For example, in one area of Akmola that was considered typical, peasants harvested an average of no more than 45 pood of hay per desiatin (about 600 pounds per acre).289

This situation of expanding numbers of livestock and settlers meant that renting land to cut hay became more and more significant. The largest landholders in the region, Cossacks and Kazakhs, were the main rentiers. This could be quite lucrative, and as more settlers came to the region, rental prices continued to increase. In 1908 rental prices in good agricultural areas of the northern steppe ranged from 25 to 35 kopeks per desiatin, by 1916 this number had climbed to 6 rubles.290 While some Kazakhs benefited from this situation, the overwhelming beneficiaries

288 Tsentral’nyi gosudarstvennyi arkhiv Respubliki Kazakhstan [Central State Archive of the Republic of Kazakhstan] hereafter referred to as, TsGARK. TsGARK f. 30, op.1, d. 59, ll.27-28. Given a stocking rate of at least 5 desiatin per head of cattle, which was average, this village would have needed around 10,000 desiatin of pasture and hay just for its cattle.
289 RGIA f. 391, op.5, d. 1613, l. 120. For comparison, modern farms in the US average a yield of about 2 tons per acre (about 4,000 pounds).
290 Demko, Russian Colonization of Kazakhstan, 155.
were usually Cossacks. This was in part because while legislation in 1891 affirmed the right of Kazakhs to rent out their land, they were limited to 15 desiatins under their personal control.\textsuperscript{291}

Given the widespread growth of renting land, officials recognized that peasants needed the ability to rent or buy land if they were going to prosper whether on good agricultural lands or poor ones. They therefore decided to create plots of land that peasants could rent from the government to help them keep more livestock in the southern parts of the oblast. However, they were concerned with just how much land peasants might need. The 1913 survey in Turgai was conducted in part to answer this question, which required answering the question of stocking rates. The author of the report, P.A. Khvorostanskii, was the head of statistical work for Turgai-Uralsk Resettlement district. His report recognized the poor hay yields in most regions of the steppe and noted that while in western Europe pasture can yield between 300-400 pood per desiatin, the same was not true in the steppe (for comparison, as noted above in Akmola 45 pood was considered typical). He went on to say that on average if a herd is kept near a village in pasture for 7 months it would require 5 desiatin per head of cattle (or its equivalent). The committee decided that they should organize plots to support the equivalent of 100 head of cattle.\textsuperscript{292}

However, determining stocking rates is always difficult. When scientists were attempting to answer this same question in the United States decades later, there was still no easy answer to determining them scientifically. Sayre’s comments about the situation in the US were just as true for the Kazakh steppe, “In principle, all that was needed was accurate measurements, but the scale and diversity of the lands in question made this a daunting task both scientifically and

\textsuperscript{291} Martha Brill Olcott, \textit{The Kazakhs}, 2nd ed. (Stanford, Hoover Institution Press, 1995), 88.
\textsuperscript{292} TsGARK f. 30, op. 1, d. 59, ll. 27-28.
logistically. What exactly should be measured, and how?\textsuperscript{293}\ The case of Turgai was no different. While Khvorostanskii might recommend plots of a particular size, even he recognized that the plots might need to be bigger because in addition to pasture, livestock require water and the plots needed to be within 3-5 versts of water sources.\textsuperscript{294}

In addition to distance to drinking water, vegetation growth in arid regions like the steppe is quite variable depending on rainfall. While imperial scientists were working from an idea of equilibrium environments common to temperate areas, the steppe is a nonequilibrium environment. Diana Davis has argued that,

Taking environmental variability into account is especially important for the vast majority of the drylands that are rangelands because it has serious implications for their use and the livelihoods of millions of people. In less variable, higher rainfall pastoral environments, grazing pressure is frequently the major determinant for ecosystem dynamics, and overgrazing can occur if grazing is not well managed. In nonequilibrium environments, though, abiotic drivers like rainfall are much more important than grazing pressure in determining vegetation cover.\textsuperscript{295}

The officials in Turgai themselves had information that would have supported variability if they had seen it as such. Their own report included evidence that one spot, Semiozernoe should not be pursued as a site for peasant pasture rental because while its pastures of 36,000 desiatin had supported 5,000 sheep and 3,500 cattle, it could only do so in years of good rainfall.\textsuperscript{296}

However, the environment was not the only factor that was affecting the size of herds and the need to demarcate more steppe land into the intellectual and administrative frameworks of officials and scientists. Fluctuations in the price of cattle and hay also played an important role in determining herd size and the need for pasture. For example, in 1913, depending on local prices...
of hay, the price for a workhorse could vary between 40-60 rubles, a cow 35-50 rubles and a pair of oxen from 125-150 rubles. This meant the price of horses could nearly double (or decrease by half) within a single year depending on the price of hay.

The price of hay in a local area itself was in turn determined by environmental factors like rainfall as well as the availability of land. Therefore, there was neither a straight line of increasing herd size for every settler nor was the size of herds determined only by economic factors or the desire of peasants to raise more animals. Interestingly, while many peasants were increasing the size of their herds, nomads were in some ways were tending more towards the aims of agronomists and officials. With old migration routes cut, those Kazakhs who still migrated often did so across shorter distances. This meant that cattle, who are ill-suited to long migrations grew in importance in Kazakh herds, whereas before settlement sheep and horses were more significant. This was coupled with a general reduction in herd size among individual Kazakh auls, because single groups could no longer support huge herds without long migrations as well. At the time officials recognized this state of affairs and applauded it because it appeared to them that the Kazakhs were beginning to transition to sedentary agriculture. However, the forces driving this change were connected to the inverse process among peasant settlers, which they opposed. Ironically, the Kazakhs were conducting more intensive animal husbandry than they had been before the conquest, although this was in large part because peasant settlers were involved in more extensive animal husbandry than previously.

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297 RGIA f. 391, op.5, d. 1613, l. 126.
298 Cameron, “People Arrive”, 54.
299 RGIA f. 391, op.5, d. 1613, l. 118.
Perfecting Pasture and Exploiting the Steppe

While creating range out of the steppe through extermination, scientifically measured stocking rates, and the penetration of capitalist values to land was important, it was one part of the process of exploiting the steppe economically. The main products of this improved, rational, and legible environment were live animals, skins, meat, and dairy products. The focus on these products gave an important role for scientists in rationalizing and building scientific authority and ownership over the steppe. However, getting these products out of the steppe was more complicated than simply creating them on a rationalized steppe. It required the creation of interlocking physical, scientific, and socio-economic infrastructures that were also connected to the process of transforming the environment from steppe to range.

Most of the steppe throughout the imperial period was a region with very little transportation infrastructure. Roads were poor and sparse, river travel limited, and railways only crossed the edges of the steppe. Officials were aware of this, and in spite of plans to build railways across settlement areas, transportation infrastructure remained limited.300 The northern and eastern parts of the steppe fared somewhat better due to the Trans-Siberian railway and the Irtysh River.301 However, one of the main concerns of this poor infrastructure was because the dreams of officials rested on the region becoming a major exporter of grain which is a bulky transport good. While those regions nearer the railway were deeply tied into imperial trade networks and supplied cities in far off European Russia, even those regions that received enough

300 In fact, a proposed railway that would cut through the most dense areas of settlement was not built until the Soviet period. Otchet o rekognoschirovochnykh izyskaniakh zhelezodorozhnnoi lini Aktyubinsk-Turgai-Akmolins-Semipalatinsk protiazheniem 1781.48 ver. Proizvedennykh letom 1906 (Saint Petersburg: Tipo-Lit. Buze i Lassman, 1907).
301 RGIA f. 391, op.5, d. 1613, l. 121.
rainfall further to the south of the Irtysh or railway lines suffered a disadvantage. Therefore, it was not only environmental factors that encouraged areas to the south to focus on livestock, there were also infrastructure causes.

While grain was bulky and difficult to transport to railheads, livestock was much more mobile, and could walk itself to railways where it could be transported anywhere in the empire. This meant that a few places where the railway touched the steppe could become the connection point for a much larger area. One such site was the small railway station at Shalkar. This station is in the middle of a very dry part of the steppe several hundred miles north of the Aral Sea, but its location along the Orenburg to Tashkent Railway made it significant. The station location was probably chosen because there is a large lake also called Shalkar nearby. In the arid steppe, the lake could serve as a source of water for the steam engines passing through. Given the lack of infrastructure, it was probably not meant to be a major loading station for livestock from across a large section of Irghiz uezd although that is what it became. It is difficult to estimate the growth in livestock exports in this region, but one telling number is that in 1882, officials counted a total of 136,559 sheep in the entire Irghiz uezd. By 1905, Irghiz reportedly sold 30,000 sheep and 41,300 animal skins (the majority of which were probably sheep). Many of these sheep alongside thousands of cattle, goats, and horses were no doubt transported through Shalkar.

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302 In places like Semipalatinsk that was on the Irtysh, grain was easily exportable to far off cities in European Russia from an early date, Ia. Nestorov. “Kak mozno dobyvat’ vodu v bezvodnykh stepiakh” Kirgizskaiia Stepnaia Gazeta (Omsk), 10 November 1896.
303 In the United States, railroads played a key role in transforming economies even beyond those areas immediately connected by rail, see Dave Donaldson and Richard Hornbeck, “Railroads and American Economic Growth: A “Market Access” Approach” The Quarterly Journal of Economics 131 no. 3 (May 2016): 799-858.
304 This was a major concern for the proposed Aktobe-Turgia-Akmola-Semipalatinsk railroad mentioned above.
305 Obzor Turgaiskoi oblasti za 1882 god (Orenburg, Tipografia B. Breslina, 1883), 22.
306 Obzor Turgaiskoi oblasti za 1905 god, 6.
In spite of the lack of plans for markets or a slaughterhouse at Shalkar, by 1906 officials reported that there were 15 different slaughterhouses or meat dealers trading at the station.\textsuperscript{307} Evidently, these businesses were making huge amounts of unsanitary waste and had no access to water to clean it up. A commission was assigned to investigate and recommended that these businesses no longer be allowed to process livestock during the heat of midday near the station or near the lake (which they may have been using as a dumping ground for animal waste).\textsuperscript{308} This situation led the uezd nachalnik to write to the oblast authorities requesting urgent funds for a slaughterhouse.\textsuperscript{309} However, it soon became clear that the project required not only permission and funds from the oblast, it also needed permission from the Tashkent to Orenburg Railway in order to get a water pipe from the lake to the proposed site.\textsuperscript{310} While it is unclear if the slaughterhouse was built, sanitation and infrastructure continued to be a problem at Shalkar. In 1912 the local veterinary inspector was still reporting problems due to a lack of loading infrastructure and apparently unsanitary conditions. In 1912, which was noted as a low year for these totals, 305 head of cattle, 166 horses, and 11,200 sheep were loaded onto trains at Shalkar.\textsuperscript{311} Given that there appears to have been little forethought put into Shalkar serving as a transport hub for livestock and meat, it should perhaps not be surprising that it frequently had trouble with sanitation when hundreds of animals were being slaughtered there daily. However, the railway made this kind of density possible, and indeed necessary.

\textsuperscript{307} TsGARK f. 25, op.1, d. 4325, l.2 Copy of report by Irghiz uezd nachalnik to the Turgai Oblast Administration, 19 July 1906.
\textsuperscript{308} Sadly, Lake Shalkar’s history of pollution only began in the imperial period. Soviet hydro-engineering that split the lake in two and mining waste have continued to plague the lake and have led to frequent massive fish kills among other problems, “’Apocalyptic’ Scene at Lake Shalkar in Western Kazakhstan” Tengri News July 9, 2014 https://en.tengrinews.kz/environment/Apocalyptic-scene-at-Lake-Shalkar-in-Western-Kazakhstan-254663/
\textsuperscript{309} TsGARK f. 25, op.1, d. 4325, l.1 Communication from Irghiz uezd nachalnik to Turgai Oblast Administration, 12 August 1906.
\textsuperscript{310} TsGARK f. 25, op.1, d. 4325, l.3.
\textsuperscript{311} TsGARK f. 25, op.1, d. 4325, l. 20 Communication from Veterinary Inspector to the Veterinary Administration, 7 January 1912.
It is not surprising that railways were major engines of western capitalist penetration of the steppe, and that they made it easier for products from the steppe to enter onto the global market. However, this process had arguably already been underway for millennia. The steppe was at the center of the Silk Road and livestock had been an important part of trade networks connecting the steppe long before the railroads arrived.\textsuperscript{312} What is more, even after Russian control of the steppe, but before the major penetration of railroads, livestock was entering into Russian markets at places like Orenburg which was a critical early site of livestock markets and export of steppe livestock to cities in European Russia.\textsuperscript{313}

Nevertheless, the railway did change the scale and scope of livestock raising on the steppe. However, it was not the railway alone, and this was not an instance of technological determinism. While the railway offered new opportunities, the haphazard nature by which at least 15 different local entrepreneurs set up business at Shalkar, apparently without any direction or planning from officials, is also an important part of this story. What is more, while officials were creating plans to increase the amount of livestock being raised on the steppe, and attempting to improve pasture, they were not the only ones who showed interest in developing a stronger, more specialized livestock industry on the steppe. Kazakh nomads had long been trading with Russians in places like Orenburg and Uralsk, even before the conquest.\textsuperscript{314} After the conquest, this process continued. However, as it became more and more clear that in many regions peasants could not survive on planted crops alone, they became important livestock

\textsuperscript{312} For an excellent summary of how the steppe was not just a place of transit for the Silk Road but its ecology and peoples were central to it see, David Christian, “Silk Roads or Steppe Roads?: The Silk Roads in World History” \textit{Journal of World History} 11 no. 1 (Spring 2000): 1-26.

\textsuperscript{313} For example, in 1898 self-described “livestock industrialists” were already organizing to better market and export their products to Moscow and St. Petersburg, see TsGARK f. 25, op.1, d. 4260, l.17 Communication from Orenburg businessmen to the Turgai Oblast Administration, 30 March 1898.

\textsuperscript{314} For just one example of the role of Orenburg as an exporter of steppe produce see, “Yarmarki ikh yekonomicheskie znachenie” \textit{Turgaiskaia Gazeta} (Orenburg) 7 February 1896.
producers as well. In fact, many peasants appear to have been very interested and indeed active in expanding livestock production, and in spite of their reputation for laziness and backwardness, they showed an entrepreneurial spirit that officials sometimes recognized and praised.

For example, in Akmola one official reported that, “Currently, under the pressure of increasing settlement and the associated decrease in available land, peasants are trying to improve their farming methods.”\textsuperscript{315} He went on to indicate that such improvements included peasant work to create healthy pastures and reported that in many places, peasants would build small temporary dams in ravines just in time for spring rains. After a few days of rain they would release the water. He said that even in soils badly impacted by salts, if they can be watered for 5-10 days peasants could harvest around 400 pood of hay per desiatin (10 times the 40 pood of hay they could harvest from unimproved steppe).\textsuperscript{316} While a sign of peasant ingenuity, this technology also relied in part on what makes dry environments unique. As Davis has argued, while they are often perceived as barren, arid regions in fact have a large amount of biomass “below ground” in the form of seeds, roots, and bulbs that are “invisible to the casual observer for the great majority of the time except following adequate rainfall events which may be years apart.”\textsuperscript{317} Much like nomadic Kazakhs who migrated to areas where fodder was more plentiful depending on the season, this peasant innovation relied on working with the environment as it was rather than as people imagined it to be.

In addition to their role as livestock exporters and steppe innovators, peasant settlers also showed a great deal of initiative in their attempts at creating dairy cooperatives. Cooperatives were not unique to the steppe, nor were they particularly new. The first cooperative in Russia

\textsuperscript{315} RGIA 391, op.5, d. 1613, l. 119.
\textsuperscript{316} Ibid., l. 126.
\textsuperscript{317} Diana K. Davis, The Arid Lands, 13.
was founded in 1866 by the nobleman Vladimir Lugnin who started a savings and loan cooperative in Kaluga province.\textsuperscript{318} However, within a few decades cooperatives had grown to become the “largest voluntary movement in late Imperial Russia. In 1914, about 17,000 institutions had a membership of some 8 to 9 million, including between one-quarter and one-third of all peasant households.”\textsuperscript{319}

The mass character of agricultural cooperatives, and their inclusion of members that cut across all orders of society, meant that they represented to some, like the agronomist Alexander Chaianov, a democratic way forward that could offer economic justice and power to the mass of Russia’s population.\textsuperscript{320} However, on the steppe, the significance of dairy cooperatives in particular is important for a different reason. They represented a concrete example of some settlers embracing the vision of agronomists and officials, and also the apparent exclusion of Kazakhs from this vision.

Dairy cooperatives (named \textit{artel} after the “informal associations that united producers and laborers on a temporary, usually seasonal basis” in sectors like hunting, trade, and crafts), were first tried in European Russia to “unite households into a larger whole for the joint output and sale of their goods.”\textsuperscript{321} The first attempt at dairy cooperatives was by a nobleman Nikolai Vereschagin who was himself inspired by cooperative dairy creameries he encountered on a trip to Switzerland.\textsuperscript{322} Between 1868 and 1879 working with zemstvos, Vereschagin helped establish

\begin{footnotesize}
\begin{enumerate}
\item Yanni Kotsonis, \textit{Making Peasants Backward}, 15.
\item Ibid., 1.
\item Although Chaianov was executed in 1937, his work was highly influential both in the early days of Soviet power, and later during Glastnost’. His work has also inspired significant debates in the field of peasant studies. For a good overview of his life and importance see the introductory essays (especially the essay by Theodor Shanin) to the 1986 translation of his work, A.V. Chaianov, \textit{The Theory of Peasant Economy} Daniel Thorner, et al. eds. (Manchester: Manchester University Press, 1986).
\item Kotsonis, \textit{Making Peasants Backward}, 24.
\item Some of the most idealized and successful dairy cooperatives began in Denmark in the nineteenth century see, Ingrid Henriksen, et. al., “Law and Peace: Contracts and the Success of the Danish Dairy Cooperatives” \textit{Journal of Economic History} 72 no. 1 (March 2012): 197-224.
\end{enumerate}
\end{footnotesize}
52 dairy cooperatives in the provinces of northern Russia. These worked under a simple process where “peasants were invited to take out loans to buy new mechanical churns, contribute milk to the artel’ to be processed into cheese, and divide the proceeds from their sale in proportion to the milk contributed.” Only one of Verschagin’s cooperatives survived into the 1890s due to a lack of continued peasant interest and of trained individuals to operate the equipment.\(^{323}\)

While dairy cooperatives had risen and fallen in European Russia already in the nineteenth century, on the steppe and in Siberia, they were just beginning to catch on around 1910. In that year, there were already five artels organized in Kostanay, each serving several villages and hoping to open their own small butter factory. The formation of these cooperatives had first been encouraged by the Resettlement Administration, but with shifts in administrative responsibilities they were all applying to the Department of Land (within the Ministry of State Domains) for a loan.\(^ {324}\) However, these organizations were not created by peasants on their own. They all sought the aid of officials, who in turn looked to similar cooperatives already forming in Siberia for a framework of how these organizations should operate.\(^ {325}\)

In Kostanay, the guidelines and contracts that the peasants signed onto were created from forms produced by officials to found butter artels. In these documents, the peasants who signed agreed to create a butter cooperative whose loans were secured by the property of the signatory participants (usually cattle). Requirements meant that any peasant with one cow could join, and those who joined after the cooperative was founded needed to also pay a small fee. The rights to the cooperative were not inheritable, and members could not sell milk outside the artel. Finally,

\(^ {324}\) TsGARK f. 30, op.1, d. 28, l. 106 Communication from the Head of Resettlement Affairs in Turgai-Uralsk Resettlement District to the Resettlement Administration, 13 June 1911.
\(^ {325}\) TsgGARK f. 30, op.1, d. 28, l. 83 Communication from the Turgai Oblast Agronomist to the Orenburg-Turgai Administration of the Ministry of State Domains, 13 November 1913.
they agreed to have their milking monitored if it was suspected they were either unsanitary in their milking practices or if they were diluting their milk.\(^{326}\)

However, simply getting an official to write out a contract and have peasants sign it did not guarantee peasants would get a government loan. Officials also sent their own letters of support or caution along with the loan applications and contracts. For example, although he had forwarded a loan request, the oblast agronomist did not support the 1913 petition of villagers in Kharkhiv for a 5-year loan of 850 rubles to build an ice house and well at their butter factory. He said it was because the village was too small with only 36 households and 85 cows. Based on his experience with similar cooperatives in Siberia, he believed this was too small for the cooperative to succeed and that the lack of local capital made the cooperative risky. However, this was not a recommendation made only out of hard-nosed business sense. The official was concerned that if the cooperative failed, and was liquidated this would ultimately hurt the peasants (presumably because their cattle would be taken as collateral).\(^{327}\)

In another instance, the oblast agronomist relied on the support of other agronomic specialists to recommend backing the loan for a butter cooperative. He supported the request of a 5-year loan for the artel in the village of Troitsk. However, he said they should only be given 903 rubles, not the 950 rubles they requested because loans were only supposed to be granted at 75\% and the 53 households with 150 milk cows had each contributed 17 rubles. The total cost of the factory in Troitsk was projected to be 1,204 rubles, with the majority of costs again going toward a well and ice house. The agronomist said he did not doubt the productivity and promise of this artel because he had received a report from the junior dairy instructor Baltkaul.

\(^{326}\) TsGARK f. 30, op.1, d. 28.

\(^{327}\) TsGARK f. 30, op.1, d. 28, l. 84, Communication from Turgai Oblast Agronomist to the Orenburg-Turgai Administration of State Domains, 13 October 1913.
said that the location was well suited to a butter cooperative in spite of the fact that they had yet to produce anything, and that the butter that was produced locally was of poor quality and made by individual peasant households. However, there was good pasture both in the open steppe and in a river valley, which would provide fodder even in winter.\footnote{TsGARK f. 30, op.1, d. 28, l.83 Communication from Turgai Oblast Agronomist to the Orenburg-Turgai Administration of State Domains, 13 November 1913.}

The fact that some butter artels and not others received government aid is telling. In the case where the Troitsk application was supported, it was because the peasant village was large and already rich at the time of application. Furthermore, they benefitted from a relationship and access to a local technician employed by the Resettlement Administration. Therefore, the butter artels could not make poor peasants rich, they could only help those already well-off peasants be more secure. This was a similar problem that Yanni Kotsonis recognized across cooperatives, but especially with regard to dairy cooperatives started by Vereshchagin when he wrote, “Once again, the contradiction intrinsic to the cooperative movement—at least as cooperative activists understood it—became apparent. If the cooperative was to be egalitarian, it was unlikely to be economically viable, and in the extreme it could be harmful. If the cooperative was to succeed economically, then it would benefit only a few, well-off households.”\footnote{Kotsonis, \textit{Making Peasants Backward}, 26.} Given that butter was big business in the steppe, this uneven distribution of resources is significant. Already by 1900 Akmola oblast alone was exporting 900 tons of butter. By 1913, that had grown to 30,000 tons, and across the steppe there were 81 butter factories in operation (many of them cooperatives).\footnote{Demko, \textit{The Russian Colonization of Kazakhstan}, 179.}

There is another story hiding in the butter artel story. In other another settler colonial context in the United States, butter cooperatives were a means of empowering white women. In her famous work on the Pennsylvania “butter belt” Joan Jensen showed how butter making
began as work that was outside the bounds of the patriarchy and capitalism. Nevertheless, enterprising women took up this work and made it economically viable and in doing so—inspired in part by radical Quaker ideas—took steps towards their own liberation. The archival record is frustratingly silent on the role of women in butter making (and in general) on the steppe. We can only hazard to guess that given the dominant nature of patriarchal values in Russian peasant society, there was no similar process to the one Jensen described in Pennsylvania.

However, recognizing the role of government loans and technical outreach to try and support settler butter making also points to another way to complicate Jensen’s contribution. While butter was a means of liberation for women in the United States, in all settler colonial contexts, the deeper penetration of capitalist economic relations was contingent, complicated, and multivalent. Butter could mean liberation for some, either women in the Mid-Atlantic United States, or (male) peasants who were given autonomy, respect, and authority for their “enterprising” attitudes. However, it also could mean subjugation for others, in Kostanay it probably meant further drudgery for settler women in milking and tending to dairy cattle, and the expansion of settler herds and pastures meant further disempowerment and dispossession for Kazakh nomads.

**Livestock Improvement**

In addition to creating an environment which they believed was better than the steppe as it was before settlement, agronomists and officials also worked to try and “improve” the

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livestock that was meant to live on the steppe. Much of this early work had begun by attempts
(often through lower agricultural schools) to encourage the cross-breeding of local cattle
varieties with pedigreed varieties imported into the steppe. However, later the work became
much more systematic and standardized. Nevertheless, this standardization was often not as
standard or scientific as agronomists would have hoped as other factors intervened. The goal of
livestock improvers was simply to add “better” genes to steppe livestock; however, this work
was complicated by things like disease, peasant desires, bureaucratic complexity, distance, and
the animals themselves who were not always ready to submit to the whims and wishes of
agronomists.

In February 1911, the Turgai Oblast Agronomic Committee met to discuss the
improvement of livestock in the region. While there were many different approaches suggested,
the committee settled on the “mass improvement of local cattle” by cross-breeding them with
Kalmyk Red cattle. However, rather than simply import a handful of improved bulls and tell
locals that they could and should breed their cattle with them, this project involved much more.
This attempt also involved livestock exhibitions, local nurseries to breed pure-blooded cattle, as
well as hiring livestock specialists, veterinarians, dairy instructors, and a program of wolf
eradication.

By 1913 the program had some tangible successes. In addition to “mating points” it had
created a “nursery” for breeding Kalmyk cattle and pedigreed pigs. This nursery included 2

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333 The Kalmyk cattle are a very old breed of cattle, believed to come from the Kalmyk steppe near modern day
Mongolia. Unlike most cattle that are poor browsers and who do not travel great distances, these cattle survived well
in the harsh steppe environment and were popular. The other main breed of cattle improvers wanted were “Swiss”
who are heavy milkers with high butterfat content in their milk. N.G. Dmitriev and L.K. Ernst, eds., Animal Genetic
Resources of the USSR (Rome: Food and Agriculture Organization, 1989), 6-93.

334 TsGARK f. 30, op.l, d. 28 l. 61, communication from the Orenburg-Turgai Administration of State Domains to
the Department of Agriculture, 14 March 1913.
Kalmyk bulls, 36 Kalmyk cows, and one Yorkshire hog and 5 sows. These differed from mating points in that they were meant as places to locally raise pure-bred animals, which could expand the work and decrease the cost of livestock improvement. Previous to the nurseries, pure-bred livestock had to be purchased in other regions of the empire and brought to the steppe. This could be done in part on train, however, many of the newer mating points were located far from railway lines and as such made it difficult and time consuming to bring the pure-bred animals to the sanctioned sites. In at least one instance, this transportation problem led to a delay of a year as it was considered ill-advised to bring a pure-bred Swiss bull from Troitsk where it had been purchased to Turgai during winter.

In March 1913, the committee met again and while members were pleased with the results they wanted to continue and expand their work, which they recognized would require more money and labor. In the words of their report, livestock improvement in Turgai was, “rather extensive and to continue to do it will require strength, special knowledge, and a serious thoughtful attitude.” It would additionally require significantly more money than the roughly 30,000 rubles that had been spent by the Department of Agriculture and local administration. Much of this went to the purchase of pedigreed livestock and also to technicians like the two dairy instructors and livestock specialist the project hired. However, continuing the work would also require a new commission whose responsibility was focused specifically on livestock improvement. In the interests of keeping the new bureaucracy small and agile it was recommended that it include only the oblast agronomist, the veterinary inspector, the advisor to the oblast administration and the senior specialist for livestock. The board also asked the

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335 TsGARK f. 30, op.1, d. 28, l. 62.
336 TsGARK f. 30, op.1 d. 28, l. 6 Communication from Oblast Agronomist to Senior Specialist for Livestock G. Stal’, 5 November 1912.
Department of Agriculture if they were interested in sending a representative, to which they
never got a reply and assumed there was no interest.  

The center piece of this new project, however, was not the bureaucracy that oversaw
livestock improvement work, instead it was the mating points. These were already established by
the time the committee met in 1913. After the 1911 meeting they had organized 13 mating points
where 29 Kalmyk bulls and 3 Swiss bulls were available for mating with local cows. The
Kalmyk’s were intended to be used for cattle raised for meat and the Swiss were meant to
improve local cattle’s dairy potential.

The idea of a mating point was not a new idea. In addition to earlier projects at lower
agricultural schools it was an obvious cheap way to at least improve local breeds by getting the
traits that agronomists believed were preferred into the bloodlines of local cattle and other
livestock. Additionally, there was a much longer history of this kind of attempt at improving
bloodlines focused on horses that had a much longer history in the steppe. However, by 1911
in Turgai oblast and other regions, officials were organizing mating points to cheaply and
quickly improve livestock bloodlines. By 1913, the oblast already had 16 breeding bulls and
spent 6,000 rubles on their upkeep annually (this was beyond the cost of purchasing the
animals).

In Turgai oblast, mating points were set up in several places. As previously stated, the
push for livestock improvement was driven in part because much of the oblast was too dry for

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337 TsGARK f. 30, op.1, d. 28, l. 62.
338 Ibid.
339 For example see: TsGARK f. 64, op.1, d. 6155, Delo o Georgievskom sluchnom punkte i
chastonovladel’cheskikh skotovodcheskikh khoziastva, 1910-1911. For discussion of the history of horse
improvement see Sean McDaniel, “The State of Horses: Science, Culture, and ‘Correct’ Horse Breeding in the
Steppe, 1880s-1920s” (Presented at the Association of Slavic, East European, and Eurasian Studies 2018 Annual
Conference, Boston, MA December 6-9).
340 TsGARK f. 30, op.1, d. 59, l. 14.
grain agriculture. However, the majority of the mating points were not established in the southern parts of the oblast where cattle raising was most widespread. Instead, officials and agronomists still focused their efforts on those regions of adequate rainfall further north. This was because denser settlement in these regions meant that agronomists hoped peasant settlers would keep fewer head of better cattle and take more attentive care of them. In the central and southern parts of the oblast, fodder and browse was so scarce it actually made sense for peasants to keep less valuable cattle or even goats and sheep that could survive on less nutritious and plentiful forage. Also, if some of the animals died, it was a less difficult blow economically. Interestingly, this was part of the rationale behind Kazakh nomadic practices where cheaper sheep instead of cattle were the most important animals.341

In far northern Turgai one of the larger mating points was at the village of Fedorovka where there were four bulls, one Swiss and three Kalmyk, although the reports indicated that two of the Kalmyk bulls were not pure-bred. Apparently, however, the Swiss bull was unpopular with locals. The Fedorovka point also illustrates how central plans could often go awry. The local veterinarian, who was in charge of overseeing the point, believed the bull was only to be used by those cows belonging to villagers who lived in the village itself. He did not understand that his instructions simply meant the bull needed to remain in the village.342 Other breeding points also had trouble with their effectiveness. In another village, there were two Kalmyk bulls but none of the peasants used them, because they were interested in producing milk not meat.343

In spite of occasional setbacks, in the minds of agronomists, mating points were meant to be more than simply a place where locals could bring their cows to have them mate with pure-

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341 Cameron, “People Arrive”, 48-49.
342 TsGARK f. 30, op.1, d. 59, l. 14.
343 Ibid., l. 14.
bred bulls. They also represented an opportunity to practice the kind of exacting scientific agriculture that they espoused. They hoped not only that this would serve as a model for local agriculturalists, but also they believed that such practices were essential to the health and well-being of these important animals. Therefore, officials created rules and regulations to instruct those in charge of the mating points how to take care of the bulls in their care scientifically. In 1913 the Turgai agronomic organization published its “Temporary Rules for Mating Points and Conditions of Their Use.” The rules focused on three main areas. First, they reaffirmed that the bulls were the property of the state. Second, it clarified that they were to be under the direction of a veterinarian, raion agronomist, or another person designated by the zootechnical committee. These rules were concerned with creating clear hierarchy and lines of authority in part because in their rush to create mating points, officials had not always been clear in their rules. As examples like Federovka illustrate, there was significant variation in how the mating points were being administered. Like many other instances of the agricultural-scientific infrastructure on the steppe, while the intention was for top-down ordered and rational practices exercised by the appropriate authorities, distance, space, new environments, and a rapidly expanding bureaucracy meant that the reality did not always reflect the planned ideal.

However, the Temporary Rules were not only creating administrative structures, they also instructed workers in how to care for the bulls. Caregivers were directed to keep the bulls in separate accommodations indoors and were to be given liberty to walk outside in a “bright and warm” fenced paddock, and their bedding was to be changed every day. In addition, the bulls were to be kept “absolutely clean” and brushed daily. This focus on clean airy

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344 TsGARK f. 30, op.1, d. 33, l. 1 “Temporary Rules for Mating Points and Conditions of Their Use.”
345 Ibid., l. 1. One funt equals .903 pounds.
accommodations was in keeping with a particular view of health and medicine connected to the zemstvo ethos of sanitation.\textsuperscript{346}

In addition to cleanliness, the instructions were specific on feeding practices. The bulls were to be fed 2-3 times a day. Their diet was to consist of 15-30 funt of hay, 5-10 funt of straw and 2-3 funt of oats plus salt.\textsuperscript{347} These dietary instructions are notable, because at first they appear to be very specific and yet in fact offer the caregivers a huge amount of leeway. The amounts of hay and straw could be doubled. And they do not indicate exactly what caregivers were supposed to base their feeding judgements on. This is surprising, because in most instances a veterinarian or raion agronomist had many other concerns and the work of caring for the animals would have been left to a caregiver who might not have any scientific agricultural training. Feeding instructions also included specific directions for feeding extra grain during “strengthening periods” and rough ratios of how fodder could be replaced by pasture in summer. While feeding instructions were sometimes surprisingly vague, another main area of concern was disease. The rules were emphatic that if any bull got sick a veterinarian was to be called immediately, and under no circumstances was a sick bull to be allowed to mate with cows. Additionally, if any bulls was found to have bovine tuberculosis it was to be immediately euthanized, and bulls that were too fat, infertile, or injured were to be “discarded.”

Finally, the instructions gave strict directions that bulls were only supposed to mate once, or at most two times a day. These mating sessions were to be conducted “by hand” (ruchnaia) and made on the premises or else under the supervision of the head of the mating point, or an appointed person.\textsuperscript{348} Once again, the shift between exacting instructions and others that involved

\textsuperscript{347} TsGARK f. 30, op.1, d. 33, l. 1.
\textsuperscript{348} Ibid., l.1. It is not clear what “by hand” meant as artificial insemination was not yet a widespread practice.
judgement are interesting given the stated desire of agronomists and officials to introduce “scientific” animal breeding to the steppe. However, most telling is the allowance for the bulls to be allowed off the property if they were supervised by someone designated by the station head. This appears to allow for a significant lack of control on the part of officials and could potentially put the very valuable bulls in vulnerable positions.

While the bulls were present across much of the steppe, and the existence of their offspring was meant to be a kind of advertising for the wonders of scientific breeding and improved livestock, officials also sought to encourage new breeding practices through other means like lectures, pamphlets, one on one agronomic advice, and also exhibitions. Exhibitions had been part of the aims of agronomists even before committees on livestock improvement were created. However, with the new push for improved livestock there was money dedicated to organizing them. In Turgai in 1913, the oblast agricultural meeting decided to hold two livestock exhibitions and allocated 2,000 rubles to their organization. The first would be in Aktobe in September and the second in Kostanay in October. The timing was meant to coincide with the local fall agricultural fairs. While it made sense from an attendance perspective to hold the exhibitions in conjunction with the fairs, it also illustrates how markets and capitalism were intertwined within the work of livestock improvement and its popularization.

Although the livestock exhibitions were focused on local markets, the goal of livestock improvement was to create a surplus that could be exported from the steppe. Just as with the railways and other infrastructure created to facilitate the export of meat, live animals, and hides from the steppe, the exhibitions were a in part a manifestation of a similar market force. The

349 TsGARK f. 30, op.1, d. 28, l.61.
350 TsGARK f. 30, op.1, d. 20, l. 91. Report of the Turgai Oblast Agricultural Meeting on Livestock Exhibitions 1913.
importance of markets and the deeper penetration of capitalism onto the steppe also worked in conjunction with one of the main concerns of agronomists regarding livestock: disease.\textsuperscript{351} In addition to the concern shown for preventing, controlling, and eradicating disease found in the instructions for mating points, the spread of livestock diseases more broadly was a major concern of agronomic work on the steppe.

Veterinary work was one of the earliest types of agricultural science and agronomy on the steppe. Even before the most intense periods of peasant settlement, government veterinarians had been assigned to the region and one of their primary focuses was addressing animal disease. The main concerns were two diseases that were endemic to the steppe: plague and anthrax. It appears likely that officials were often unsure of whether or not a disease was plague, but the fears of the disease, perhaps driven in part by its “foreign” nature meant that officials were sometimes misnaming disease outbreaks of plague that were not actually plague.\textsuperscript{352} Anthrax was another disease that was not common in northern European Russia, but lives in the soil of the steppe. However, like plague, officials had some familiarity with it because they had already been dealing with it in the South Russian and Ukrainian Steppes.\textsuperscript{353}

The focus on epidemic diseases was in part because livestock were one of the first things exported from the steppe in large numbers, and in large livestock herds it could spread quickly.\textsuperscript{354} For example, in 1886 plague was first reported in January in Uralsk oblast. This

\textsuperscript{351} One of the best studies of the connection between capitalist markets and concerns about disease is Claire Strom, \textit{Making Catfish Bait out of Government Boys: The Fight against Cattle Ticks and the Transformation of the Yeoman South} (Athens: University of Georgia Press, 2010).

\textsuperscript{352} In fact, even historians until quite recently had not even identified the correct source of the Black Death in Europe, see Ole J. Benedictow, \textit{The Black Death: 1346-1353: The Complete History} (Woodbridge: Boydell Press, 2012).

\textsuperscript{353} Maksym Bezymennyi, et. al., “Spatio-temporal Patterns of Livestock Anthrax in Ukraine During the Past Century, 1913-2012” \textit{Applied Geography} 54 (October 2014): 129-138.

\textsuperscript{354} Plague was a frequent concern in the steppe press with numerous stories warning of diseases especially “Asiatic Plague” for an example of this kind of journalism see, \textit{Omskii Vestnik} (Omsk) 26 January 1911.
caused the Turgai Governor to send out word to all his uezd nachalniks to notify them and instruct them to take measures to control and stop its spread. In spite of these warnings, by February fourteen cattle had fallen ill in Kostanay. In response, the governor ordered the veterinarian Aktonov to travel to the area and begin to take “active measures.” While the outbreak was spreading in Kostanay, in Aktobe there was an even larger outbreak where 65 animals had fallen ill. The plague spread so quickly that by June Kostanay alone had 104 cases and 97 animals had died.

In addition to sending veterinarians to the site of outbreaks, fairs and bazaars became important choke points where government veterinarians and inspectors could focus their efforts, and further illustrates the connection between markets and the deployment of livestock science. In the 1886 plague outbreak in Turgai, this was exactly the approach the governor urged Aktonov to take. As products from the steppe began to be exported further and further away, the intertwining of disease and markets could even take on global implications. In 1912, the American Consular General in Moscow wrote to the Governor General of Turgai asking for a report on the state of medical and veterinary care in the oblast, and specifically asked about the presence of plague and anthrax. If products were going to be exported to the United States, they needed to know what measures were in place to protect American consumer and supply chains. Therefore, in spite of the steppe’s reputation as a place of “foreign” diseases like “Asiatic Plague” and anthrax, through the development of global agricultural markets, it became more

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355 By the late nineteenth century scientists working at the Saratov Bacteriological Laboratory had begun developing and vaccinating livestock against plague. For example in 1894, they vaccinated over 86,000 sheep and around 4,000 cattle in Saratov guberniya. “Vaccinations Against Siberian Plague” *Turgaiskaia Gazeta* 23 April 1895.
356 TsGARK f. 30, op.1, d. 2412, l. 4-5, O khode bolezni chumy na rogatom skote v Turgaiskii oblasti v 1886 godu.”
357 TsGARK f. 30, op.1, d. 2412, l.14, O khode bolezni chumy na rogatom skot ve Turgaiskii oblasti v 1886 godu.”
358 TsGARK f. 25, op.1, d. 4389, l.1. Communication from the US Consol General to the Turgai Oblast Governor, 23 January 1912.
closely bound to exactly those regions and people who were most likely to view it as a dangerous “other.”

**Conclusion**

While agricultural scientists and officials had not always foreseen the potential of the steppe in raising livestock, and livestock products like butter, as they recognized this potential (and reality), they quickly sought to give their own advice and create their own structures to try and make the livestock economy of the steppe fit their vision. This included a need to exterminate animals, diseases, and nomadic lifeways, but also to attempt to stop the slide of peasants into a wasteful extensive exclusively livestock economy. It also involved the construction of administrative, scientific, and transportation infrastructure to make sure that the products of this economy could get to far away markets.

In their attempt to produce a range out of the steppe, agricultural scientists and officials turned to the age-old practices of extermination, legibility, and expertise that was imbued with not only the cultural chauvinism of settler colonialism, but also the ideology of global markets and an export-based economy. In this intertwining of the extermination of animals, cultures, and indigenous property rights, we can see how settler colonial science in the steppe was not a singular force or ideology. The ideas underpinning it had many strands that simultaneously created both the overarching ideology of settler colonialism, and also the science, markets, and “logic of elimination” that drove change on the steppe. The determination of stocking rates, based on an improper idea of a static steppe, was both changed by and was also part of what drove the need to exterminate wolves and groundhogs. These extermination campaigns began not only because of a capitalist market desire to raise the maximum number of livestock, but also because of their cultural reputation in folklore (in the case of wolves) and their perceived role as
carriers of foreign disease (in the case of groundhogs). All of these forces and ideas were acting both in concert and to create one another on the steppe, and as such represent a technopolitical structure. At the same time, all of these aspects were creating and were in service of the fundamental idea of domination inherent in settler colonialism. Settler science was built on the idea of dominating the steppe and because it viewed its science, culture, and people as superior it had all the justification it needed to do so.

In addition to the need to produce range out of the steppe, livestock and grazing science was also preoccupied with notions of bloodline and pedigree. There is an eerie parallel to the views of officials who believed nomadic lifeways were dying out due to their unsuitability to the environment of the modern world and the hopes of agricultural scientists in “improving” the bloodlines of livestock. While this was a goal of nearly all Western agricultural science at the time (and today), the context in which this work was undertaken makes the two ideas seem to mutually reassure one another. Certainly, the Kazakh Steppe was not the site of a full-blown eugenicist project, but the similarities of impulse are a reminder that the same scientific evidence and certainty that animal breeding provides can also be turned to darker ends. Even more significant, the connection between these two impulses also helps reveal that an argument for a “better” human is just as subjective as a “better” cow. Officials were attempting to create ideal livestock for their vision of the steppe as they wanted it to become, not as it was. In fact, given the very small percentage of cattle in most Kazakh herds before settlement and their inability to travel great distances, there is a good argument that for the most part all cattle are unsuitable for the steppe. However, the ideology of settler colonialism and of scientific certainty obscured this from officials and scientists alike.
CHAPTER FIVE: PLANTING THE STEPPE

In the summer of 1913, the Main Directorate for Land Use and Cultivation (GUZiZ) wrote to the government agronomist for Turgai Oblast, I. M. Pakhov requesting that he forward the names and stories of exemplary peasant farmers who would be eligible for prizes to mark the 300th anniversary of the reign of the Romanov dynasty. To Pakhov, it was clear that the most successful farmer was Timofei Panchenko, a peasant in the village of Novo-Nikolaevskii in Aktobe uезд. Panchenko farmed nearly 100 desiatin of land, practiced crop rotation, grew several acres of alfalfa for high quality forage, all of which improved his farm’s soil. In fact, probably to all officials, he seemed the most obvious candidate for an award given to those who advanced the local agricultural economy, and served as a positive role model to other farmers.

However, Pakhov agreed Panchenko was an unsuitable candidate for the award in spite of his diversified farming operation. Instead, the award went to two peasants with extensive orchards; however, given the climate, the orchards were not economically viable and probably lost their owners money. The problem was that Panchenko, in spite of utilizing the most up-to-date practices, had a significant shortcoming, he did not own most of the land that he farmed, and his farm was so large, it required hired laborers and thus did not fit the definition of a family farm for the award.359 This contradiction, where the person that scientists believed was the “best” farmer in the region was kept from receiving an award, hints at some of the contradictions at work in the project of growing grain on the steppe. While on the one hand, officials wanted to bring to bear the most up to date machinery and scientifically proven growing practices, on the

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359 Центральный государственный архив Республики Казахстан [Central State Archive of the Republic of Kazakhstan] hereafter referred to as, TsGARK. TsGARK f. 30, op.1, d. 53, ll. 7-8, Жurnal Турагского областного агрономического совещания об устройстве выставок скота в области в 1913.
other hand, the realities of the steppe environment, imperial bureaucracy, and global agricultural markets made such a program much more difficult to achieve than previously hoped.

Instead of a simple story of foreign, supposedly superior, knowledge and technology transforming the steppe, the changes in grain farming, while great, were much more contingent on other factors like climate, the realities of distance, and regional and local knowledge of non-Russian cultivators than on the dreams of officials. Although infrastructure like grain silos, windmills, and government-funded agricultural machinery dealerships were part of the significant changes to the steppe, they themselves were not simple determinants of the course of history. Instead of acting on their own, these technologies interacted with a diverse array of human, bureaucratic, and non-human factors to create a steppe that was at once more developed, sedentary, and Russian than it had been half a century before, and yet these changes also had many so-called primitive, mobile, and non-Russian characteristics.

It is difficult to overstate the challenge of intensively growing grain in much of the steppe region. What is more, the area is vast, and its size means a great deal of environmental diversity. While in general rainfall declines further to the south, some areas that typically received enough rainfall sometimes did not. Therefore, it is difficult to predict and ensure a steady harvest of grain. One of the best examples of this is the wildly varying harvests experienced during the Virgin Lands Campaign under Khrushchev. For the first six years of the campaign, harvests alternated between bumper crops during good years of plentiful rainfall, and bad harvests during years of near drought.\footnote{On Virgin Lands harvests see, Alec Nove, \textit{Economic History of the USSR}, (London: Allen and Unwin, 1982), 332-333.} Given this variability, imperial era agronomists, officials, and peasant settlers were all in a constant search for grains and ways of cultivating grains that would ensure a good steady harvest. Though they never found the silver bullet, the search for the perfect grain
reveals much about the methods and mindset of scientists, officials, and peasants. Additionally, much like the aid and subsidies (beyond land) given to peasants to help them with livestock, the agronomic aid supplied by imperial authorities was not equally distributed between Kazakhs and settlers. Instead, true to the settler colonial nature of this undertaking, the vast majority of agronomic aid to support growing crops like wheat went to peasant settlers, and Kazakhs were often kept out of aid programs, especially those created and overseen by the Resettlement Administration.

**Perfecting Grain**

One of the main hopes for officials was that they could find a wheat variety already suitable for the arid steppe environment. While many believed there might be more than one for different subregions, their hope that they might find a grain that was suitable for particular environments was compelling. It is easy to understand this impulse. If there were such a plant, it would be a cheap and easily dispersible technology that could quickly ensure a steady supply of wheat from the steppe. In other settler colonies at the same time, numerous plant explorers were engaged in a similar project. However, rather than sending plant explorers elsewhere, imperial officials across the Russian Empire spent most of their energy attempting to collect plants (especially wheat varieties) within the empire itself. This is not surprising since the Russian Empire was one of the main destinations of plant explorers, especially those in search of wheat.

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361 One of the most prolific “plant explorers” for the United States was Frank N. Meyer, see: Isabel Shipley Cunningham, *Frank N. Meyer: Plant Hunter in Asia* (Ames: Iowa State University Press, 1984).
362 Though also interested in alfalfa and stone fruits, Neils Hansen took several trips to the Kazakh steppe, mostly in search of alfalfa, but collecting other plants as well, see: M. D. Rumbaugh “N. E. Hansen’s Contributions to Alfalfa Breeding in North America” *Bulletins* Paper 670 (South Dakota State University Agricultural Experiment Station, 1979).
While imperial agronomists had been collecting and cataloging wheat and plant samples for a long time, their work on the Kazakh steppe coincided with the period of most intense settlement after the 1904 Revolution. By 1910, as the agronomic apparatus had spread across the steppe and as the best settlement areas were being filled up forcing peasants onto more and more marginal land, the administrative apparatus became involved in attempts to identify and disseminate the most appropriate grains for the steppe with a special focus on wheat. This work was undertaken under the direction of the head agronomist of the Governor Generalship of the Steppe, V. Khristianovich. Khristianovich’s work consisted both of collecting information on local wheat varieties and hosting an exhibition in Omsk in 1911. At the exhibition, it was hoped that people could see the new or unfamiliar varieties and be encouraged to begin planting these seeds themselves.

By focusing on the varieties of wheat that were currently being grown in the region, Khristianovich was touching on recent scientific debates around the question of acclimatization or adaptation. The difference between the two was that acclimatizers believed plants and animals could, within their lifetimes, adapt to a new environment, while those who argued for adaptation, believed the changes that allowed plants to live in new places was gradual and occurred through generational evolution. Those who believed in acclimatization combined a mix of faith in science and also an internalized notion of settler colonialism. In fact, in several settler colonies, most notably the United States, Canada, Australia, and New Zealand, the desire to remake the

363 Although government-sponsored seed collection and improvement work was important, it is important to note it built on a firm foundation of earlier non-governmental agricultural science, Olga Elina, “Planting the Seeds for the Revolution: The Rise of Russian Agricultural Science” Science in Context 15 no. 2 (June 2002): 209-237.
364 TsGARK f. 64, op.1, d. 6156, ll. 1-37, “Delo o izuchenii mestnykh sortov pshenitsy, 1910.
environment in the image of the home country led to the founding of acclimatization societies that actively sponsored the introduction of species (mostly birds and mammals) from Europe into the settler colony. The fact that these new species were meant to replace indigenous species is a further reminder of the ways settler colonial assumptions were reflected in broader scientific and political undertakings.

Similar to the acclimatization societies, officials like Khrustianovich hoped that if they could collect a sample of wheat from areas nearby the steppe that grew well in the steppe region, they could encourage its broader planting and it would replace not only other varieties of wheat, but also pastoral nomadism. This search for plants to match the environment was part of why Khrustianovich wanted correspondents to send him information not only on the plant itself but on cultivation, climate, yields, and resistance to diseases. The fact remained, however, that most settlers came from steppe regions that were not totally dissimilar from the Kazakh steppe such as South Russia and Ukraine, so in fact, many of their varieties were already theoretically well-suited to the steppe.

Nevertheless, officials were still interested in mapping what imports or varieties from Central Asia might be best suited to particular regions. Luckily for Khrustianovich, there were several sources he could draw on to give him local reports on wheat varieties that grew well in their particular climate. In addition to local officials, he could also rely on the network of lower agricultural schools that were still in operation, and even some experimental fields that were recently established on the steppe. Khrustianovich contacted all of these and requested they send

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367 TsGARK f. 64, op.1, d. 6156, l. 20.
368 On the sources of peasant settlers to the Kazakh steppe see, Demko, *The Russian Colonization of Kazakhstan*, 63.
him samples of wheat grown in the area and information on yields and where it was believed they came from.

For example, in 1910 Kristianovich was very interested in a rumor that a wheat variety grew in the area near the Kopal Lower Agricultural School, and asked school officials to send them a sample. In response to a similar request, the Pavlodar lower agricultural school reported that in the region around the school there were six different varieties of wheat being grown: argautka, belo turk, chernokoloska, sinuska, kitaika, almatinska, krasnen’skaia, bezuska, and kitaiskaia yaritska. Given the names, it appears that several of the varieties may have come from China (sinuska, kitaika, and kitaiskaia yaritska), and Turk may have come from Turkey. Most interesting is almatinska which appears to at one point have come from the Semirechye region, perhaps from nearby modern day Almaty. However, none of these varieties had to originate in these places, names of varieties might simply indicate where the seed came from most recently. For example, a sample that Khristianovich sent to the Bureau of Applied Botany in St. Petersburg that locals had called kitaika (Chinese) was identified in fact as a variety of English wheat: Triticum Turgidum Var. Lustanicum.

369 TsGARK, f. 64, op.1, d. 6156, l. 7 Communication between Agronomist of the Governor Generalship of the Steppe and the Kopal Lower Agricultural School, October 1910.
370 TsGARK f. 64, op.1, d. 6156, ll. 19-20, Communication from the Pavlodar Lower Agricultural School to the Agronomist of the Governor Generalship of the Steppe, 4 October 1910.
371 Although, many wheat varieties with some version of the word “Turk” in them had little to do with Turkey. See for example the incorrect claim that the wheat came Turkey not Crimea, K. S. Quisenberry and R. L. Reitz, “Turkey Wheat: The Cornerstone of an Empire” Agricultural History 48 no.1 (January 1974), 104. This was corrected in a reply article, Robert G. Dunbar, “Turkey Wheat: A Comment” Agricultural History (January 1974), 114. However, the original mistake has been repeated numerous times.
372 TsGARK f. 64, op.1, d. 6156, l. 27. Communication from the Bureau of Applied Botany to Khristianovich, 1910. The Bureau of Applied Botany which was under the Scientific Committee of the Ministry of State Domains had its own program of collecting and identifying plants across the empire during this same period, although their work had begun earlier than Khristianovich’s work. Although they were doing roughly the same work, since Khristianovich, working for the Governor Generalship of the Steppe was under the jurisdiction of the Ministry of Internal Affairs, and therefore officially the two projects were totally independent of one another.
In addition to agricultural schools, Khristianovich also relied on local officials like uezd nachalniks to gather samples and information. One uezd Nachalnik in Kokshetau sent a very rare sample of wheat that locals called Polskii (Polish); although, according to Khristianovich this variety had nothing to do with Poland. Instead, Khristianovich claimed that it “obviously” came from China and had been exported to Germany, although he did not explain how he knew this. He did say that peasants in Tomsk oblast in Siberia and Semipalatinsk had gotten the wheat from Siberia, however, apparently, they already knew about the original source because they called it “Chinese rye.” Nevertheless, as the example of English wheat indicates, Khristianovich could himself sometimes be wrong about the source of wheat, and his lack of explanation as to how he knew this information makes it conjecture at best.

In spite of the mystery of the provenance of wheat varieties, what is most interesting about Khristianovich’s search is that large numbers of the varieties were not clearly known and almost none appear to have been varieties created by professional breeders. This was in spite of the fact that since the 1880s, agronomists on the steppe had been concerned with the need for “improved” varieties. However, their notion of improved varieties did not mean they had to be developed by professional breeders or agronomists. This is another point at which the very scientific nature and idea of scientists interested in controlling and perfecting nature fails to hold up. What seemed to be driving steppe agronomists the most with regard to wheat was a hope that somewhere there existed an appropriate variety, and their work seemed to focus on gathering

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373 However, local officials like uezd nachalniks had roles that were were ill-defined and often changing, therefore, the collection of information from them would not be systematic or even guaranteed. On local governance on the steppe see, Sultangalieva, Volosti i volostnye upraviteli, 11-24.
374 TsGARK f. 64, op.1, d. 6156, l. 6. Communication from Khristianovich to Pavlov, Krestianskii Nachalnik 24 September 1910.
varieties rather than crossing and breeding new varieties to perfect them. This was a difference between steppe agronomy and other agronomists in other regions.\(^{375}\)

Furthermore, steppe agronomists were happy to recognize the work of some seed improvers. Although, those who they were willing to acknowledge in seed propagation work illustrates their blind spots. For example, no effort was made to explain which person or village in China developed the *kitaiskii* variety. However, there was significant interest in the propagators of other wheat varieties. For example, among Khristianovich’s records there was a newspaper clipping from an unknown newspaper that described “Afrikaniki” or “African” wheat. According to the article, a village priest named Poletaem in Atbasar uезд sowed the wheat extensively. Scientists later identified the variety as Africanum Congum. However, the priest had gotten the wheat in Samara in European Russia in 1891. He then took the wheat to the Kazakh Steppe when he moved there and disseminated the wheat. According to reports, it did very well in poor harvest years.\(^{376}\) While it is unclear how popular the variety was, it was popular enough that at the exhibition in Omsk in the summer of 1911, the American plant explorer Frank Meyer had heard about it, and was able to get a sample of it which was later tested in the “semiarid Northwest” of the United States.\(^{377}\)

While Khristianovich was busy working on an exhibition of wheat varieties grown in the Steppe Governor-Generalship, the Bureau of Applied Botany, which was part of the Scientific Committee of the GUZiZ in St. Petersburg, was continuing its work on an empire-wide scale. However, the Bureau itself recognized in 1911 that it was behind in this work and saw the

\(^{375}\) For example, the US plant explorer Niels Hansen referenced earlier spent much of his time breeding new crosses of alfalfas and other plants he collected on his travels.
\(^{376}\) TsGARK f. 64, op.1, d. 6156, l. 29 Unidentified newspaper clipping.
unfamiliarity with individual plants as a “significant gap” in agronomic knowledge, which the United States had already been working on for nine years. Therefore, the Bureau proposed to collect samples and test the varieties, but because they were behind, they would focus on “local” wheat varieties as Khristianovich had done.  

Already by 1912, the Bureau could report some success, having collected 2,800 varieties of wheat, 2,500 of barley, and 700 of oats in addition to pasture plants. While this was an empire-wide project, the Baltic and steppe regions were their main focus. Although the Bureau could rely on local sources like those Khristianovich had, they also had funds to send their own plant explorer to Central Asia to gather varieties. Therefore, they sent Vasily Benzin to focus especially on the region of Semirechye. However, although this region of Central Asia had significant irrigated settled agriculture, in addition to nomadic pastoralism, he was directed to focus on non-irrigated wheat varieties. This was because the committee was interested in transplanting these varieties to other regions of the steppe without irrigation such as those further to the north. What is more, he was not only directed to collect the plants, but also asked to compile a list of those individuals who grew them, ostensibly so they could be contacted for advice on cultivation and also for future seed collection.

Benzin sent many varieties back to the Bureau, but one of the most interesting varieties was a sample of 20 pood of rye that he acquired from the area near modern day Taraz in Southern Kazakhstan. The sample came from a Kazakh farmer named Bazaraev who cultivated it with a “Kazakh” plow and irrigated the crop three times. While this was outside of Benzin’s

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378 Rossiiskii Gosudarstvennyi Istoricheskii Arkhiv [Russian State Historical Archive] hereafter referred to as RGIA. RGIA f. 382, op. 9, d. 161, l. 22.  
380 RGIA f. 382, op. 9, d. 161, l. 26 Communication from the Bureau of Applied Botany to Vasily Benzin, 23 May 1912.
directions that he should seek out solely un-irrigated crops, the low rainfall in Taraz meant that irrigating it only three times made it very drought tolerant. Furthermore, the nature of this sample, one that came from a Kazakh farmer, is interesting especially since Kazakhs were not supposed to be farmers in the eyes of many imperial officials. In spite of its source, it made it into the collection of the empire-wide Bureau of Applied Botany for dissemination to other regions as a unique and valuable variety. This clearly muddies the picture of what imperial agronomy looked like in practice. While the center was collecting and naming, it was also constantly collecting and appropriating local knowledge without much sign of worry that this might undermine their authority. In fact, the question probably never occurred to officials at the Bureau. To complicate this picture further, the actual source of the rye remains unclear. Bazaraev reportedly simply purchased the seed from a local peasant at the market.381 Was this peasant Russian? Or perhaps a Sart, Uzbek, or Tatar? To Bazaraev it did not matter. And in fact, given the complicated histories of seed genetics, what would a family tree of this variety even look like? As Courtney Fullilove has shown, the stories of where seeds come from is always very muddy and rarely gives us answers with certainty.382

The story of this variety of rye is also interesting for what it tells us about the global exchange of agronomic expertise in the early twentieth century. While the search for grains that could survive in arid environments was driven in part by the needs of agronomists and settlers on the Kazakh steppe, the story of Benzin’s work does not end there. After the expedition, he published his study on rye in arid regions, and after the revolution in 1917 emigrated first to Czechoslovakia where he continued his academic work on grains, and later to the United States.

381 RGIA f. 382, op.9, d. 161, l. 40 Communication from the Aulieatinsk Uezd Nachalnik to the Bureau of Applied Botany, 30 September, 1912.
In the US, he became involved in a “Slavic American Colonization Company” in Texas and Mexico. Later, due to his close association with the Orthodox Church in the United States, he worked on similar plant research in Alaska as well. Benzin, though a minor, and rather unknown figure, stands out as an agronomist who worked on at least three different settler colonial projects across several decades.

However, his work as a person on advancing settler colonialism in Central Asia, Siberia, Texas, Alaska, and Mexico was not his only contribution. Viewed this way could mask the way settler colonialism in this period operated as a global system that was simultaneously about competition between settler colonial states, while it also encouraged scientific cooperation across imperial boundaries. Benzin’s work was translated into a number of different languages, and his command of several different languages allowed him to work in a variety of these contexts and pull resources and knowledge from many different sources. He not only worked on arid ryes, he also wrote a doctoral dissertation on corn, and conducted research on cold weather plants in Alaska. This reminds us of the need to rethink the geographic scope of settler colonial science; while the settler colonies were in competition with one another for economic dominance, they easily relied on one another and shared knowledge across porous borders. What is more, the knowledge need not stop at classically recognized settler colonies. For example, the Bureau who employed Benzin was in contact with the Russian Consul in Damascus asking for wheat varieties that grew in that arid region. While Ottoman Syria was not exactly a settler colony, it certainly

383 It appears this may refer to a Polish settlement project in Texas, especially the Texas panhandle. Dennis Kolinski, “Polish Rural Settlement in America” Polish American Studies 52 no. 2 (Autumn 1995): 21-55.
was part of an imperial project and is a reminder of the frequent overlap between settler colonial and colonial science.\textsuperscript{385}

In addition to professional scientists like Benzin, the Bureau was not above including work by local improvers. In fact, they gladly accepted from Khristianovich a sample of wheat grown in Omsk by the “self-taught acclimatizer” Pavel Komisarov.\textsuperscript{386} The record is scant on who local improvers like Komisarov were, or how prevalent they were, but they clearly played a role in the imaginations of steppe agronomists and officials who were frequently in search of “advanced” segments of the peasantry. In spite of the fact that agronomists and scientists were happy to accept the improvement work of non-specialists, they still believed that the peasants needed to be shown what to do. This was in part the reasoning behind Khristianovich’s exhibition in 1911. However, it was not enough to expect the peasants to come to them, officials quickly began to recognize they would need to go to the people. Therefore, the Resettlement Administration began working on hiring agronomic instructors to showcase seed varieties especially in experimental plantings. These were the plantings discussed in chapter two, which were often undertaken by local farmers or cooperatives under the guidance and support of agronomist technicians to showcase new crops and seed varieties in an effort to both test and popularize new crops.\textsuperscript{387}

However, planting the correct seed was not enough. One of the main frustrations of agronomists was that they believed peasants were planting “dirty” seed that included too much weed seed which could adversely affect yields. Therefore, in order to make sure that peasants

\textsuperscript{385} RGIA f. 382, op. 9, d. 161, l. 39 Communication from the Russian Consul in Damascus to the Bureau of Applied Botany, 3 August 1912.
\textsuperscript{386} TsGARK f. 64, op.1, d. 6156, l. 9 Communication from Khristianovich to the Bureau of Applied Botany, 13 October 1910.
\textsuperscript{387} TsGARK f. 30, op.1, d. 4, l. 46 Communication from the Government Agronomist Turgai to the Department of Agriculture, 23 February 1912.
were replanting clean seed, they need to clean it first to get weed seeds out. This task was laborious if done by hand, but could be greatly speeded up by utilizing seed cleaning machines. However, this machinery was expensive, and the vast distances of the steppe made it unlikely peasants would transport their seed to sites to have it cleaned. In order to address this difficulty officials began to push for the creation of mobile seed cleaning units. Officials hoped peasants would join together in an artel (a cooperative association that typically used shared equipment) and rent the machinery to have their seed cleaned. The goal was that through cooperative financing, peasants could pull their resources and have better yields. Agronomists tried to inform peasants about this process, achieving varying degrees of success.

While yields were foremost in the minds of most agronomists, they also recognized that if the steppe was going to export seed and grain, most large markets would require cleaned seed that was pure and ready for milling or could fetch the price of high grade seed on the market. However, this was not simply a case of a further penetration of “foreign” forces like markets onto the steppe. In fact, the mobile nature of the seed cleaning equipment is an important aspect, which illustrates how even external equipment and ideas interacted with the steppe environment in ways that were reminiscent of nomadic adaptation. The seed cleaners were mobile and community-based just like Kazakh nomads who nomadized in small community-based groups who shared pastures while still maintaining their own household economies. Both these adaptations grew out of the vast distances on the steppe, although the nomads were adapting to take advantage of distance (as a means of resiliency in a variable steppe environment), while the

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389 TsGARK f. 30, op.1, d. 19, Instruktsii, smety i proyekty sortirovennykh i prokatnykh stantsii v zernochistitel'nykh punkhtakh.
mobile seed cleaning artels were created to accommodate the problem of getting seed to central
seed-cleaning stations.

**Disaster Markets**

In spite of the best efforts of officials and peasants to use clean seeds and appropriate
varieties, growing grain—especially wheat—on the steppe was often a challenging undertaking
that frequently resulted in failure. For example, in 1900-1901 much of the steppe experienced
famine-like conditions that caused many settlers to join the nearly 22 percent of settlers who
gave up and returned to European Russia. Similarly, 1911 was a year of very low wheat
yields.\(^{390}\)

In the face of the challenging grain-growing environment, the imperial government was
frequently giving food and seed aid to settlers whose crops had failed, or who simply came to the
steppe so destitute they could not afford seed, especially after poor harvests. Supplying large
amounts of seed aid on top of the large-scale agronomic aid and land given to settlers, was just
one of the many subsidies given to the settler colonial project that allowed settler colonial
agriculture to compete with Kazakh nomadism or agriculture on an uneven playing field.

However, the seed aid was meant to be only a loan, and because there were large
numbers of peasants who did not repay their loans, officials tried to address this problem.
Nevertheless, even those settlers who intended to repay their loans had a difficult time. This was
because repayment in cash was a moving target. Grain and flour prices fluctuated wildly on the
steppe. This was because in dryland farming, harvests could fluctuate greatly. This would
become manifest much later during the Virgin Lands Campaign in the 1950s and 60s where
bumper crops were followed by abysmal yields. These kinds of yearly fluctuations, rather than

\(^{390}\) Demko, *Russian Colonization of Kazakhstan*, 86.
being abnormal, should in fact be seen as a normal and healthy part of arid ecosystems as Diana Davis has shown.\textsuperscript{391} In spite of this environmental reality, it was a constant challenge to steppe settlement, and also was part of why long range pastoral nomadism is so well suited to the environment, because nomads could move to areas with more rainfall and pasture.

Due to the possibility of large swings in the grain harvest from year to year, the price of grain and flour on the steppe also changed dramatically. When a poor harvest was widespread grain prices rose significantly, and peasants often could not afford the price of flour or seed. However, if the next harvest was good across the region, this could drive down the price of grain, and make it difficult or impossible for peasants to repay their loans in spite of having an excellent harvest. This situation appears to have occurred when the poor harvest in 1901 was followed by a better harvest in 1902.\textsuperscript{392} However, large climatic swings were not the only thing that affected the price of grain and flour on the steppe, people could too. Many Kazakhs tended to purchase flour or grain twice a year, once after selling cattle and wool at summer markets, and again in the fall after selling leather, suet, and other animal products.\textsuperscript{393}

Given the unstable price of grain, officials began in the early twentieth century to adopt a new practice. In 1900-1901, both Siberia and the Kazakh steppe saw poor harvests. Therefore, officials set up a system by which settlers in those regions could repay their seed and feed loans in kind at a rate of two \textit{pood} per one \textit{pood} of grain they had received. Later, similar programs offered in-kind repayment at a rate of five to one.\textsuperscript{394} Not all officials were happy with this program, some thought that the peasants were taking advantage of the government and did not

\textsuperscript{392} RGIA f. 391, op. 4, d. 1823, l. 1. Communication from the Resettlement Administration to the Ministry of Internal Affairs, 1912.
\textsuperscript{393} RGIA f. 391, op. 3, d. 1052, l. 18 obo Report from Governor General of the Steppe to the GUZ\textsuperscript{I}Z, February 1908.
\textsuperscript{394} RGIS f. 391, op. 4, d. 1823, l. 1.
need the grain as much as they said they did.\textsuperscript{395} In spite of the opposition of some, several regions in Siberia and the steppe developed large-scale programs of grain aid and in-kind repayment of loans. While this solved the problem of peasant debt defaults, it led to another challenge: what to do with all the grain the peasants paid to the government. This was not a small challenge, because peasants were paying back five times as much grain as they borrowed. For example, in 1911 peasants in Turgai and Akmola oblasts took out over two million \textit{pood} of grain each, while in Tomsk in Siberia peasants took out loans of nearly 8.5 million \textit{pood} of grain.\textsuperscript{396} Therefore, the government needed some way of collecting and storing at least 10 million \textit{pood} of grain for Turgai and Akmola.

In Akmola, where the program of in-kind loan repayments had been already underway, officials had constructed 22 grain storage silos to hold repayment grain by 1904.\textsuperscript{397} However, not everyone believed that the storage facilities should be government projects. Glinka, a noted colonial enthusiast supported a project to encourage private grain storage facilities.\textsuperscript{398} Although he noted generally that such facilities were essential to supporting colonization, he did not believe they should be government projects.\textsuperscript{399} It was difficult to find private support for the granaries, and so it appears it was left to the government to construct them. Nevertheless, many officials began to see there were other values to the granaries than simply addressing peasant crop failure. Krivoshein, as head of the GUZiZ noted that beyond simply helping starving peasants, the grain storage facilities could help stabilize grain prices, putting an end to the wild

\textsuperscript{395} RGIA f. 391, op. 3, d. 1052, l. 12 Zhurnal yekstrennago zasedaniiia Atbasar uezd s’ezda krestianskikh nachalnikov, 29 March 1908.
\textsuperscript{396} RGIA f. 391, op. 4, d. 1823, l. 2.
\textsuperscript{397} RGIA f. 391, op. 4, d. 1823, l. 2 obo.
\textsuperscript{398} Glinka famously picked up where his predecessor Krivoshein left off, defending colonization and the Resettlement Administration which both headed. Ian W. Campbell, \textit{Knowledge and the Ends of Empire}, 149.
\textsuperscript{399} RGIA f. 391, op. 3, d. 1052, l. 7.
fluctuations that were endemic to dryland farming on the steppe. While recognizing that these facilities were especially important in isolated places, they could have effects beyond their immediate locales. What is more, he believed that grain storage silos should also be built in other regions far from the immediate steppe settlement provinces or Siberia. He specifically mentioned how building grain silos in Ufa, Orenburg, and Samara could stabilize prices and limit hunger.

However, in order to have these effects, the government silos needed to become a large-scale infrastructure project. The silos were large, complex structures that required significant material be transported to the steppe along with engineering expertise. For example, the most common type of silos were built to hold 50,000 pood of grain, and cost on average a little less than 10,000 rubles each. While the several dozen large silos constructed in the first decade of the project appear to have been sufficient at stabilizing prices and staving off the worst starvation on the steppe, by 1915, they came to be seen as insufficient. This was due in part to the stresses put on the agricultural economy by the First World War. For example, in Akmola oblast, the roughly 40 government granaries were insufficient to hold the 2.7 million pood of grain officials expected and hoped for in the upcoming harvest. Therefore, they began to allocate funds to construct another 23 massive silos that would hold nearly 400,000 pood of grain. This was not meant to hold all the grain; however, it would store about half the grain in government granaries and allow the rest to either be stored locally or shipped off to markets across the empire.

The role of government grain silos at first appears to be a simple infrastructure project to address widespread crop failure in a region of variable harvests. However, closer inspection

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400 At this time, Krivoshein was serving as head of the GUZiZ where he used his position to push a pro-colonization agenda. Campbell, Knowledge and the Ends of Empire, 161.
401 RGIA f. 391, op. 4, d. 1823, l. 4 Letter from Krivoshein to the Ministry of Finance 20 June 1912.
402 RGIA f. 391, op. 6, d. 146, l. 1 O postroike 23-kh zernokhranilisch v Akmolinskoi oblasti 1916.
403 Ibid., l. 1.
reveals that while they were created to address a problem that was driven by the intersection of the particularities of the steppe climate and a government intent on supporting settlers with a mix of subsidy and credit, eventually they developed into something more complex. They came to serve as a kind of market stabilizer, that grew out of a strictly humanitarian concern for peasant health. Finally, during wartime, they were turned into important aspects of national defense that stabilized food supplies at a critical time for the empire. Therefore, they were neither purely humanitarian, nor were they solely a project of capitalist expansion, instead they represent in a material form the ways the environment, settler colonialism, the logic of capitalist expansion, and engineering intersected on the environment to create new physical, economic, and social structures on the steppe.

**Infrastructure**

Although grain silos were a vital part of grain-producing infrastructure on the steppe, they were not the only important aid to settlers that both facilitated and protected the growing of grain on the steppe. While silos stored grain, there were other steps along the process of getting the grain to markets or turning the grain into wheat. None of these were crucial components of a nomadic economy, because the primary export product—livestock—was itself mobile. While this seems like a rather obvious observation, it is important, because it was not only that increased settlement was hurting nomadism and causing its decline. In addition, the large infrastructure projects were also giving further subsidies both to encourage more settlement, and to encourage particular types of agriculture that centered grain produced on sedentary farms.

While there was no railway line directly through the most important areas of peasant settlement, the railway did provide an important connection that allowed both more peasant settlement and also the export of agricultural products. Furthermore, the recognition of the
importance of the railways in this regard was not lost on officials.\textsuperscript{404} Therefore, officials frequently discussed and began preparatory work on expanding railways on the steppe. While their broadest visions were not achieved until the Soviet period, the continuity in thinking about railways across the 1917 divide is another important aspect of agricultural change on the steppe.\textsuperscript{405}

One railway that was built in part was a line cutting across the northern part of Kostanay oblast in some of the most fertile grain producing regions. At least one study was completed on the project, and while it was a difficult engineering project, it seems likely that had not the First World War and the revolutions of 1917 intervened, it would probably have been completed in its totality.\textsuperscript{406} While there were significant business interests who wanted a railway linking this fertile region to the rest of the empire, it was not driven solely by an economic concern. For example, a government report on the proposed line focused on the “great colonization value” of the line. It went on to mention how this would not only allow for the export of agricultural products, but also develop new agricultural lands and increase the “sown area.” However, this was meant not only to help settlers, it was clear to officials that the railway and expanded settlement were inimical to nomadism, which they believed was a good thing. They hoped this expansion of agriculture would “facilitate the transition to agriculture of the semi-nomadic mass of the Kazakhs” while also opening up new regions for peasant settlement.\textsuperscript{407}

\textsuperscript{404} In fact, Steven Marks illustrated that officials were well aware of the impact railway projects, like the Trans-Siberian Railway could, and did, have on settlement and economic development. Steven G. Marks, \textit{The Road to Power: The Trans-Siberian Railway and the Colonization of Asian Russia, 1850-1917} (New York: I.B. Taurus, 1991).

\textsuperscript{405} On the railway in Kazakhstan during the Soviet period see, Payne, \textit{Stalin’s Railroad}.

\textsuperscript{406} “Istoria kостанайской железной дороги” (article written by staff at the Kostanay Oblast History Museum) http://kostanay1879.ru/index.php?option=com_content&task=view&id=416&Itemid=51.

\textsuperscript{407} RGIA f. 391, op. 4, d. 2888, l. 13 Materialy o sooruzhenii dorogii Kustanai-Troitskii, 1909-1912.
What is notable about this is not only that officials were clear in the connection between railways, settlement, and the decrease in nomadism. It is also important that officials already recognized that most Kazakhs in these regions were already only “semi-nomadic.” This was because these regions had seen large amounts of peasant settlement which made full nomadism almost impossible. However, in spite of this state of transition for Kazakhs, officials were not interested in funneling the huge amount of resources to Kazakhs that they had been giving to peasant settlers. Furthermore, the railroad was one more expensive and difficult project that simultaneously harmed nomads and helped sedentary agriculturalists. While officials frequently mentioned how they believed the Kazakhs would “naturally” change to sedentary agriculture, the projects and money that facilitated sedentary grain agriculture and actively hurt nomadism, made this change far from natural in any real sense of the word. Additionally, while less significant, and less well documented, there were also smaller projects to attempt to build roads in the steppe regions as well, which had similar effects on trade and settlement.408

In addition to railways and silos, sedentary peasant agriculture also received a further subsidy in the form of discounted agricultural machinery that officials helped bring to the steppe. Officials quickly realized that distances on the steppe and lack of capital by peasants created the same challenges with most agricultural equipment that they did for seed cleaning machinery discussed earlier. While on the one hand, the Russian peasantry was notorious for its “low-level” of agricultural machinery usage, it is unclear if this was even the primary difficulty peasants faced. In fact, David Moon has argued that peasants did adapt new machinery when it suited them, and in fact grew more grain for the market when markets were within easy reach.409

408 TsGARK f. 29, op.1, d. 301. Delo o postroike kolodtsev i dorozhnikh sooruzhenii v Turgiaskoi Ural’skom raione.
409 David Moon, “Russia’s Rural Economy, 1800-1930” Kritika: Explorations in Russian and Eurasian History 1 no. 4 (Fall 2000), 688.
Furthermore, the reality was that most peasant settlers to the Kazakh steppe came from regions with some of the highest usages of agricultural machinery and market-oriented farming in South Russia and Ukraine. However, getting to the actual sites of settlement, was a long and arduous journey that typically—especially in later years of settlement—ended in settlement far from railway lines or even roads. The reality is that hauling large amounts of heavy agricultural equipment first on the train to an embarkation point and then via wagon across the steppe was simply impractical. Therefore, to address what officials and many peasants felt was a low-level of agricultural machinery usage across the steppe, officials created a system of government-run agricultural machinery dealers (called *skladi*) across the steppe settlement regions.

In spite of the original impulse being driven in part by government initiative, the creation of *skladi* did not begin entirely as a top-down government-driven project. The first *skladi* were created in 1896 in Siberia as private businesses. Although these *skladi* were private enterprises, they were financed at least in part by a fund of 10,000 rubles created by the Siberian Railway Committee who was at the time still in charge of settlement. However, these enterprises quickly ran into difficulties as they had little oversight on how the money was spent, and the directors of the companies often had little commercial experience.  

By 1898, as government officials became more involved in oversight and in providing capital to the *skladi*, they began to expand into the steppe oblasts. Already by that year, there were 15 in Omsk and Petropavlsk oblasts each with 19,050 and 14,862 rubles in sales respectively. One year later, in 1899, all the *skladi* under the Resettlement Administration, which included those in Siberia and the steppe oblasts, were selling 275,975 rubles worth of

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410 RGIA f. 391, op.2, d. 556, l. 111-112, Communication from the Ministry of Internal Affairs to the Resettlement Administration, 1899.
411 RGIA f. 391, op.2, d. 556, l. 9 Ob organizatsii i deiatel'nosti sel'skokhoziastvennykh skladov Pereslencheskogo upravleniia.
agricultural machinery. Of which, only 30% was sold on credit. This incredibly rapid growth is an indication not only of how quickly settlement was expanding, it also shows how popular agricultural equipment was, and how much settlers wanted it, and could afford it.

However, the growth in the value of machinery sold only tells part of the story. The machinery for sale was not exactly the most modern and advanced agricultural machinery available. Instead, peasant settlers for the most part purchased relatively simple and common agricultural machinery (an indication perhaps that they simply did not want to transport machinery a vast distance). For example, the most popular piece of equipment were sickles, which the skladi sold 8,901 of in the first 8 months of 1899. However, even more interesting is that the skladi sold nearly twice as many (8,197) wooden plows (saban) as regular plows (4,121) in the same period. This reliance on rather simple and popular agricultural equipment meant the skladi were not exactly kulturtrager of new technologies into the steppe. Even the most “advanced” equipment that was widely sold, such as hay rakes, indicate that peasant farmers were not all exactly adapting to the kind of European-style intensive agriculture from the imagination of officials. Instead, it indicates that settlers were interested in cutting more hay and practicing a more extensive animal-husbandry system of agriculture. What is more, rather than them each purchasing their own hay-making equipment, officials on the steppe mentioned that it was quite common for farmers to share or rent hay-making equipment which was still not exactly reflecting the archetype of the independent Stolypin peasant.

Not only were more advanced types of machinery less popular among peasants than might be hoped by some officials, even if peasants had wanted it, it was still difficult for them to

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412 RGIA f. 391, op.2, d. 556, l. 23, Communication from the Ministry of Internal Affairs to the Resettlement Administration, 11 November 1899.
413 RGIA f. 391, op.2, d. 556, l. 22.
414 RGIA f. 391, op. 5, d. 1613, l. 120.
find that machinery to purchase. While agricultural machinery was an important sector in industrialization in other settler colonies like the US, Russia failed to copy that model. In fact, even as late at 1908, officials in the Resettlement Administration were still struggling with getting more advanced machinery into the warehouses. While, officials across the government hoped that the government warehouses would purchase Russian-built machinery, they complained that there was not enough quality machinery being produced. In fact, the government warehouses were stocked largely with machinery from the United States, especially Deering.

While they hoped the government could eventually get licenses to build particular Deering machinery in Russia, this was a longer term project and the Resettlement Administration instead spent nearly one million rubles on importing machines from the United States, which was half of what they had asked for funds to purchase. However, the types of machines the Resettlement Administration wanted to purchase were not all types of machinery, instead it was largely machines to facilitate hay-making. In 1907, they requested funds to purchase over 6,000 mowers, nearly 7,000 horse rakes, 3,348 “mowing harvesters” and about 5,000 reapers in addition to 100,000 rubles worth of spare parts and 16,000 poed of twine. The rest of the proposal was filled out with 120 disk harrows and nine portable steam engines. Once again, while officials and agricultural scientists were interested in developing wheat on the steppe, the realities of the steppe made it more suitable to animal husbandry, and fodder production, which were tacitly admitted in the purchase orders by the Resettlement Administration for machines from the United States.

415 This led to a deep involvement of agricultural machinery companies from Europe and the US being involved in Russian agricultural development, see R. Munting, “Ransomes in Russia: An English Agricultural Engineering Company’s Trade with Russia to 1917” Economic History Review 31 no. 2 (May 1978): 257-269.
417 RGIA f. 382, op.3, d. 1043, ll. 88-91, Communication from the Glav Kontor of Agricultural Warehouses of the Resettlement Administration to the Resettlement Administration, 23 August, 1907.
In addition to plowing, harvesting, cleaning seed, and finally transporting grain there was another stage in the process of making wheat into a usable commodity: milling. Although wheat is more stable as a seed during transport and storage, selling flour was also big business on the steppe. What is more, it required the harnessing of the steppe’s natural environment. Rather than steam or water-powered milling, most grain on the steppe was processed into flour in windmills. These structures therefore served several roles at once. In addition to serving simply as places to make flour, they also had symbolic significance, as they represented to many settlers the establishment of civilization on the steppe and came to hold particular cultural meaning. However, they also represent a hybrid of technical machinery and the environment since they relied on the copious amount of wind on the steppe to operate. The symbolism of windmills is still strong, especially among ethnic Russians in places like Kostanay. When the city of Kostanay decided on a new city crest after the fall of the USSR, it was decided to include a windmill in the center of the emblem.418

Therefore, like most other infrastructure on the steppe, windmills were not simply technical machinery, or symbolic architecture divorced form the cultural milieu of settler colonialism; they were also government subsidized projects. Early in the process of heavy peasant settlement, just after the turn of the twentieth century, officials became involved in helping to construct windmills. A closer inspection of what made some projects worthwhile in the eyes of officials tells an important story of contingency and ideology.

In March of 1901, peasants from the village of Pavlogradskoe in Omsk uezd petitioned the Akmola oblast government for a loan to build a mill. The mill was to be overseen by the peasant Teslenko, and he convinced the oblast government to support the petition to the

Governor Generalship of the Steppe which had final say on the loan.\textsuperscript{419} In this instance it is unclear how he was able to convince them to support it, however, other records show the types of things that mattered to officials when supporting loans for windmills.

For example, in 1902, the Steppe General Governorship supported the petition of the peasant Vasily Vologdin of the village of Uspenskii in Petropavlsk uezd. They stated the reason for this was that Volodin had “technical knowledge” of how to operate the mill and offered as proof the fact that he had already built several parts of the future windmill out of wood. However, Vologdin was not only a handicraftsman. He appears to have been able to make the calculation and argument that constructing the mill would allow villagers to have their grain milled for 1 kopek less per pood than if they had to take them to other villages. With this mix of technical and economic knowledge, officials supported the petition of 300 rubles to build the mill.\textsuperscript{420} Another petition seems to have indicated technical knowledge might have been involved because the petitioner for a mill in the village of Kreshenko, Petropavlsk uezd had the last name Melnikov (Miller). Nevertheless, the loan still needed to be guaranteed by the village obshestvo.\textsuperscript{421}

While technical knowledge and the promise of profit were important considerations in distributing loans, there were further considerations as well. For example, in the village of Taganskoe in Akmola Oblast, Alexis Buravlev requested a 200 ruble loan to construct a mill. In this instance, he appears to have appealed to the fact that the distance the peasants had to transport the grain was too great (40 versts each way). However, the petition recognized that the

\textsuperscript{419} RGIA f. 391, op. 2, d. 819, l. 15 Communication from the Governor Generalship of the Steppe Chancellery to the Ministry of Internal Affairs, 22 March, 1901.
\textsuperscript{420} RGIA f. 391, op. 2, d. 819, l. 39 Communication from the Governor Generalship of the Steppe Chancellery to the Ministry of Internal Affairs, 14 January 1902.
\textsuperscript{421} RGIA f. 391, op. 2, d. 819, l. 67. Communication from the Governor Generalship of the Steppe Chancellery to the Ministry of Internal Affairs, 14 June, 1902.
village (who would guarantee the loan) and Buravlev had significant debt (5,100 rubles and 100 rubles respectively).

Perhaps because the village was guaranteeing the loan the price of grinding grain was to be set at 5 kopeks per pood and the mill had to serve any village resident first. This indicates that there was a kind of communal attitude in the village, in spite of the fact that the villagers had significant debt which indicates they probably had significant market ties. However, this kind of civic attitude was not limited to the “small-mindedness” of the peasant commune. It could just as easily exist in the person of peasant settlers establishing a new community. While some villages were transplanted colonies to the steppe, most were new creations, and given that the petition mentioned the Buravlev himself was from the Cossack lands in Troitsk volost, in the steppe of European Russia, it seems unlikely that this settlement was a colony. Instead, over the years of living together, they had created a new community that saw the need for a mill. That this community had a mix of communal and market ideologies operating side by side was probably not unique, and in fact indicates the ease at which peasant settlers were constructing a new settler colonial society and values.**422**

**Conclusion**

While wheat figured prominently in the schemes of agronomists and the dreams of peasants, it was a difficult crop to grow in the arid steppe environment. However, in spite of the challenges, officials, scientists, and peasants did not give up on the crop. This was in part due to the nature of dryland farming, where if one could wait out the bad years, in the good years, the payoff could be quite large. Therefore, like so many truisms in the steppe, it cannot be fully said that wheat is unsuitable for the steppe. Rather, given the realities of agriculture in Kazakhstan for

**422** RGIA f. 391, op. 2, d. 819, l. 53. Communication from the Governor Generalship of the Steppe Chancellery to the Ministry of Internal Affairs, 22 January 1902.
more than the past century, and Kazakhstan’s current status as a global leader in wheat production, it is perhaps better to say that growing wheat in the steppe is very difficult. It was perhaps its variability that made it so difficult for peasants and agronomists to simply give up on wheat and try other crops in spite of the frequent frustrations and setbacks.

In their quest to grow wheat on the steppe, agricultural scientists and officials illustrated the variety of ways that the agrotechnical infrastructure that supported wheat growing was constructed from a variety of sources and knowledge bases. For example, wheat varieties relied not only on centuries of peasant knowledge from China, the steppe, or Europe, but also the growing agronomic bureaucracy both on the steppe and in St. Petersburg. It also included plant explorers like Vasily Benzin who operated in a global world of agricultural science and whose work advanced not only settlement in the steppe, but also in other settler colonies like the United States. Therefore, the quest for improved wheat varieties does not neatly fit into any box of top-down or center-periphery much less a notion of a modernizing scientific bureaucracy intent on implementing a totally alien way of agriculture, even if that reflects part of the story.

Similarly, while the massive infrastructure project of grain silos that held millions of tons of wheat on the steppe can and should in some ways be understood as a technological and engineering feat that required significant state power and technical know-how, that is not the entire story. As this chapter illustrated, the history of the silos was instead rooted in a humanitarian effort to feed starving peasant settlers. However, even this humanitarian impulse was in pursuit of the aim of indigenous displacement. Nevertheless, what began as a relief effort grew into a loan repayment project that was required due to the unique character of the steppe environment that caused massive fluctuations in grain yields and therefore prices. In short, no single aspect be it humanitarian, economic, technological, or even environmental fully
encapsulated the forces behind the construction of large grain storage infrastructure that
eventually served a wartime aim during the First World War.

In keeping with the theme of myriad forces shaping the agricultural science and
agronomic infrastructure on the steppe, the physical infrastructures like railways, roads, machine
*skladi*, and windmills also defy definition or analysis through a single lens like the environment,
technology, or economics. While this dissertation develops this theme across several aspects of
scientific agriculture in the settler colonial project, it is perhaps most important in the discussion
of wheat. Wheat was at the center of the vision for settlement both by officials and peasants.
Wheat was also at the center of the eventual realization of these earlier imperial dreams when
Khrushchev’s Virgin Lands Campaign plowed and planted the steppe on a scale previously
unimaginable.

However, the scale was in part unimaginable because of the scale of plowing that the
Virgin Lands Campaign required, which was carried out via Machine Tractor Stations (MTC).
These stations were meant to supply several communal or state farms with the machine
equipment they required rather than having each communal farm have its own equipment. In a
foreshadowing of the massive tractor infrastructure that would later be required some officials
were already calling for something like it in 1911. That year, the head of resettlement in Akmola
pointed out in a report that the main thing limiting the expansion of arable onto “virgin” steppe
was that plowing was too expensive and required specialized equipment to do it on a large scale.
Therefore, he proposed the creation of state-owned tractor centers that could be rented out to
plow new lands. It does not appear this proposal went anywhere, but it does show how closely
the thinking of officials behind the Virgin Lands Campaign and the earlier imperial settler colonial project aligned.\textsuperscript{423}

\textsuperscript{423} RGIA f. 391, op. 4, d. 986, ll. 2-4, Report of the Head of Resettlement in the Akmola Resettlement District, 15 November 1911.
CHAPTER SIX: THE ‘PLAGUE’ OF ARIDITY

In 1897, the hydraulic engineer Kravtsev was sent by the Governor-General of the Steppe on an inspection tour of water resources in the resettlement districts in Omsk and Petropavlovsk uezds of Akmola oblast. During the course of his tour, he found a wide array of water sources being used by settlers to sustain themselves and their farms on the steppe. On the tour, he identified several villages that he believed had sufficient water and others whose water supply was insecure. The sources he found included lakes, streams, and wells whose water quality ranged from perfectly fresh to somewhat salty. It also included several wells that were so salty they were unsuitable even for livestock. In addition to a vast spectrum of quality, the artificial water sources he inspected were also constructed by an array of builders.

In the village of Krasnoyarsk, water was supplied by a nearby lake called Kuday-Kuduk which provided water only during the spring until June. This was in addition to the village’s four wells. One well had been built by the government and was 65 feet deep and held 18 feet of water. A second government well was nearly 70 feet deep with 44 feet of water. The village was also the site of an earlier Kazakh-built well which was 35 feet deep and held just under 4 feet of water, as well as a peasant-constructed well of the same depth which only held one foot of water. This peasant-built well not only had the least water, it was the only well described as salty instead of fresh. Nevertheless, Krasnoyarsk was lucky in that it was considered to be secure in its water supply. 424

This collection of natural water sources and infrastructure that was constructed by Kazakhs, peasant settlers, and government officials reflects some of the various structures and

actors who created the hydrotechnical infrastructure on the Kazakh steppe in the late nineteenth and early twentieth centuries. It also reflects the assortment of actors and structures that were typical for the first stage of post-1881 steppe settlement that saw an imperial bureaucracy scrambling to deal with the flood of (sometimes unwelcome) settlers to the region. In many ways this early mix of wells and water sources could serve as a juxtaposition to later hydrologic infrastructure on the steppe. Following the expansion and creation of the Resettlement Administration, an office that Willard Sunderland said approached a “colonial ministry,” hydrologic and hydrotechnical work took on a different form that was more strategic, widespread, and centralized. However, this centralized expansion narrative, while in some ways true, also needs to be complicated. In addition to later phases of hydrotechnical work that relied on this earlier assortment of infrastructures, the ideas and even the actors driving this change were not always working towards the same ends or driven by the same impulses.

Water was probably the most significant challenge to the settler colonial project on the steppe. Aridity placed real limits on the work and hopes of agronomists, bureaucrats, and settlers alike. According to Diana K. Davis, “land with an annual average rainfall below 400 mm is usually considered marginal for agriculture.” This meant that much of the steppe was at best, “marginal” and many areas were unsuitable. However, that did not mean that settlement on the steppe stopped at an imaginary border between those areas that received more than 400mm of rainfall and those that received less. If rainfall were the sole determining factor in settlement,

\[\text{\footnotesize 425} \] Although not focused on the Kazakh steppe, a good description of what he called the state of “correct colonization” is: Willard Sunderland, *Taming the Wild Field*, 177-220.

\[\text{\footnotesize 426} \] Sunderland, “The Ministry of Asiatic Russia.”


\[\text{\footnotesize 428} \] In the United States, “the 100th Meridian” has sometimes been considered the boundary between the arid West and the East. This idea is attributed to John Wesley Powell in, J.W. Powell, *Report on the Lands of Arid Region of the United States with a More Detailed Account of the Lands of Utah* (Washington: Government Printing Office, 1897). For background on Powell’s life and useful insight into framing his thought see: Wallace Stegner, *Beyond the Hundredth Meridian* (New York: Houghton Mifflin, 1953); for an excellent discussion of how this boundary has
peasant settlement would have stopped much further north than it did. Therefore, while it never achieved all the wildest dreams of agronomists and officials, and was in many ways another example of colonial failure, imperial hydrotechnology on the Kazakh steppe had real material affects on settlement. The projects of well-building, dam and pond construction, dry farming techniques, and other water managing technologies developed, popularized, or used by agronomists and settlers were in fact crucial to expanding and maintaining peasant settlement deep into the Kazakh steppe.

Furthermore, while officials and scientists in the hydrologic bureaucracy often did not agree on the specifics of how to do their work, they did agree in its fundamental goal: expanding peasant settlement. Therefore, the entirety of these hydrotechnical technologies were based upon a settler colonial ethos both in its assumptions and in its implementation, in its aims and in its effect. These technologies, imbued with settler colonial values were also a crucial component of the new “[hybrid] of technical systems and political practices that produce new forms of power and agency” which is according to Edwards and Hecht the very definition of technopolitics.

What is more, as this chapter illustrates, the search and securing of water often led directly to the dispossession of Kazakhs from their land. Peasant villages required water for settlement. The fact that Kazakhs also relied on water, meant that invariably areas with useable water in them were already being used by the Kazakhs. However, officials privileged the rights of settlers over the Kazakhs, and conflict over water was just as crucial as conflicts over land in the steppe.

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429 Sarah Cameron pointed to an outer limit of 8 inches (203 mm) of annual rainfall as the furthest extent of peasant settlement during the imperial period, which is far south of the “marginal” line for agriculture, Sarah Cameron, “People Arrive but the Land Does Not Move.”

Given the imperial government’s interest in peasant settlement, it should come as little surprise that in these conflicts, they usually sided with peasant settlers against the Kazakhs.

However, in spite of their role in creating new forms of power, the story of these technologies was not an entirely triumphalist or hegemonic narrative. First, the infrastructures were not created as top-down technologies imposed on the steppe by scientists and engineers. Instead, the reality was that these technologies relied on peasant and indigenous knowledge, and in some instances were simply modifications of peasant or Kazakh engineering. Secondly, any success in increasing access to water for peasants overlooks the fact that peasant settlement was inimical to the preservation and well-being of Kazakh nomadic society. Finally, the creation and installation of new water technologies on the steppe was not driven entirely by rational scientific observation and decisions based on efficiency. In addition to the underlying assumption that peasant settlement and sedentary agriculture on the steppe was a positive development, the actual creation of hydrotechnical infrastructure on the steppe was much more contested than might be assumed. While there was a huge government bureaucracy and tomes of scientific knowledge produced in Russia and Europe as well as surveys and expeditions into the steppe, the decisions of when, where, and how to construct hydrotechnical infrastructure were in fact messy undertakings. These projects also included many actors sometimes acting in concert, and at other times acting at cross ends, and often with diverse motivating factors behind their involvement.

**Peasant Roots of Hydrotechnical Infrastructure on the Steppe**

Like other agricultural knowledge created, popularized, and instituted on the steppe by agronomists and agricultural scientists in the employ of the empire, hydrotechnical infrastructure is another example of how this knowledge was not simply a story of the transference of scientific knowledge from European Russia to the steppe. Instead, it was created on the steppe itself and
had a variety of sources and influences. One of the most significant examples of this knowledge that was created on the steppe were called snezhniki or what I term “snow wells.”

In 1899, Ia. Nestorov, writing in the newspaper *Kirgizskaia Stepnaia Gazeta* described the transformation that a new technology had brought to the steppe around the city of Semipalatinsk, a region which is quite dry, receiving on average just 275 mm of precipitation each year. He described how just a few years earlier, the region was an uninhabited wasteland and was now a thriving community writing:

> The Belagachevsky steppe, about which I spoke above, was uninhabited, herds of Kazakh and Cossack horses only grazed in the winter, and in summer, the Cossacks and merchants of the city of Semipalatinsk gathered around their small settlement in the pines like pathetic rabbits. And now? The entire steppe with a radius of 80 versts is built up with the estates of Cossacks, merchants, and Kazakhs. Everywhere you look there are mounds of bread, merchant country houses, and herds of cattle grazing. From this fruitless land, Semipalatinsk exports via the Irtysch river to Tyumen, Yekaterinburg, and even to Kostroma and beyond 1.5 million [pood?] of grain every year, with enough still left over for local consumption.

What had caused this transformation of an entire area from a desert around a small settlement to a prosperous farming community? Surprisingly, the technology that in Nesterov’s eyes had revolutionized this harsh environment was quite simple. It could be built from materials at hand, and was so easy even children could be involved in its construction. What is more, it had been invented locally in Semipalatinsk oblast. Nesterov credited the change around Semipalatinsk to snezhniki which is usually translated as “snow fields.” However, naturally occurring snow fields most commonly describe snow that continues to exist at lower elevations in the warmer months (usually below the tree line). These “fields” eventually forms a kind of mini glacier that help

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feed alpine streams. Nesterov’s snow fields were intentional constructions that usually included a man-made well or pond.\textsuperscript{433} Hence my use of the term “snow well.”

Nesterov’s article described in detail how residents across the steppe who lived in places with too little water could build their own snezhniki. The most important aspect to consider before construction was soil and to be sure there was a thick layer of clay soil under the snow well, if the soil was too sandy, it would melt and simply drain away. Site selection was also important because it needed to be constructed far away from any trees or structures that could inhibit the snow from drifting. This was because the snezhniki worked based on the idea of snow blowing in from the side, not from falling directly on the site. Once a location was selected, the turf needed to be removed and then a tall wattle fence was constructed down wind from the direction snow usually blew in order to capture and artificially drift the snow. Then once the builder believed there would be no more snow that season (usually sometime in March), they should cover it with a layer of hay. Later in the spring when the snows began to melt, an even thicker layer of hay should be added to the top and sides to insulate the mound. A small pond or even a well could then be constructed beside the snow well and, if properly constructed and if enough snow fell, it would give water for the entire summer.\textsuperscript{434}

The simplicity of the device struck many as an answer to settling the steppe in places where there was neither drinkable surface water nor shallow groundwater that could be easily reached with a well. However, it was not only the simplicity of the technology that appealed to agronomists and officials. They also believed in its effectiveness because in addition to its transformational power that Nesterov wrote about on the Bel-Agach Steppe, it was also invented


\textsuperscript{434} Ia. Nesterov, “Kak mozhno dobyvat vodu.”
on the steppe itself. According to Nesterov and the *Kirgizskaiia Stepnaia Gazeta*, the first snow well was constructed by a Cossack Ivan Iakovlevich Shestakov from the village of Belokamenka in Semipalatinsk oblast. Shestakov reportedly noticed how some snow drifts lasted until mid-May. As an experiment, in one of his fields he constructed a semi-circular windbreak 10 *sazhen* long (about 70 feet). This created a snow field of around 100 *sazhen* square (700 square feet) with a depth of 4 *arshin* (28 feet). He then covered the snow with straw and poked holes in it to allow the sun to melt the snow in spots and allow access to fresh water. After the first year, they made some adjustments. Most notably, on site where the snow field was constructed, Shestakov dug a wooden-lined pit to pool melted water with an outlet to allow the melted snow to flow into a well. Writers like Nesterov encouraged building these across the steppe, and the Steppe Governor-Generalship even published a booklet to assist all residents who were not “lazy” to construct their own *snezhniki* and encourage their neighbors to do so as well.\(^\text{435}\)

(Figure 5.1 Snezhniki with well and pond illustrated and described.)\(^\text{436}\)

\(^{435}\) 1899 “Kak dobavt vodu v bezvodnoi stepe?” *Kirgizskaiia Stepnaia Gazeta* (Omsk) November 28.

\(^{436}\) *Kirgizskaiia Stepnaia Gazeta* (Omsk) 3 November 1896.
Although snezhniki were simple and seemingly useful almost anywhere on the steppe, it took fifty years after Shestakov’s first attempt for agronomists and popularizers to begin to disseminate it. However, what is more interesting is that directions and news stories about the snow wells in *Kirgizskaiia Stepnaiia Gazeta* were written in both Russian and Kazakh. The pamphlet published by the Governor-Generalship was also available in both languages. However, just like the lower agricultural schools that were begun sometimes exclusively for Kazakh children, this type of agronomic outreach was only targeted at Kazakhs for a short period of time. Beginning in 1902, the newspaper that popularized snezhniki which was one of the main publications for agricultural (and general news) on the steppe ceased dual-language publication. What is more, it changed its name and took on a more explicitly agricultural focus calling itself *Sel’skokhoziastvennyi Listok* (Agricultural Paper).\(^{437}\) This change was another way in which around the turn of the twentieth century, Kazakhs were overlooked with increasing frequency as potential farmers in spite of the fact that it was well known that they were turning more and more to farming as pure nomadism became increasingly untenable.\(^{438}\)

Although they began to limit the population targeted with agronomic information like snow wells, the promise of snezhniki was such that officials saw them as a solution to the problem of aridity in areas of the steppe beyond Semipalatinsk. For example, in Akmola oblast already in 1902, before the massive influx of agronomists and money that came with the post-Stolypin Resettlement Administration, snow wells were an important part of hydrotechnical work overseen and funded by the oblast administration. In fact, beyond forest work, the only

\(^{437}\) Although the editors announced that the newspaper was still for “all categories” of steppe residents including “peasants, settlers, Cossacks, and Kazakhs” the fact that it would later cease publication in Kazakh makes this claim suspect. *Sel’skokhoziastvennyi Listok* (Omsk) 7 April 1902.

\(^{438}\) For discussion of how Kazakh animal husbandry was changed by increasing settlement see, Virginia Martin, *Law and Custom in the Steppe*, 74-83. See also, *Turgaiskaia Stepnaiia Gazeta* (Orenburg), “Posev ozinmy kirgizami” 29 January 1895 and “Probnyi umolit’ khlebov v Turgaiskom uezde” 17 September 1895.
public works completed under oblast initiatives addressed water shortages. In addition to
dredging and deepening 13 lakes and building 19 new wells, these initiative also put around 500
men to work constructing 24 snezhniki that would cover an area of over 15,000 sq. sazhen.439

This work continued and in 1903, the Akmola Oblast Engineer Pekovskii was assigned to
conduct a survey of all hydrotechnical infrastructure. His report focused heavily on snow wells,
and he believed they were an effective and efficient way to secure water in the region, especially
as the best lands were largely occupied by settlers already by this early date. Pekovskii made a
distinction between different types of snezhniki. Those modeled on Shestakov’s he called, “Bel-
Agach snezhniki.” In so doing, Pekovskii also wrote Shestakov out of his role in creating the
wells. In fact, outside of the newspaper accounts there are almost no references to the Shestakov
having invented the snezhniki.

The other kind of snezhniki Pekovskii described appear to refer to simpler attempts to
keep snow directly on the fields by constructing dikes out of snow. It seems that Pekovskii
intended for these works to be constructed directly on the fields that peasants planned to plant the
following spring. These structures could capture snow and allow it to melt directly into the soil
where it lay. This would not have worked in sandier soils in places like the Bel-Agach Steppe,
but in some regions of Akmola where the soil was less sandy and had more organic matter it
could be effective.440

439 “Obshestvennya raboty v Akmolinskoi oblasti” Sel’skokhoziastvennyi listok (Omsk), 5 May 1902. In this and in
other cases, it is not always clear if these snezhniki included a well, or they simply referred to any attempt at
controlling the drifting of snow that farmers sometimes tried to trap directly on their fields. 15,000 sq. sazhen
divided by 24 snezhniki comes out to an average of about 1.5 acres of snow per snezhniki, which indicates that in
this instance there was probably a well or pond attached.

440 While dryland farming is a controversial topic, most proponents now agree that leaving crop stubble in the field
can help retain snow and thereby increase moisture in the soil which is the critical component of successful dryland
farming systems in cold areas with snow. See, Colorado State University Extension R.L. Croissant, et.al., “Dryland
Cropping Systems” Fact Sheet 0.516 (December 2014). https://extension.colostate.edu/docs/pubs/crops/00516.pdf It
also appears that Mennonite farmers may have already had a similar idea by utilizing furrows to capture snow over
the winter on fields where they practiced “black fallow.” Moon, The Plough That Broke the Steppes, 263.
Pekovskii reported that already in 1901 there were orders for the construction of Bel-Agach snezhniki and snow dikes, however, work had still not begun, on the projects in the fall of 1902 and only started in January 1903. By this time, the snow was apparently too deep and the peasant horses in the area were not strong enough to move the snow in order to construct the snow dikes. In still other places, it was blown away or fell in too thin a layer to be of significance, which also made the construction of dikes impossible. Nevertheless, Pekovskii felt this method was significant because, unlike Bel-Agach snezhniki, it did not require wood which was in short supply in many places on the steppe. He only reported on one successful instance of snow dikes, which he found constructed in Supolevskii village in Kokshetau uezd. This project consisted of a hollow near the village that was open at one end to the wind which caused it to fill with deep snow. In this instance, Pekovskii focused on how he believed the effect of the dikes was similar to a forest where the snow was deepest at the forest edge. He went on to say that he hoped this would encourage further afforestation efforts in the region and bemoaned the fact that so little was being done to plant trees. Interestingly, most advice about creating snow fields emphasized the need to construct them far away from forests and how they were most effective on the open steppe, and Pekovskii’s afforestation dreams would potentially interfere with this.

In spite of a general lack of wood in many parts of the steppe, in the more northern reaches of Akmola like Omsk uezd, wood was widely available, and construction of snezhniki

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441 RGIA f. 391 op.2, d. 699, l.105, “Report from Akmola Oblast Engineer Pekovskii to the Military Governor of Akmola oblast N.I. Sannikov” 1 June 1902.
442 RGIA f. 391, op.2, d. 699, l. 106.
was made possible because wattle fences did not require large trees or wood of high quality. However, it did require time to build the fences. In Omsk, under the auspices of the oblast administration, a large work project had been organized to encourage peasants to construct sections of wooden fences in their own homes during the winter months (it is unclear if this work was paid or not). Pekovskii was enthusiastic about this project both because it was work that women and children could assist in, and because he felt it allowed for each family as an individual unit to make as many fences as they needed if they had the work ethic and put them on their own fields. While this predated the Stolypin reforms to encourage the development of a peasant yeomanry to overcome the control of the peasant commune, these ideas were clearly in circulation much more broadly even before they came into practice.

Pekovskii was most enthusiastic about the fence making he observed in the villages in Kokshetau uezd. Villagers there had constructed a 2.5 arshin high and 22.5 arshin long fence. He went on to make significant calculations about the size and depth of the snow field this would create and cited the work of the famed agronomist P.A. Kostychev in Petersburg oblast. However, he then seemed to contradict himself when he pointed out that this did not actually matter. Pekovskii wrote, “Of course, these numbers are not so important in themselves. It is important to show and make peasants aware of this work, which can help make it possible by means of the mass of blowing snow to fight the only enemy of the Akmola settler: droughts.” What was important in the end was that peasants could see it work themselves, and even those

444 RGIA f. 391, op.2, d. 699, l. 105.
445 Interestingly Kostychev was himself of peasant stock in spite of becoming one of the most famous soil scientists in Russia: Bol'shaia Sovetskaia Entsiklopediia, s.v. “Kostychev, Pavel Andreevich,” Sovetskaia Entsiklopediia, 1978.
446 RGIA f. 391, op.3, d. 699, l. 105 obo.
neighbors who did not construct fences could see the advantages because the snow would remain.

Pekovskii spent much of the rest of his report discussing things that at first appear only tangentially related to *snezhniki*—peasant work ethics. That is, he saw peasant industriousness (or the lack of it) as interacting with this new technology in a significant way. It may seem odd that an engineer reporting on “hydrotechnical infrastructure” would spend so much time discussing human aspects of a particular technology. However, in the context of the late Russian Empire, many fields were involved in approaching questions of development from a holistic and human perspective. The most famous example of this approach of technical experts trying to solve problems related to Russia’s “backwardness” is what Nancy Frieden called, “zemstvo medicine.”

> These doctors relied on their scientific expertise to both treat disease as well as the underlying social problems causing the disease. Perhaps the best description of zemstvo medicine is John P. Davis’s, who wrote, “Zemstvo medicine stressed causation between science and the laws of nature, sociological phenomena and public and private human actions that aided in the discovery of these laws.”

There were also other professions with a similar “zemstvo ethos” like teachers and agronomists. However, the Governor-Generalship of the Steppe like the rest of Russian Central Asia had no zemstvos and was instead under direct military rule. Nevertheless, a similar kind of concern and recognition that a singular focus on solving a

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447 Zemstvo were local councils established in European Russia as part of the “Great Reforms” that included the liberation of the serfs in 1861. For an overview of zemstvo and their work see, Terence Emmons and Wayne S. Vucinich, *The Zemstvo in Russia: An Experiment in Local Self-Government* (Cambridge: Cambridge University Press, 1982).


technical problem separate from human and social questions was at play among technical professionals in the steppe as well.

Something similar to a “zemstvo” ethos can be found in what Pekovskii wrote in his report to the governor,

There is a widespread opinion that low harvests of settler is because of his insufficient energy, which in turn is explained by his low material inventory [tools] and his negative personal qualities of laziness, ineptitude, unwillingness to work the land, and even his unwillingness to increase the amount of plowed land within the limits that he has. This opinion is wrong. The government has done and does much to put the settler on his feet, and the settler does not use this aid. In order to judge his energy, it is enough to trace the growth of plowed land among the divided familial units of settler families found in the Akmola Oblast Reviews.451

Pekovskii was curious about the idea that settlement had encouraged settlers to become the yeomanry of Stolypin’s imagination, and his hopeful comments that the peasants were increasing the amount of sown land indicates his support for those peasants he considered to be industrious. In fact, Pekovskii was rather sympathetic and supportive of most peasant settlers, and while he did not mention (or perhaps even know) that the Bel-Agach wells had been invented by a simple Cossack farmer, he appeared ready to give credit to the peasants for their industriousness in building fences for snow fields. What is more, he argued that, if peasants and officials could begin to more skillfully retain snow on the fields it would “not be difficult” to prove that snezhniki could greatly improve the material welfare of settlers, a fact recognized by the peasants themselves.452 In a clear indication of his role as a scientist with a “zemstvo ethic” he even pointed out that that there was simply not enough water in the area by citing the famed

451 RGIA f. 391, op.2, d.699, l. 106 obo.
452 RGIA f. 391, op.2, d. 699, l. 106 obo.
agricultural scientist Herman Hellriegel who showed that one *pood* of wheat required 575 *pood* of water, and noted that Akmola rarely got that much rain.\(^{453}\)

Pekovskii’s feelings towards the peasants, and how deeply his opinions as an engineer affected how he saw and understood these technologies is reflective of the complicated relationship many officials and agronomists had with the peasants. He certainly hoped they would do more and work harder, but he also did not entirely blame them for their fate. Nevertheless, he also had a rather patronizing attitude toward them and implied that peasant logic was simple, and all they needed was to see *snezhniki* in action and they would adopt the technology. A further layer of the complexities of the relationship between scientists and peasants is evidenced in the supposed inventor of *snezhniki*, the Cossack Shestakov. He was at first lauded but eventually written out of the story, but his role reflects other peasant technologies like anti-locust hopper dozers that were also often peasant engineered and then appropriated by scientists and officials discussed in the next chapter.

**Kazakh Hydraulic Engineering**

While in many places, *snezhniki* were offered up as solutions to the challenge of aridity, and eventually became part of the cannon of hydrologic technology, peasants were not the only ones who contributed to the base of knowledge. Kazakhs also played an important role. In spite of serving as scouts and local sources about the location of surface and ground water, they still occupied an ambiguous status in the eyes of agronomists and officials. This was in part, because during the nineteenth and twentieth centuries they were undergoing massive societal changes in how they raised food. This included a significant shift towards more sedentary forms of agriculture that included the widespread shift to haymaking as discussed in chapter 4 of this

\(^{453}\) RGIA f. 391, op.2, d. 699, l. 108-110. Hellriegel was most famous for proving that legumes can “fix” nitrogen from the air and thereby improve soil fertility.
dissertation. This meant that agronomists and officials were constantly referring to them as “nomads” even though many of them—especially in areas with the most dense peasant settlement—were at least harvesting crops, which was common knowledge.

However, Kazakhs were not only cutting some fodder in the meadows of river valleys. At least one group of Kazakhs had responded to encroaching settlement by undertaking significant irrigated sedentary agriculture in an area that was not typically associated with such agriculture. Regions to the South and East of the steppe in Semirechye or southern Semipalatinsk (like Zaisan) were often recognized as having some Kazakh irrigated agriculture.454 However, already in the early nineteenth century Kazakhs in the Karaturgai region of southern Turgai oblast were undertaking rather significant irrigation works. Closer examination of the story of the creation and use of these works, and of Russian responses to them, offers useful insight into how Kazakh knowledge was created, perceived, and even potentially utilized as part of the steppe settler colonial project. It also reveals a double standard with regard to how officials supported Kazakh sedentary agriculture versus their response and support of peasant settlers.

In the spring of 1882 violence broke out between Kazakhs from Sarykopinskii volost and the relatives of Gaimurat Turkebayev over access to several lakes in Karaturgai volost including a large lake called “Sulekty.” Disputes between different groups of Kazakhs, especially over access to water or pasture was nothing unique since nomads require access to water and pasture to support their herds. The sizes of these herds could fluctuate and sometimes resources that had previously belonged to one group no longer sufficed.455 Additionally, complex and sometimes shifting kinship networks meant that deciding who a particular lake or pasture belonged to was

454 For example the irrigated fields at the Zaisan Kazakh Agricultural School discussed in Chapter 1.
455 For discussion of how environmental developments could cause fluctuation in herd size see: Ian W. Campbell, “‘The Scourge of Stock Raising,’” 60-74.
not always simple. This provided no end of headaches for Russian officials trying to keep order on the Steppe sometimes with only a light handle on Kazakh customary law.\footnote{The best discussion of how Kazakh customary law changed under the influence of Russian colonization and conquest is Martin, \textit{Law and Custom in the Steppe}. On Kazakh law and society before the conquest see, Elizabeth E. Bacon, \textit{Central Asians Under Russian Rule: A Study in Culture Change}, 2nd ed. (Ithaca: Cornell University Press, 1980), 29-42.} However, what made this conflict which killed two people unique was that it was not between two groups of nomads, but one group of nomads and another group that could be understood as “sedentary.”

What is more, word of the conflict very easily might never have made it into the records of the Russian imperial administration were it not for the issue of water which was the cause of this conflict. In 1901, the Turgai uezd nachalnik reported to the oblast administration what was in his eyes a rather strange situation, Kazakhs were farming grain via irrigated land who were now seeking government aid to maintain their irrigation infrastructure. According to the report sometime at the beginning of the nineteenth century, while the Kazakhs were “in a semi-wild state” a group of them who the official said were of the “Kaz’” branch, under their leader Zharylgat Shirlishev began to sow grain near their winter pastures on the banks of the river Turgai and its tributary the Kabirgi.\footnote{Tsentral’nyi gosudarstvennyi arkhiv Respubliki Kazakhstan [Central State Archive of the Republic of Kazakhstan] hereafter referred to as, TsGARK. TsGARK f. 25, op.1, d. 2755, l. 3 “Po voprosu o razvitii kklebopawstva v karaturgaiiskii volosti Turgaiiskogo uezda” November 23, 1901. It does not seem that the report which identifies several Kazakh “branches” (otdelenie) is referring to either larger tribal groupings “zhus” or smaller tribes. However, they do not specify.} These early plantings were apparently undertaken because Shirlishev needed to find work for “his” laborers which implies he was a man of some stature.\footnote{In Kazakh society, according to Elizabeth Bacon “In the camps of wealthy families, there were often hired workers, orphans or men who had lost their livestock, who served until they had earned enough animals to set up on their own. These hired workers received food and clothing in addition to animals and were treated as members of the family.” Elizabeth Bacon, \textit{Central Asians Under Russian Rule}, 35.} However, these early plantings required a significant amount of labor and were inefficient because they apparently relied on “chigir’” also known as a “sakia” or Persian water wheel.
Due to this inefficiency, the water was mostly used only for livestock. Nevertheless, according to the report, though the plantings were not large, there was arable farming going on in the area and the report continued that, “Thus, in the steppes of Turgai uezd there appeared a new kind of industrial agriculture” which owed its beginning to Shirshilov. In spite of Russian officials’ apparent ignorance of this farming, the development was noted by other nearby Kazakhs who attacked the farmers several times and forced Shirlishev to construct several round fortified grain warehouses, which apparently could still be seen at the time of the report.460

Desiring to expand the grain production, the Kazakhs under Gaimurat Turkebayev, a relative of Shirlishev’s (who had died in 1864) decided in 1879 that they needed a source of water more efficient than the chigir’. They identified a lake, “Sulety” north of the river that was higher in elevation from their fields and decided to dig an irrigation canal (aryk) to connect the

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459 Pre-Revolutionary photo collection of the Central State Archive of Film and Audio Republic of Kazakhstan (hereafter referred to as TsGARKZRK).
460 TsGARK f. 25, op.1, d. 2755, l. 3 obo.
lake to their fields. However, Turkebayev had difficulty persuading anyone to help with the project except his relatives who belonged to the “Shii” (an unknown group).\textsuperscript{461} Sixty people agreed to work for Turkebayev, and a wide canal with a depth of up to 5 arshin (35 feet) was completed in 1880.\textsuperscript{462}

According to the report, the canal irrigated enough land that each of the 60 families that helped dig the canal got 200 poods of millet (which would indicate a harvest total of 433,320 pounds of grain). At first this might seem a huge amount of grain. However, to the south in Khiva, farmers averaged about 30 bushels of grain per acre on irrigated land using relatively simple technologies.\textsuperscript{463} If the Kazakhs in Karaturgai were also achieving roughly the same yield, this meant that they harvested about 240 acres of grain, which while significant seems feasible. Based on this initial success, the following year the total number of farmers increased to 200 and those involved became quite wealthy with even poorer farmers being able to buy livestock from a harvest of wheat and millet.\textsuperscript{464} The project was apparently so successful that his relatives asked for new irrigation sites and he encouraged them to construct a dam and canals at two places “Kyr-Kan” and “Sry-sai” which they did under his guidance. These dams and canals apparently were well constructed except for the dam on the Kyr-kan.\textsuperscript{465}

It was then that the wealth of these Kazakhs began to attract the attention of other Kazakhs nearby. In the spring of 1882, a group of Kazakhs from Sarykopinskii volost attacked

\textsuperscript{461} While there appears to be no record of a tribe by this name, according to Bacon “Followers of a strong leader often took his name for their group, and this name was in time incorporated into the tribal genology as that of an eponymous ancestor.” Bacon, Central Asians Under Russian Rule, 36.

\textsuperscript{462} TsGARK f. 25, op.1, d. 2755, l. 4.

\textsuperscript{463} Henry Spalding, trans., Khiva and Turkestan (London: Chapman and Hall 1874), 211.

\textsuperscript{464} Although the report does not specify what grains, the most common grains grown in the region were wheat, barley, sorghum, and millet. Ian Muarry Matley, “The Population and the Land” in Central Asia: 130 Years of Russian Dominance, A Historical Overview, ed. Edward Allworth 2\textsuperscript{nd} ed. (Durham: Duke University Press, 1999), 92-120.

\textsuperscript{465} TsGARK f. 25, op.1, d. 2755, l. 4.
some of Turkebayev’s relatives who had only begun farming the previous year. The conflict apparently was dealt with by Kazakh customary courts and in order to stop the conflict, Turkebayev agreed to a truce in which he lost half of the arable land to the Syrkopinskii volost Kazakhs.\textsuperscript{466} However, Turkeybayev continued to construct new dams and irrigation ditches to irrigate from other lakes in the area, and even got aid from the uezd nachalnik in 1882 for one of these projects.\textsuperscript{467} In spite of these efforts, the economic situation deteriorated for the Kazakhs. Without the source of water from Lake Sulekty, other sources failed to provide enough water apparently to irrigate the fields. One project, the dam at Kyr-kan dried up entirely and farmers who had previously sold 100 \textit{pood} of grain a year now had to buy grain.\textsuperscript{468} Even more troubling, there was not even enough water for livestock. It was not until 1900 that a new leader among the Kazakhs, Turkebayev’s son, Aytkul Baimurakhov organized 100 families to each donate two rubles and one sheep to support building a new dam. With this money, he hired workers, fixed the problematic Kyr-kan dam and raised its water levels from 7 to 12 \textit{arshin}, and also installed an overflow on the reservoir to allow it to irrigate crops.\textsuperscript{469}

In order to rescue these pioneering Kazakhs who had turned to sedentary agriculture decades before, the uezd nachalnik had asked the oblast administration for aid. With the new dam and larger reservoir, the Kazakhs planned in 1902 to plant irrigated grain crops, which the uezd nachalnik was confident in. However, they still lacked tools or money to buy them.

\textsuperscript{466} On Kazakh customary law under Russian rule see, Virginia Martin, “Kazakh Oath-Taking in Colonial Courtrooms: Legal Culture and Russian Empire Building” \textit{Kritika: Explorations in Russian and Eurasian History} 5 no. 3 (Summer 2004): 483-514; Paolo Sartori, “Murder in Mangishlaq: Notes on an Instance of Qazaq Customary Law in Khiva (1895) \textit{Der Islam: Journal of the History and Culture of the Middle East} 88 no. 2 (2012): 217-257.

\textsuperscript{467} TsGARK f. 25, op.1, d. 2755, l.5.

\textsuperscript{468} In addition to the fact that even Kazakh nomads ate grain in the form of bread, a kind of very weak beer, a fermented grain drink called “bozo” was and still is an important symbolic and nutritional foodstuff for Kazakhs and most Central Asians see: Charles Perry, “The Horseback Kitchen of Central Asia” in \textit{Food on the Move: Proceedings from the Oxford Symposium on Food and Cookery} 1996 ed. Harlan Walker (Blackawton, Devon: Prospect Books, 1997), 243-248.

\textsuperscript{469} TsGARK f. 25, op.1, d. 2755, l. 5.
Therefore, the uezd nachalnik requested a loan of 500 rubles to buy tools on their behalf. Additionally, since the dam was made of sand and bundles of brush, it was in constant need of repair, so he believed they would need additional funds for maintenance work. In total, he sought 800 rubles that he would pay directly to Baimurkhanov.\textsuperscript{470}

Although the governor supported the idea, he did not think the oblast could afford it and he encouraged the uezd nachalnik to use local funds.\textsuperscript{471} However, he replied that there were no local funds available and that they needed to support this critical work that was “important for the entire population of Karaturgai volost.”\textsuperscript{472} The oblast governor eventually did write to the Ministry of Cultivation and State Property as the Ministry of Agriculture was then called, and they eventually gave the Kazakhs 400 rubles. However, the Ministry also informed the governor that they had also ordered a hydrotechnical survey of the area in the next year which would help identify what else was needed to secure water in the area.\textsuperscript{473}

After this, the archival record of this story disappears. There were some hydrotechnical surveys of the area in the following years, however, even those records are scattered and sometimes incomplete. Locating what happened to these irrigated lands is made even more difficult because the reports were not very specific on their exact location. However, it appears likely that by 1914, Baimurkhanov’s efforts were in vain and a peasant settlement called Grigorevskii now stood in its place, perhaps even using the same fields established by the Kazakhs nearly a century previously.\textsuperscript{474} If this was so, then this irrigation infrastructure, just like

\begin{footnotes}
\item[470] Ibid., l. 6.
\item[471] TsGARK f. 25, op.1, d. 2755, l. 10 Correspondence from the Turgai Oblast Governor to the Turgai uezd Nachalnik, 29 December 1901.
\item[472] TsGARK f. 25, op.1, d. 2755, l. 11-12 Correspondence from the Turgai uezd Nachalnik to the Turgai Oblast Governor, 17 January 1902.
\item[473] TsGARK f. 25, op.1, d. 2755, l. 33, 36-44.
\item[474] TsGARK f. 29, op.1, d. 333, ll. 8-22, “Pechatnye plan zemleotvodykh gidrotekhicheskikh rabot v Turgaisko-Ural’skom Pereslencheskam raione i dr.” 1914.
\end{footnotes}
the countless Kazakh wells commandeered and expropriated by imperial officials, became part of the imperial hydrotechnical apparatus. Even if this was not the case, and the Kazakhs were not displaced by settlement, the treatment of the Kazakhs, who were by all accounts doing the “right” thing by sedentarizing and engaging in agriculture reveals that the agenda of the Russian empire went beyond chauvinism and preference for sedentary agriculture. Given the huge financial outlays that were beginning to be undertaken on behalf of peasant settlers under the new Resettlement Administration, the 400 rubles given to the Kazakhs appears rather miserly.

**Hydrotechnical Surveys and “Legibility”**

Hydrotechnical surveys were one of the first tools that imperial officials brought to bear in the battle against aridity in the steppe. At first glance, it might appear that the mapping, measuring, reporting, and organizing technology of a hydrotechnical survey was the embodiment of “high modernism” and of attempting to apply “foreign” science to the steppe to “make it legible.”\(^{475}\) However, closer examination of what the surveys actually involved complicates this picture. First, it should be noted that these surveys were not being carried out on a totally blank canvas. By the time these surveys became quite frequent (in the early twentieth century), the Russian Empire had over a century of experience on the steppe. Several previous surveys and scientific expeditions gave them significant knowledge of the human and natural resources and environments.\(^{476}\) Additionally, the surveys were conducted in areas that were planned for peasant settlement, and the hydrologic survey was part of the process by which the imperial government was attempting to control and guide settlement on the Steppe. As more and more peasants moved

\(^{475}\) Scott, *Seeing Like a State*.

\(^{476}\) Campbell, “Settlement Promoted, Settlement Contested.”
into lands that were only marginally capable of supporting sedentary agriculture, they often found themselves in great need of government food aid.\(^{477}\)

Therefore, in some ways, these surveys were often conducted on land that could be already considered in part “legible” because the boundaries of proposed settlements were marked off on maps. This did not mean that the exact location of villages had already been identified however. For example before 1909 in Akmola oblast, the plots that were assigned to peasant settlements in some places were as large as 25,000 desiatins (an area over 100 square miles).\(^{478}\)

In Turgai-Uralsk Resettlement District, some plots were even twice that.\(^{479}\) Much of this preliminary work was not made solely on maps in St. Petersburg or Omsk, it was local, but it was carried out over extremely large areas in a short amount of time. For example, between 1895 and 1903, around 800,000 square versits was surveyed by the Resettlement Administration.\(^{480}\)

Additionally, although the sites of hydrologic surveys were in some ways already “legible” to the imperial administration, and had been slated for settlement, it was up to the hydraulic surveyor to give a “final answer” to identifying the particular location of a village, how many people it could sustain, and if not enough water was found, whether or not the spot should be settled at all.\(^{481}\)

In spite of this important responsibility given to hydrologic surveyors, the instructions for how they should carry out and report about their work was quite structured and formulaic. In addition to being assigned particular plots to investigate, they were also given very specific instructions of what and how to measure and what information to record to send back to their

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\(^{477}\) Willard Sunderland, “Peasant Pioneering.”

\(^{478}\) RGIA, f. 391, op.3, d. 1864 l. 55 “Poriadok proizvodstva burovskikh rabot’ pri izyskaniakh na gruntovykh vodakh” (1909).

\(^{479}\) TsGARK f. 29, op.1 d. 41, l. 2, “Gidrotekhnicheskie obysledovanie ploschadi nakhodiaschikhia v yuzhnoi chasti Karachaganskoj volosti Ural’skogo uezda i oblasti mezhdu rekami Chingirlau, Zhaman-kargaly, i Kurmanbai-sai” (1913).

\(^{480}\) RGIA f. 391, op.2, d. 700, l. 91 “O Gidrotekhnicheskikh sooruzhenikh v pereslencheshikh poselkakh po komandirovanii osobogo gidrotekhnika dla nablyudenia za sooruzheniami 1900-1905.

\(^{481}\) RGIA f. 391, op.3, d. 1864, l. 55.
superiors. In fact, like heads of lower agricultural schools they were given pages of forms with blanks to fill out about a particular site.\textsuperscript{482}

In many ways, this was another unsuccessful attempt to force a natural landscape into a box or paper form, what Timothy Mitchell called, “the character of calculability.” In Mitchell’s opinion this:

new regime of calculation did not produce, necessarily a more accurate knowledge of the world, despite its claims, nor even any overall increase in the quantity of knowledge. Its achievement was to redistribute forms of knowledge, increasing it in some places, and decreasing it in others. At the same time, it transferred this knowledge to new sites. By a series of removals, it opened up a certain distance, the distance between the field and the computing g office, between the farmer and the colonial survey officer, between the iron triangulation marker and the paper map.\textsuperscript{483}

However, as Mitchell pointed out, just because these projects were incapable of fully capturing the physical world, they did serve to make the representations and the created knowledge appear separate and fully under the control of officials. This gave it a power irrespective of its ability to capture reality.

The formulaic nature of the oversight of the surveys also does not appear have held hydrotechnicians back from completing their survey work in a meaningful way. One partial explanation for this was the high level of training and professional identity that some hydrotechnical surveyors had in their work. They were engineers who were tasked with interesting and challenging work, not simply pushing papers around and filling out reports, which raises a question of the professional identity of these professionals. One indication of a potential professional identity is the wide array of instructions on how to conduct hydrotechnical surveys in the Kazakh Steppe that were composed by fellow engineers.\textsuperscript{484} Conversely, as

\textsuperscript{482}RGIA f. 391, op.3, d. 1864, l. 1-83.
\textsuperscript{483}Mitchell, Rule of Experts, 92.
\textsuperscript{484}RGIA f. 391, op.3, d. 1864, l. 46 see for example, Engineer-Hydrototnik Lyschinsky, Instrukcie dlia proizvodstva detal’nykh gidrotekhnicheskikh izyskanii v Akmolinskii Pereselencheskom raione, (1909).
settlement increased, it was not always possible to get highly trained scientists to complete the work. This meant that in many cases students were doing work that was supposed to be undertaken by full time engineers which many felt reflected poorly on the profession.\textsuperscript{485}

In 1904 the engineer Shiriaev was sent on a “special” hydrotechnical survey in Turgai oblast. His report is quite typical and offers insight into how they were conducted. One of the first places Shiriaev investigated was a proposed peasant village to be called “Mikhailovskii” on one of the tributaries of the Berdianka River, which is itself a tributary of the Ural.\textsuperscript{486} This site was near an already existing village called Kikhailovskii which was created by settlers without the approval or sanction of the government.\textsuperscript{487} Shiriaev was hopeful about the proposed site. He commented on how there was plenty of fresh water flowing into the stream via groundwater. Although one tributary was stagnant, and not promising for building wells on, the main tributary seemed promising.\textsuperscript{488} At the site of another proposed village on a tributary of the Zhaman-Kargaly (a tributary of the Kargaly River which leads to the Ilek and then the Ural) Shiriaev did not think the site was suitable for settlement in spite of the existence of water.\textsuperscript{489} However on a different tributary of the Kargali, the Zhaksi-Kargaly he did believe that in spite of the presence of some dry wells on one part of the site, another part of the site on the right bank of the river was promising for settlement.\textsuperscript{490} One final site that Shiriaev also believed would make a good village was a location called Karagandi-sai.\textsuperscript{491}

\textsuperscript{485} RGIA f. 391, op.3, d. 1857, l. 128 In this case a majority of hydrotechnicians were students working in the summer between their studies.
\textsuperscript{486} TsGARK f. 29, op.1, d. 17, l.1 “Rezultaty spetsial’nikh gidrotekhnicheskikh izyskanii proizvedennykh v 1904 godu chinami partii gornogo inzhenera Shiriaeva”
\textsuperscript{488} TsGARK f. 29, op.1, d. 17, l. 1.
\textsuperscript{489} TsGARK f. 29, op.1, d. 17, l. 2 obo.
\textsuperscript{490} TsGARK f. 29, op.1, d. 17, l. 2.
\textsuperscript{491} TsGARK f. 29, op.1, d. 17, l. 3.
Of these proposed sites how did Shiriaev first determine if they were suitable or unsuitable for settlement, and secondly, how did he identify the particular place to locate a village within the large area marked off on a map? The answer lay in a mix of advanced scientific observation and experimentation and also in other knowledge that was much more localized. Like all hydrotechnical surveyors he carried with him a mobile laboratory that accompanied the survey teams which included tools and supplies to analyze levels of chlorine, sulfuric nitrogen, nitrogen compounds, hydrogen sulfide, ammonia, and water hardness. This allowed him to test water for its salinity and other chemical qualities that could affect its usefulness, and also might offer insight into the underlaying geology. There were also earlier large-scale surveys of the region that had mapped out general courses of rivers and some of the geology. Shiriaev relied on his training to use and understand all of these technologies and to construct a narrative. He also relied on his training of scientific observation, taking exacting notes about the volumes of water, the size of pebbles, and even the plant life that grew along the riverbanks.

However, there were other clues to indicate water quantity and quality that had nothing to do with science he had learned in European Russia. In the proposed Mikhailovskii site for instance, the fact that there was already a peasant village nearby indicated that there was enough water to support whatever kind of agriculture Shiriaev observed in the village. In fact, there was a homestead (khutor) already on the site that he proposed for the village. While Shiriaev did use his scientific measurement to decide that the inflow of fresh groundwater and sandy glacial

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492 RGIA f. 391, op.3, d. 1860, l. 3 “Kratky obzor gidrotekhnicheskikh rabot proizvedennykh v Turgaiskoi I Ural’skoi oblastakh v letnii period 1909 goda.”
493 RGIA f. 391, op.4, d. 2088 “Materialy o sooruzhenii dorogi Kustanai-Troitskii, 1909-1912.” Other similar reports were created in other regions such as: *Yekonomicheskaia zapiska k proektu Akmolinskoi Zheleznoi Dorogi (Petropavlovsk-Akmolinsk)* (Tipografia V.D. Smirnova, 1913).
494 TsGARK f. 29, op. 1, d. 17, l. 1.
layers meant that the location could support another village and several more wells, there was already ample evidence to the untrained eye that the site was suitable.\textsuperscript{495}

The two sites on the tributaries of the Kargaly River could also be judged by a mix of scientific and local knowledge for their suitability. The first indication that the Zhaman-Kargali site was unacceptable should have been the name of the river itself. \textit{“Zhaman”} means “bad” in Kazakh. This information, coupled with the fact that Shiriaev found wells that held water part of the year, indicates that the Kazakhs already had significant knowledge about the hydrology of the place. The other site on the Zhaksi-Kargaly also could have given its fate away by its name as, \textit{“Zhaksy”} means “good” in Kazakh. While Shiriaev reported that there were several dry wells in this spot (likely also built by Kazakhs that probably only gave water part of the year), he admitted to getting advice about water flows in the river from Kazakhs. They told him that the water in the river did not decrease even when they watered large flocks at certain spots. Shiriaev’s knowledge of hydrology told him these spots were probably groundwater inflows because he found the water to be cool and not salty.\textsuperscript{496} The final proposed settlement at Karagandi-Sai was a clear contender because Shiriaev noted that there were already three Kazakh wells on the site each with between 4-7 feet of fresh water in them.\textsuperscript{497} In fact, in his report Shiriaev did not even discuss any other scientific observations or tests, he simply saw the Kazakhs had already built wells with fresh water in them and used their work to declare the site suitable for peasant settlement. However, Shiriaev was not alone in relying in part on local knowledge. In his pamphlet titled \textit{Instructions for Producing Detailed Hydrotechnical Surveys in Akmola Oblast}, the hydrotechnical engineer Lyschinsky encouraged all surveyors to examine the

\textsuperscript{495} TsGARK f. 29, op.1, d. 17, l. 1 obo.
\textsuperscript{496} TsGARK f. 29, op.1, d. 17, ll. 2-2obo.
\textsuperscript{497} TsGARK f. 29, op.1, d. 17, l. 3.
“agricultural character and land-use” of the Kazakhs which would limit the number of test wells and other work. 498

The situation in which the hydrotechnical surveyor was tasked with giving a “final answer” regarding the specifics and even fundamental question of settlement could lead to disagreement between more powerful officials in St. Petersburg or Omsk. This was especially true when those officials wanted to open up new areas to settlement. This sometimes led to a situation where officials ordered additional hydrological surveys of an area that had already been surveyed. In fact, this appears to have happened to the region Shiriaev surveyed in 1904, when it was surveyed a second time in 1913 in the hopes of finding suitable locations along the Zhaman-Kargali. 499 However, this situation also existed because the hydrotechnical arm of the Resettlement Administration had two separate goals. The first was to bring land into a state that was suitable for settlement through securing water by building wells and other infrastructure, and the second was to study regions for future settlement and assess their water suitability. 500 These tasks could be at odds with one another depending on differing interpretations of data and information. These tensions led to several changes in the way that instructions were created for new settlement plots, which attempted to integrate both surveying work and hydrological work throughout the early twentieth century. However, these conflicts appear to have remained unresolved. 501

In addition, hydrotechnical surveys not only led to conflict within the colonial administration, it also led to conflict between Kazakhs and settlers, because part of the task of

498 RGIA f. 391, op.3, d. 1864, l. 55.
499 TsGARK f. 29, op.1, d. 41, “Gidrotekhnicheskie obsledovanie ploshadi nahodiascheisia v yuzhnoi chasti kara-chaganskoi volositi, Ural’skogo uezda” 1913.
501 RGIA 391, op. 3, d. 1864, l. 20 Instructions from the Director of Resettlement Work, Akmola Region, 1909.
surveying was also identifying land to remunerate the Kazakhs for their losses if the area contained an important water source or was not considered “excess.” While this should have protected Kazakhs, in truth, the privileging of settlers at the expense of Kazakhs and chauvinistic attitudes toward Kazakh agriculture meant that this was not the case. The example of the proposed settlement at Korgan-Kul in Pavlodar uezd, Semipalatinsk oblast illustrates how this situation actually worked in reality. In 1907, authorities approved the expropriation of 15,415 desiatin of Kazakh land that included a lake to create a resettlement district called Kurgan-Kul. Hydrological and other surveys indicated that the location could support a village of 823 families. Four Kazakhs from Aul number 10 of Kyzil-Alachskii volost (Magrym Kel’dinov, Taxe Abynbaev, Abdualet Karinzhanov, and Akhmat Boitsov) petitioned to be able to either keep the lake or at the very least to have rights to water their livestock, because it was their only source of water. They said that in addition, while they were left with some of their land, the best land went to the peasant settlement and they were left only with salinated soils with no water that were useless for hay and unsuitable for growing grain, which they claimed to have done on about 20 desiatin of their expropriated land. These concerns were overruled by the commission and the creation of the village went ahead.

However, the Kazakhs continued their complaints which caused some officials at the Resettlement Administration in St. Petersburg to look into the matter further. In his defense to the officials, the head of the commission that decided to establish the peasant village cited the study by the Scherbina expedition. This report said that the 40 Kazakh families were living on 172,046 desiatin of land, and the expedition found 152,949 desiatin of that (including Lake

502 RGIA f. 391, op.3, d. 1459, l. 3 “Zhurnal Obshago Prisustviia Semipalatinskago Oblastnogo Pravleniia” 1 November 1907.
503 RGIA f. 391, op.3, d. 1459, l. 1 “Communication from the Ministry of Internal Affairs to the Main Directorate for Land Use and Cultivation” 18 April, 1909.
Korgan-Kul) to be “excess. What is more, he went on to say that the Kazakhs were only “using” 19,067 desiatin of their land, meaning they still had 121,942 desiatin extra. The defense also pointed out that the original survey had identified water in another winter campsite. In spite of this, a second survey was made of the region which included a survey by the hydrotechnician Nikitin who claimed to have found water of good quality and inflow at a depth of around 30 feet on another region of their territory. However, the Kazakhs were apparently supposed to build their own wells to reach this water.

The Governor of Semipalatinsk also got involved in the dispute and on the 9th of March 1909, he wrote to the Resettlement Administration in St. Petersburg defending the decision of the local authorities. He took the word of local officials and said that the Kazakhs were exaggerating and they would easily be able to make up the lost water with the wells proposed by the commission. What is more, the local officials accused the Kazakhs of lying about their plantings of grain, saying that these were not regular plantings and had only been there a few years. However, he argued that even if the Kazakhs were telling the truth that they were being hurt by taking away their lake and land, the fact remained that the village was in existence and according to the law of 1893, once a peasant settlement site was formed, it was final. The Governor then went on to imply that in spite of his protestations, the Kazakhs were probably being hurt by the loss of the lake. However, if this project were stopped because it did damage to the Kazakhs, then all settlement would have to stop because, “the whole part of the steppe suitable for agriculture is used, one way or another by the Kazakhs.”

In the end, the Resettlement officials in St. Petersburg largely agreed with the governor. They admitted that there was no way to take back the settlement, or give Kazakhs access to the

504 RGIA f. 391, op.3, d. 1459, I. 4.
505 RGIA f. 391, op.3, d. 1459, II. 2-obo.
lake, because the settlers need it and giving it the Kazakhs would probably lead to conflict. Also, if they did not have the lake, the government would be required to build wells for the settlers.\textsuperscript{506} However, they also took into account reports from the Ministry of State Lands that the Kazakhs needed more water and they were unable to afford to build the wells themselves.\textsuperscript{507} Therefore, since the governor said it would be illegal for him to give the Kazakhs money to build the wells, in the interest of peace and the settlers, the wells would be built with government funds, apparently from the Resettlement Administration.\textsuperscript{508}

**Wells, Ponds, and the Growth of Hydrotechnical Infrastructure**

Hydrotechnical infrastructure developed in phases on the steppe. The first focused work was undertaken under the advice of the Trans-Siberian Railroad Commission, which together with the Ministry of Cultivation and State Property began a plan for surveys and well building in the Governor-Generalship of the Steppe beginning in May of 1895. Already in 1897, in response to settlers occupying lands far to the south of the railway line, officials began developing plans for transferring responsibility away form the railway onto the ministries responsible for agriculture and peasant settlement.\textsuperscript{509} In 1900, this was extended to the Turgai-Uralsk region as well. However, according to officials, this early work was mostly of a “demonstrative” character, to show peasants how to build wells and encourage them to build them on their own. It was not until 1905 that this work began to take on a much larger scale as peasant settlement was

\textsuperscript{506} RGIA f. 391, op.3, d. 1459, l. 13 Communication from the Resettlement Administration to the Head of Resettlement in Semipalatinsk. 29 May, 1909.
\textsuperscript{507} RGIA f. 391, op.3, d. 1459 l. 1-lobo. Communication from the Ministry of State Domains (Land Division) to the Head of State Domains” 10 April 1909.
\textsuperscript{508} RGIA f. 391, op. 3, d. 1459, ll. 13-14.
\textsuperscript{509} RGIA f. 391, op.2, d. 840, l. 13-16.
increasing at the same time the Resettlement Administration was growing in size and influence.\textsuperscript{510}

Within only a few years, in 1909, hydrotechnical work in the Turgai-Uralsk Resettlement District surveyed an area of over 1.7 million acres across just two of the steppe oblasts. These surveys and the construction of 57 new wells and repairs to older wells and dams were undertaken by 33 technical teams led by 9 permanent and 24 temporary hydraulic technicians. In addition to the wells built and repaired, the surveys identified 144 new resettlement plots of the potential 167 surveyed which could support another 55,000 new settlers in the region. What is more, this work appears to have been helpful and effective in aiding peasant settlement. That same year in Turgai oblast, in 83 new peasant uchastoks were considered to be “secure” in their water, only 10 were deemed “insecure.” This meant that in just one year in one oblast, across an area of 59,789 desiatins, 29,391 new settlers had enough water and only 5,704 did not.\textsuperscript{511}

Hydrotechnical infrastructure focused on two main ways of securing water if there was not an open body of water nearby, wells and ponds. Wells were the most common, they were cheap, and peasants could even easily often construct them without aid from the government. However, in some places either because groundwater was too deep or because the wells that had been dug were often impinged by salts as the groundwater changed, officials deemed it necessary to build a pond or dam a stream.\textsuperscript{512} This work was much more time consuming and expensive. When dams and ponds were built, they usually were located on a small stream or swamp that

\textsuperscript{510} RGIA f. 391, op.2, d. 700 l. 90, O gidrotecknicheskikh sooruzhdeniakh v pereslencheskikh poselkakh i o komandirovanii osobogo gidrotekhnika dliia nablyudenii za sooruzheniami, 1900-1905.

\textsuperscript{511} RGIA f. 391, op.3, d. 1860, ll. 3-4 ob.

\textsuperscript{512} Although salinization of wells is most common through coastal salt water intrusion that comes from over pumping see: H. Murat Ozler, “Hydrochemistry and Salt-water Intrusion in the Van Aquifer, East Turkey” \textit{Environmental Geology} 43 no. 7 (March 2003): 759-775; it also occurs through mineralization, which is more likely in arid environments like the Kazakh steppe, see: Hichem Yangui, et. al., “Recharge Mode and Mineralization of Groundwater in a Semi-arid Region: Sidi Bouzid Plain (Central Tunisia)” \textit{Environmental Earth Sciences} 63 no.5 (July 2011): 969-979.
was dammed to create a pond. Resettlement officials then typically constructed a well that could draw on the pond, but which had a filter to keep the well water as clean as possible. For example in 1908, the Resettlement Administration constructed three of these ponds and wells with a filter in Akmola oblast. While they were adequate, the earthen dam structures in less than ideal soils needed frequent dredging and repair on the banks. The filters also often failed to keep the wells clean.\textsuperscript{513}

(Figure 5.3. Well with filter and supply pond in the background, built by the Resettlement Administration, Koksheatu, 1911)\textsuperscript{514}

While ponds and wells with filters were built, they were relatively rare due to their expense and the time needed to construct them. Therefore, especially in the last years before the outbreak of the First World War, another technology appeared more promising in the battle against aridity on the steppe. This new technology—deep-drilled artesian wells—offered many officials hope that although the surface of the steppe might appear desolate and incapable of

\textsuperscript{513} RGIA f. 391, op. 3 d. 1861, Materialy o gidrotekhnicheskikh sooruzhdeniiakh 1908-1910.

\textsuperscript{514} Pre-Revolutionary Photo Collection, TsGARKZRK.
supporting sedentary agriculture and peasant settlement, beneath the surface there was water that the advanced science of the Russian Empire could unlock.

Beginning in 1906, the engineer A. Kozyrev tasked with testing out exploratory deep boreholes in Atbasar and Akmola oblasts. Specifically, the areas he was charged with investigating consisted of 2.7 million acres (1 million desiatin) of land near the Ishim River. They drilled eight boreholes of a depth between 15 and 42 sazhen, and found water, which potentially opened up the entire 2.7 million acres to settlement if the government would agree to build another 60 drilled artesian wells at a cost of 2,500 to 3,000 rubles each. Officials believed if they undertook this project, it would allow for another 100,000 peasant families to settle in the region.\(^{515}\)

It appeared Kozyrev, his crew, and Russian hydrotechnical engineering had heroically opened up a massive area of settlement. However, this was not to be the case, while deep artesian drilling promised a great deal, the realities were more complicated. However, the lofty dreams that this technology inspired do reflect the views and hopes of scientists and officials on the steppe in their quest for water. The reality was that the area Kozyrev had been assigned to was far too large to make this kind of blanket statement, and while his wells did turn up significant amounts of water, later attempts to expand on his work faced challenges.\(^{516}\) For example, when a well was attempted in 1909, though the well was drilled to a depth of 37.7 sazhen and had significant water pressure, it was too salty even for cattle.\(^{517}\) In other instances, the distance of the proposed sites from the railway or from Orsk where the drilling equipment was kept in winter made drilling the wells, especially deep wells cost prohibitive.\(^{518}\)

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\(^{515}\) RGIA f. 391, op. 3, d. 1862, l. 143.

\(^{516}\) RGIA f. 391, op.3, d. 1862, l. 9.

\(^{517}\) RGIA f. 391, op.3, d. 1862, l. 92.

\(^{518}\) RGIA f. 391, op.3, d. 1862, l. 6.
However, in spite of these challenges and shortcomings, the allure of a hidden source of water deep below the Steppe that could be unlocked only with advanced technology was strong in the Resettlement and agronomic bureaucracy. Therefore, in spite of the problems in replicating Kozyrev’s work, some believed that Kozyrev simply hadn’t drilled deep enough.\textsuperscript{519} Others believed that perhaps if the wells could use a steam drill they might be able to drill more quickly and deeply.\textsuperscript{520} All of these questions and concerns were why the hydrotechnician Nifantovi was sent to the Second All-Russian Congress of Applied Geology to get answers. While at the conference, most seemed to agree that the blanket statement of Kozyrev was unreasonable, this did not entirely dampen the allure of deep artesian well drilling in the steppe.\textsuperscript{521}

Instead of giving up the idea entirely officials began to focus and systematize their efforts. For example, in Kostanai uezd where engineers had the most success with deep artesian drilling, they focused their efforts on smaller regions with more intensive hydrological surveys. For example, Letovke number 94 (letovke means summer pasture indicating this was probably a Kazakh pasture) had already shown good plentiful water in an earlier survey and well drilled by Pankov, was divided into five peasant settlement districts which would eventually become villages. Each of these future villages was to have three wells drilled in it since it was believed they all drew from the same aquifer at roughly the same rate of 4,800 \textit{vedro} per day like Pankov’s well. With these 15 new deep artesian wells (drilled to 23 sazhen) it was believed that this area could support another 3,250 settlers.\textsuperscript{522} What is more, once the initial drilling had identified the aquifer, the additional wells could be drilled and constructed at very little expense.

\textsuperscript{519} RGIA f. 391, op.3, d. 1862, l. 105-8.  
\textsuperscript{520} RGIA f. 391, op. 3, d. 1862, l. 227 ob.  
\textsuperscript{521} RGIA f. 391, op.3, d. 1862, l. 297.  
\textsuperscript{522} RGIA f. 391, op.3, d. 1862, l. 45.
especially if the individual wells were “nortonovskii” wells, more commonly known as “Abyssinian wells.”

While the results of artesian deep well drilling were a far cry from what Kozyrev had promised, the fact remained that these wells (and others like them) did allow for settlement where none had been before. They reflect the frequent story seen throughout this dissertation that while imperial scientists and officials rarely attained their lofty goals on the steppe, they did advance towards them. Three thousand settlers on Letovke number 94 was not 100,000 across all of Akmola oblast, but it still represented a significant increase in settler populations. In Kostanay

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523 The name “Nortonovskii” appears to be from the name of the British manufacturer of these wells, that were supposedly invented for another colonial undertaking, British military expedition into Ethiopia.

uezd, where *Letovke* number 94 was located, the population of Russians increased by about 10,000 persons each year, meaning that this single project completed in one season was responsible for nearly 1/3 of that growth.\(^{525}\) Insufficient records make it impossible to make these kind of numeric claims about the effects of hydrotechnical infrastructure and work. However, in the years before the First World War there were dozens or even hundreds of wells being built by the Resettlement Administration in some of the most challenging environments in each oblast. Therefore, this work deserves a significant amount of credit (or blame) for the large increases in peasant settlement in this period.

Finally, it is important to note that the units the engineers themselves seemed most inclined to count were not only water flows, or even potential head of sheep a single well could support, but rather peasant settlers. This focus on settlers even by scientists and engineers indicates just how deeply the assumptions and aims of settler colonialism were rooted in the thinking and work of hydrotechnicians. While they might feely rely on ideas, information, or even wells built by Kazakhs, it was clear who they were there to help. One of the clearest examples of this is the view of the head engineer for hydrologic work in Akmola oblast. In the “Plan of Hydrotechnical Work for Akmola Region for 1909” he wrote that in identifying new settlement sites, the hydrotechnician “takes upon himself the moral responsibility to populate the site for all eternity with his own kind.”\(^{526}\) The “kind” here is clearly Russians, and this is one of the few instances where such clear racial competition comes to the fore in the archival record. Perhaps it is because the challenge of aridity felt so huge and threatening to the entire project. Whatever the reason, the fact that such an idea was included in a simple work plan for drilling

\(^{525}\) According to Demko, the Russian population in Kostanay uezd was 102,000 and in 1916 it was 200,000. Demko, *The Russian Colonization of Kazakhstan*, 211.

\(^{526}\) RGIA f. 391, op.3, d. 1857, l. 127.
wells is a powerful example of how many engineers felt about their task. It was not simply a technical problem to be solved. Much like the zemstvo doctors, some saw their task as a moral crusade, albeit a racist crusade.

**Cholera**

While in many ways the large construction projects of artesian wells, dams, ponds, filters, and hydrologic surveys could be interpreted a story of the nascent frontier technostate with grand plans to remake a landscape through science, technology and expertise, this project was not entirely a story of technicians and officials enacting their vision on a passive landscape and nomadic and settler populations. In addition to the contributions of peasant settlers and Kazakhs, there was another important actor overlooked in this story—the environment. In addition to the aridity of the steppe and the salinity of the soil that made hydrotechnical work so challenging, there was also the water itself. For example, the lake, Kuday-Kuduk near Krasnoyarsk discussed at the beginning of this chapter—like many others in the steppe—supplied water only for part of the year was both an aid and a frustration to the goals of technicians and officials as it provided water but only on its own terms. While water and aridity were important constraints or aids to the work and vision of officials, there was another natural “actor” that illustrates the complex interactions of technology, the environment, markets, ideals of settler colonialism, and human and non-human actors on the Kazakh steppe: *vibrio cholerae*, the bacteria that causes cholera in humans.527

The steppe, like the rest of the Russian Empire, was the site of frequent cholera outbreaks and scares throughout the nineteenth and early twentieth centuries and cholera was a major concern of officials who were in charge of overseeing the steppe and its settlement. Between

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527 This lens is indebted to questions about mosquitos in the first chapter of Mitchell, *Rule of Experts*, 19-53.
1855 and 1922, Russia had an estimated 5.5 million cases of cholera and 2.2 million deaths from the disease. In the first decades of the twentieth century (between 1901 and 1926) Russia was “free” of cholera for only two years in 1903 and 1906. In Central Asia, the record of cholera is more spotty. While it does appear the first cholera outbreak in Russia in 1823 was via the Silk Road, Central Asia’s proximity and historical and economic connectivity to India mean its history with cholera was both part of Russia’s story and also unique. Most significantly was that cholera typically was understood to have entered the Russian empire via ports on the Black Sea and spread across the empire. While after peasant settlement and railways began to increase in the late nineteenth and early twentieth centuries the Black Sea was one source of cholera on the steppe, direct transmission via caravan was also possible.

Therefore, it was a major concern not only of officials but also of ordinary residents. For example, in Omsk during the 1910 epidemic, the newspaper Omskii Telegraph gave frequent updates on the spread of the disease and numbers of deaths across the empire. The daily updates on numbers falling ill and dying as the epidemic spread gave a sense of foreboding, and the paper carried little more than information on the spread of the disease which in some ways made the progress of the disease seem inevitable. When cholera hit Omsk in September, however, the newspaper did offer more concrete descriptions of what measures were in place to combat it.

In Omsk and in other places on the steppe, fears of cholera had caused officials in the Ministry of Internal Affairs to establish local city and regional sanitary commissions to carry out

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529 Ibid., 38.
530 An example of this interpretation is, K. David Patterson, “Cholera Diffusion in Russia, 1823-1923” *Social Science and Medicine* 38 no. 9 (May 1994): 1171-1191.
531 For example in 1829, a caravan brought cholera to Orenburg from Bukhara, Anna Afansayeva, “Quarantines and Copper Amulets: The Struggle Against Cholera in the Kazakh Steppe in the Nineteenth Century” *Jahrbucher fur Geschichte Osteuropas* 61 no. 4 (2013): 492.
532 Omskii Telegraph, (Omsk), August to November 1910.
the recommendations of doctors and scientists to help limit the disease.\footnote{Davis argues that this “flexible” approach to battling cholera was in fact more effective given Russia’s geographic position and the demands of its economy, and it could not use quarantine the way other countries more distant from India had. He also argues that the zemstvo ethos was crucial in imperial successes in controlling the disease and in the Soviet’s eventual eradication of cholera in the 1920s. Davis, \textit{Russia in the Time of Cholera}, 2-5.} These included the establishment of cholera barracks as well as special directions about trade, the sale of animal and food products, as well as cleanup of public and private spaces and wells.\footnote{For examples of these sanitary measures in Turgai Oblast and communications with the Ministries in St. Petersburg see see: TsGARK, f. 25, op.1, d. 3886, “O priniatii mer protiv kholoroi yepidemii 1893 v Turgaiiskoi oblasti, 1892-1902.” for examples of how local authorities constituted and directed these committees see: TsGARK f. 25, op.1, d. 3916, “O merakh protiv chumy v sluchae pojavleniia ee v Turgaiiskoi oblasti, 1897-1904.”} However, in spite of the best efforts of the city Sanitation Commission, by mid-September 90 residents of Omsk had contracted the disease and 50 had died.\footnote{Omskii Telegraf, September 18, 1910.} Sanitation was a crucial part of anti-cholera measures across all of Russia.\footnote{For an example of how more draconian measures like quarantines could lead to violent conflict in Russia’s Central Asian Empire see, Jeff Sahadeo, “Epidemic and Empire: Ethnicity, Class, and “Civilization” in the 1892 Tashkent Cholera Riot” \textit{Slavic Review} 64 no. 1 (Spring 2005): 117-139.} This was in part because the zemstvo ethos of medicine caused doctors to understand that those weakened by poor nutrition or unsanitary conditions were more susceptible to the disease.\footnote{Davis, \textit{Russia in the Time of Cholera}, 28.} It was also because cholera causes copious diarrhea (often referred to as “rice water” due to its milky white consistency) which can easily infect water supplies and the dehydration of this diarrhea is typically what leads to death in cholera victims.

The 1910 outbreak that the residents of Omsk read about daily in their newspaper was already devastating regions of the steppe further west, specifically Kostanay uezd which was one of the regions to suffer most that year. The first person to fall ill from cholera in Kostanay uezd was the 28 year old peasant Kozuma Saschenkov who was hired by the merchant Korsakov to work in his store at the village of Ust-Uiskoe in Cheliabinsk uezd which served as an important waypoint for settlers coming to Kostanay and parts of Aktobe uezds. Ust-Uiskoe had seen 120...
cases of cholera just in July of 1910. Sashenkov completed his work and returned home to his village of Vvedenskii and fell ill on the 12th of July, but by the time the district doctor saw him on the 14th, he was already better. Although the doctor carried out a disinfection of the places where Sashenkov had been, the bacteria made its way into Kostanay uezd in the bowels of peasant settlers who had unknowingly come into contact with infected water or food that Sashenkov had soiled. The gestation period of cholera can be as long as five days before a person shows symptoms which was ample time for settlers to make their way to other population centers where the outbreak spread.

By August Kostanay uezd was the site of a full-blown cholera epidemic. By August 11, Kostanay already had 54 confirmed cases of whom 27 had died, in Aktobe 25 cases were confirmed and cholera had killed 15. Much of the volume of the cases was focused in towns like Kostanay and Turgai which had almost no sanitary infrastructure and denser settlement and in both cases relied on drinking water supplied by the adjacent Tobol or Turgai rivers. However, the hardest hit places in terms of percentage of the population affected were usually settler villages where a combination of poor water supply, poor nutrition, and inadequate shelter left peasant immune systems more susceptible to the disease. For example, cholera arrived in the village of Kamenskii in Aktobe uezd on the 10th of August. By the 18th of August 54 had contracted the illness 30 of whom had died, and the village was still reporting 5-6 new cases per day. Officials pointed out that part of the reason Kamenskii suffered so severely was because of

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538 TsGARK f. 25, op.1, d. 4068, l. 31, “Zhurnal osobago zasedania obschago Prisustviia Turgaiskago Oblastnogo Pravlneia” 16 July 1910. Rail transport was a major influence on the speed and territory of cholera outbreaks and could mean that some areas suffered heavily and others nearby were barely affected, Patterson, “Cholera Diffusion in Russia.”
539 TsGARK f. 25, op.1, d. 4068, l. 9, Report by the Kostanay uezd Head to the Turgai Governor, 17 July 1910.
540 World Health Organization “Cholera Factsheet” http://www.who.int/news-room/fact-sheets/detail/cholera
541 TsGARK f. 25, op.1 d. 4068, l. 265 “Zhurnal zasedania Turgaiskoi oblastnoi sanitarno-ispolnitelnoi komissii” 14 August 1910.
542 Ibid., 268.
the lack of adequate clean drinking water in and around the village. The village was supplied by two “small poorly-built wells” which villagers had named “Korsakovskii” and “Gladovskii.” In fact, these wells were considered dirty and hazardous even in “non-choleric times.” In order to stop the spread of cholera from these wells, officials ordered them closed.543

However, closing the wells was not enough, the settlers still needed water to survive. In search of a new source, villagers in and around Kamenskii next began to collect water from the river Ui, located eight miles from the village. However, this spot was about two miles downstream from the village of Lugov in Orenburg oblast which recently had a cholera outbreak, meaning the water in the river was possibly now contaminated as well. Therefore, the Kostanay uyezd sanitary commission asked the governor to request that the Resettlement Administration dispatch a team of technicians to Kamenskii to identify proper locations and to construct five wells to support settlers.544 On August 22nd the Turgai governor followed their recommendation and the hydraulic engineer Haldin was dispatched to Kamenskii to immediately begin construction of the five wells.545

On November 3rd the Kostanay uyezd Sanitary-Executive Committee met to discuss the summer and fall epidemic and make plans for future outbreaks.546 Members reported that cholera had appeared in 11 populated places in the uyezd and had killed 130 people (meaning ¼ of the deaths occurred in Kamenskii because of inadequate wells). The commission also requested that

543 TsGARK f. 25, op.1, d. 4068, l. 357 “Zhurnal zasedaniia Kustanaiskoi uezdnoi sanitarno-izpolnitel’noi komissii” 20 August, 1910.
544 Ibid., 358-9.
545 TsGARK f. 25, op.1, d. 4068, l. 401, “Zhurnal zasedaniia Kustanaiskoi uezdnoi sanitarno-izpolnitel’noi komissii” 13 September, 1910.
district doctors provide it with an update on the status of water supplies in the entire uezd. Early reports from two doctors indicated they found water supplies inadequate.\textsuperscript{547}

In the spring of 1911, the threat of cholera was in the air (and water) once again. Therefore, the Governor of Turgai Oblast wrote to the head of the Turgai-Uralsk Resettlement district asking for them to construct more wells in the region, especially in several poorer communities who lacked the resources to do this on their own. He pointed to a direct correlation between the outbreak in 1910 and the lack of clean and plentiful wells writing, “…the past epidemic polluted drinking water and severely contributed to the spread of the cholera epidemic, therefore, I believe the measure proposed by the Chairman of the [sanitary] commission [asking for Resettlement funds to be spent on wells] to be appropriate.”\textsuperscript{548} It is unclear if the Governor ever got a response, however, given the example of Kamenskii and others, it appears likely that in many cases, the Resettlement Administration was factoring cholera into its decisions on where and how to build wells. Even those wells seemingly unconnected to cholera outbreaks were still built to specifications which were concerned with the installation of proper uniform lids to keep out litter, animals, and hopefully disease.

Ironically, the source of some of the cholera outbreaks appears to have been driven by more peasant settlers coming from South Russia where cholera often entered the empire via the Black Sea. Therefore, as the settler colonial project was more and more successful, it also made it more likely that cholera outbreaks would continue, which would spur more wells and thereby allow for more settlement.\textsuperscript{549} However, there is also evidence that the Black Sea was not the only

\textsuperscript{547} TsGARK, f. 25, op.1, d. 4068, ll. 463-466 “Zhurnal zasedaniiia Kustanaiskoi uezdnoi sanitarno-izpolnitel’noi komissii” 3 November 1910.
\textsuperscript{548} TsGARK f. 25, op.1, d. 4083, l. 59, Letter from the Governor General of Turgai Oblast to the Head of Resettlement Affairs in Turgai-Uralsk Raion, 12 April 1911.
\textsuperscript{549} Authorities were well aware of settlers as a source of cholera and as such instituted many measures mostly along railways to try and control and treat cholera outbreaks. See: RGIA f. 391, op.1 3, d. 736, “O merakh preduprezhdennia i bor’by s kholernoi yepidemiei na putakh peredvizheniia i v mestakh vodvoreniiia pereselentsev”
route that brought cholera to the steppe. In fact, in addition to outbreaks in the nineteenth century, like the Orenburg epidemic in 1829, it appears that older routes that connected the steppe to regions to the south and then on to India were also responsible for cholera on the Kazakh steppe.\footnote{On cholera entering the oblast from the south see for example: TsGARK f.25, op.1, d.3991, l. 5, “Protokol zasedaniia Osobago Prisustviia Turgaiskago oblastnogo Pravleniia ot 15-go noiabria 1904.”}

Therefore, while the rapid expansion of well and dam building carried out by the hydrotechnical section of the Resettlement Administration can be clearly seen as—and was indeed—a manifestation of growing state and technopolitical power in the Kazakh steppe settler colony, it was anything but a top-down project except perhaps in the imaginations of some officials and technicians. Indeed, perhaps the cholera bacteria should not be seen entirely as an obstacle to hydrologic technicians like it was for those in the medical bureaucracy. In some cases, it encouraged more well building and more work for these technicians. Perhaps it is even possible to view \textit{vibrio cholerae} as a co-constructor of (or at the very least a catalyst for) the wells in Kamenskii and elsewhere.

**Conclusion**

Nevertheless, there were other important actors too who helped create the hydrotechnical infrastructure that supported peasant settlement on the steppe. In addition to the peasant settlers who constructed some wells that the settler colony made ample use of, Kazakhl wells were also integral parts of steppe hydraulic infrastructure. Furthermore, the hydrological surveys did not only rely on the portable laboratories and expertise of scientists alone. Local Kazakhs also often provided information to the surveyors on where good water was to be found, especially in places where water appeared only seasonally. Nevertheless, the process of creating a narrative around and on actions to help settlers on arrival fight cholera see: RGIA f. 391, op.2, d. 409, “O priniatii mer dla bor’by protiv infektionnikh bolezni (tsingii i prochego) v pereslanchesikh poselakh Akmolinskoj oblasti, 1898-1904”
this infrastructure could obscure these sources of knowledge, and indeed frame science in a triumphalist narrative, which in colonial contexts so often created greater distance between colonizer and colonized as a technology of rule. This collection of varied sources of science and knowledge along with the wide array of human and non-human actors offers a useful lens and framework for understanding and synthesizing the various bureaucratic, environmental, and scientific forces at work on the steppe with regard to water. There were many interacting parts, persons, ideas, and organisms that all played a part in this story.

However, the complexity of the story should not be misunderstood as an attempt to hide the truth about what was driving the changes on the steppe. While cholera bacteria and local Kazakhs sometimes played a role in the creation of this imperial knowledge, the project of hydrotechnical work on the steppe was overwhelmingly and fundamentally about supporting the settler colonial project. Perhaps the hubris of Russian scientists caused them to believe they could succeed where previous attempts at settled agriculture had often failed cause them to overlook evidence of successful settled agriculture at places like the irrigated Kazakh farms in Karaturgai volost. Certainly, the dream of a “settled and prosperous” steppe had inspired hydrotechnicians and officials to take on an incredibly daunting and difficult task, and while this task did not achieve their highest aims, their ability to find and supply water to keep settlers on the steppe should not be overlooked. Nor should their focus on protecting settler populations more than Kazakhs be ignored.

If this work was simply about finding water and giving it to residents regardless of their ethnicity, the hydrotechnical arm had ample opportunity to do so and they did not. This focus on supporting settlers and ignoring Kazakhs make it clear that at its root, the goal of steppe hydrotechnical work was resettlement of Slavic settlers (or in the words of one hydraulic
engineer, his “own kind”) onto “excess” Kazakh lands. This reality underlay not only hydrologic work on the steppe, but given the clear necessity of water, and the fact that imperial hydrologists, engineers, and technicians did not only find water, they were also part of a bureaucracy that allocated it from some groups (usually Kazakhs) to another (usually peasant settlers) is a powerful reminder of the implications and power of science on the steppe. Therefore, while the work of the hydrotechnical arm of the Resettlement Administration was impressive in its scope, innovation, and scale, those must be viewed alongside its legacy of dispossession and destruction.

The success of the Resettlement Administration in securing water for new settlers where it appeared no settlement or agriculture was previously possible continued to serve as a hope and inspiration for officials and engineers alike. It also meant that all steppe lands could eventually become the target of resettlement projects, and as such the promise of new lands made fertile through irrigation or artesian wells continued to attract the attention of settlers and officials at the expense of Kazakhs. The dreams of settler colonialism that universally promised the chance to remake not only an environment but also the settlers themselves was a powerful motivator when coupled with the possibilities that imperial science and the bureaucracy unlocked (that this science was created in part by Kazakhs or peasants did not always matter). However, like most settler colonial undertakings things did not always go according to plan. Lastly, this impulse was constrained by a web of interactions between cholera, the steppe environment, hydraulic drilling tools, Kazakh knowledge, settler land hunger, and official hubris and cultural chauvinism.
CHAPTER SEVEN: THE TECHNO-SETTLER COLONY VERSUS THE LOCUST

In the spring of 1914, with talk of war in the air across Europe, the Siberian Cossack Host mobilized to prepare for battle in defense of their homes and the Russian Empire. True to the nature of this twentieth century conflict, the bravery and muscle of the Cossacks would be deployed alongside chemical and mechanical warfare in the upcoming struggle, and the success of this campaign relied—as modern warfare so often does—on the infrastructure of railways and supply lines. However, the invasion the Cossacks faced was not the combined military might of the Central Powers whom they would soon fight on the battlefields of the Eastern Front. Instead, the enemy was one that officials, farmers, and nomads on the Kazakh steppe had failed to eliminate during decades of previous battle: the locust.

This conflict did not only employ the methods of modern warfare, it was also, like the First World War, a war for empire. However, battle against the locust was fought on a front in a different imperial project than the one that dragged Russia into war in Europe, it was just one front in the long war of settler colonialism on the Kazakh Steppe. The ideologies behind this conflict with the locust were no less important than the ideas of colonialism that helped bring about the Great War. However, they were—like the other aspects of scientific agriculture described in this dissertation—obscured by assumptions of scientific objectivity and rationality.

A closer examination of the story of locust control reveals that ethnic chauvinism, classist othering of peasants, hidden assumptions of what constituted progress, and belief in the superiority of market relations were just as important for scientists as faith in the scientific

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method, objective observation, or Newtonian physics. The various projects of locust control also show the development, growth, and deployment of the nascent technostate that was in its early stages of development on the steppe as illustrated in the previous chapters of this dissertation. This nascent technostate culminated in the chemical locust control campaigns which were the technostate’s fullest manifestation. While this settler colonial technostate was in many ways expansive, invasive, and powerful, it also came close to failing in its project of remaking the steppe in part because of the locust. Reports like the following that describe the destruction the locust brought were consistent, and indicate the real threat locusts posed to settled agriculture:

This year the locust has caused such large loses that peasant food stocks must be considered since the wheat was almost totally eaten by the locusts. The population was powerless to fight against them on their own and the means available to the regional administration were negligible. If next year a proper struggle is not organized, it is almost certain that in many villages the crops will be completely destroyed. I think that the loses from locusts this year amounted to something in the region of hundreds of thousands of rubles, but they of course could grow larger if preparatory work is not begun in time.

The inability of scientists and settlers to solve the pressing locust problem put the entire settler colonial project at risk for several reasons. First, locusts were primarily a threat to sedentary agriculture, nomads could and did move to areas untouched by the locusts. By the early twentieth century nomads were being pushed on to less and less land and had their grazing lands and migration routes curtailed. Prior to heavy peasant settlement, nomadism was thus a

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552 While the locust was a significant problem, it was not the only pest threat, in addition to poor soils and water discussed elsewhere in this dissertation, plant diseases like wheat bunt (also known as smut) was also the target of agronomic outreach by scientists concerned with harmful pests. See Tsentral’nyi gosudarstvennyi arkhiv Respubliki Kazakhstan [Central State Archive of the Republic of Kazakhstan] hereafter referred to as TsGARK. TsGARK f. 64. op. 1 d. 6157, ll.7.
553 TsGARK, f. 64, op. 1, d. 6157, ll. 47. Letter from the Semipalatinsk Oblast agronomist to the Agronomic Department of the Steppe Governor Generalship, 20 April 1910.
554 Though he also rightly points out that locusts did attack nomadic pastures, mobility as a defense against locusts is also made by Dolbee in his dissertation on nomads and locusts in a different region, Samuel Dolbee, “The Locust and the Starling: People, Insects, and Disease in the Late Ottoman Jazira and After, 1860-1940” (PhD diss., New York University, 2017), 84.
useful adaptation to the locust problem on the steppe. Secondly, settler colonialism is a project of
remaking the environment and the settlers within it, and as such has a kind of utopianism at its
roots. Lorenzo Veracini pointed to this when he wrote, “Settlers, unlike other migrants,
“remove” to establish a better polity, either by setting up an ideal social body or by constituting
an exemplary model of social organization.” The case of agricultural science on the Kazakh
steppe enables us to broaden conceptions of settler colonialism that focus on the ideas and
practices of the settlers, and, enables us to see that settler colonialism is not always driven by the
ideas and actions of settlers alone. On the steppe, imperial agronomists and scientists also
played an important role that created similar outcomes to other settler colonial experiences.
While Veracini focused on cultural and political power in his theoretical abstractions, the Kazakh
steppe indicates that technopolitical power could serve much the same ends.

However, this did not mean that the settler colonial state on the steppe was always
successful. As previous chapters of this dissertation have shown, nearly all of the agronomic
projects suffered significant setbacks and sometimes outright failure. Veracini recognized a
similar tendency for settler colonialism “recurrently failing to establish the regenerated
community.” Nevertheless, in other areas, imperial officials could point to physical
infrastructures such as wells, railways, grain storage facilities, and the presence of wheat on the
steppe where none had grown before. While other agricultural challenges officials had faced in
the steppe—like weather, poor soils, and a lack of water—could be navigated and engineered
around with at least something to show for their efforts, even if these projects often promised

556 Ibid., 9.
more than they delivered. Scientists could also reinforce their power and legitimacy by using science to declare that certain areas were unfit for settlement due to low rainfalls, and poor soils fell into a similar category. Wells and irrigation ponds strengthened the narrative of settler colonial claims because they represented a physical presence that reinforced ideas of remaking and progress. Even if their symbolic significance sometimes outweighed their impact on agriculture, these structures still served as a kind of transcription written on the landscape that marked the land as colonized and signaled the supposed power of the colonizer.

The locust defied the claims of the Russian settler colonial project in part because they were often present in areas that had been deemed suitable to steppe settlement with plentiful rainfall and good soils. However, scientists had no effective infrastructure that they could place on the steppe to signify their work like they could with irrigation works or wells. Nevertheless, while not a physical signifier, the anti-locust spraying campaigns on the eve of the First World War served a similar role. What is more, these campaigns were in some ways even more effective physical representations of the settler colonial project because they were a demonstration of the vast power behind them. Similar to how the pageantry of a royal court or parades on Red Square served as a performance of power, the campaigns could potentially do the

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559 The problem of locusts was not limited to the Kazakh steppe. Other regions like Southern Russia and the North Caucasus also faced locusts, however, in these regions sedentary agriculture was more firmly established and therefore meant that while locusts could also destroy crops, they did not challenge the claim that the region was suitable for sedentary grain agriculture. On the locust problem in other regions see Anastasia Fedotova and Aleksei Kuprianov “Resultat khimicheskoi bor’by blestiaschii, posevy zaschischayutsia, nastroenie bodroec: Boris Uvarov i bor’ba s saranchoi na Stavropol’e v 1911-1914 godakh” Priroda no. 1 (2018): 42-51.
same.\textsuperscript{560} However, unlike parades that took place in colonial or imperial capitals, the pageantry of the anti-locust campaign came right to the doorstep of peasant settlers and Kazakhs.\textsuperscript{561}

In the process of combatting the locust, these campaigns enabled the empire to transcribe onto the landscape a narrative that symbolized and represented the power, organization, and effectiveness of the settler colonial project. What is more, it was a project of remaking settlers, nomads, and the environment that reached into the smallest localities and tied some of the most peripheral farmers and regions into the empire, and into a network of agronomic knowledge, technical machinery, and chemical pathways that stretched around the globe. The horse drawn sprayer overseen by the rayon agronomist or an agronomy student from St. Petersburg was a physical marker not only of the sprayer. It also signified the earlier mapping by imperial officials, reports by the village nachalnik to the regional agronomist, as well as a connection to the railway lines that brought the sprayer and the rayon agronomist to the doorstep of the peasant, all of which were connected physically to the chemical factories in Estonia that supplied the insecticides.

Therefore, the anti-locust campaigns represent this highest form of the nascent techno settler state because they were both a representation of the complex knowledge, personnel, and infrastructure networks that made up the settler colonial project, and were also the actual physical networks themselves, made manifest. The campaigns were then also the process of remaking the environment and people of the steppe while simultaneously being remade and reorganized itself. However, it is impossible to separate out these actors and forces into neat


\textsuperscript{561} This pattern was reflected in Russia as a whole with deeper penetration of the state into previously under-governed areas, see: Judith Pallot, Land reform in Russia, 1906-1917: Peasant Responses to Stolypin’s Project of Rural Transformation (Oxford, Clarendon Press, 1999). Yanni Kotsonis, “‘No place to go’: taxation and state transformation in late imperial and early Soviet Russia.” The Journal of Modern History 76, no. 3 (2004): 531-577
categories, especially, or what Bruno Latour described as “the divide that separates exact knowledge and the exercise of power—let us say nature and culture.”

**Physical and Mechanical Locust Control**

While steppe agronomists eventually pursued the mass spraying of pesticides to combat the locust, this practice only became coordinated on a large scale in the years just prior to the First World War. Before adopting chemical spraying, agronomists on the steppe proposed a variety of physical and mechanical locust controls, many of which were of marginal effectiveness, to create a cannon of anti-locust advice. Examining what made it into the cannon of appropriate techniques, and how agronomists talked about approved practices shows the hidden—and not so hidden—assumptions at work in the applied science of locust control.

One of the main challenges of early attempts at locust control was the lack of effective advice, which had the potential to undercut the legitimacy of agronomists and their work on the steppe. This added to the cloud of mistrust and lack of confidence many peasant settlers had in agricultural science. The low opinion many peasants had of agronomy coupled with the real damage that locusts did to crops meant that agronomists needed some advice to offer steppe farmers. This advice usually consisted either of practices that peasants already used to control locusts or new techniques that agronomists hoped farmers would adopt on a wider scale. However, agronomists did not simply repeat peasant methods and recognize them as such. Instead, they described simple methods in exacting and complicated terms, a practice that could be described as making the simple complex. This repackaging made the advice seem new and more substantive even if it differed little in practice and effectiveness from peasant practices.

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563 TsGARK f. 64 op. 1 d. 6175 ll. 23 “Ochet o deiatel’nosti agronomicheskoi organizatsii v Akmolinskoii oblasti za 1913 god,” 31 January 1914.
also increased the perceived distance in knowledge between agronomists and farmers. Creating this kind of distance is a well-known method of producing and exerting power, especially in colonial contexts.  

In 1894, the applied entomologist I.A. Porchinskii, disparagingly described how peasant settlers on the steppe had attempted to protect their crops from locusts by collecting them on large pieces of canvas. The peasants first spread the canvases around the infested fields and then attempted to chase the locusts onto the canvases. Porchinskii was only an observer and not a participant in this “sad” and demoralizing scene. He had described the peasants in order to make a point about the backwardness of peasant locust control that did not use science and juxtapose it with his own locust control advice later in the text.

Therefore, it is surprising that in spite of Porchinskii’s apparent skepticism on gathering locusts by hand, later, in the same text he gave his own advice on the proper approach to hand gathering locusts. His approach consisted of two methods, one for young locusts and the other for adults, although in truth they operated on the same principle, and simply required a slightly modification to the equipment. Porchinskii’s methods consisted of using a small homemade butterfly net that he gave the important soundings name of “entomological net.”

His description of the net is somewhat excessive because it was actually a rather simple construction made of a metal loop, “not more than one and a half arshin in diameter.” For catching young locusts the net was supposed to be used without a handle and the farmer was directed to hunch close to the ground, but for an adult locust infestation a long handle was added.

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564 Mitchell, Colonizing Egypt.
565 Porchinskii was involved in applied entomology in South Russia in an earlier period and was similarly skeptical of hand-picking pests like the grain or “kuzka” beetle. Fedotova, “The Beetle Question”, 80.
566 I.A. Porchinskii O Kobylkakh: poverzhdavshikh posevy i travy v guberniyakh permskoi tobolskoi orenburgskoi (Saint Petersburg: Tipografia V. Demakova, 1894), 38.
567 Porchinskii, O Kobylkakh, 40.
so the farmer could stand. Porchinskii’s advice even came with illustrations in case peasants were unsure how to crouch and stand. It is difficult to read this advice and not suspect that Porchinskii was not in part compensating for a lack of scientific advice on how to deal with locusts by using overly exacting instructions. If he had simply said to peasants “make a net and go catch locusts” the reality is his advice would not be very different from what many peasants were already doing.\footnote{\textit{Turgaiskaia Gazeta}, (Orenburg) June 20, 1904.}

However, Porchinskii, and other steppe agronomists were able to turn their lack of effective advice into an effective means of creating difference and the perception of useful specialized knowledge. Giving specific advice using units of measurement to construct the net, Porchinskii emphasized his credentials as a scientist, trained in St. Petersburg.\footnote{Loskutova and Fedotova “The Rise of Applied Entomology in the Russian Empire,” 152.} This classroom and laboratory training also prepared Porchinskii in his own mind to give ergonomic advice to peasants who no doubt spent significantly more time working outside than Porchinskii. In advising peasants to use his carefully described etymological net, Porchinskii effectively changed the conversation from one where he had little to offer peasants beyond what they were already doing, to one where he was the expert, with exacting and complex advice. Porchinskii made the simple complex, which reinforced his position as an expert with specialized training and also highlighted the difference between himself and peasant farmers.

Just as agronomists could try to increase their legitimacy and difference from peasant practices by making simple technologies seem complex, they could also co-opt peasant practices and claim them as their own to achieve similar results. In fact, by the time Porchinskii was writing, peasants were already devising more complicated methods to catch locusts. In numerous newspaper articles peasants were reportedly constructing their own plows and locust gathering
farm machinery to deal with the locusts. Especially in the South Russian steppe and Siberia peasants had invented simple lawnmower-like machines with nets attached to collect locusts. These locust catching machines were usually referred to as “hopper dozers” and worked either by scooping up locusts from the ground and dumping them into an attached bag or barrel, or by utilizing a sticky substance like tar that the locusts would be jump into only to become stuck. Hopper dozers were, however, not unique to the Russian locust experience as farmers in another settler colony plagued by locusts, the American West, also constructed similar machines.

Agronomists like Porchinskii described and advised peasants to use hopper dozers and other similar machines, however, they rarely recognized that peasants were often the ones who designed and constructed them. Porchinskii reported that peasants in Orenburg Oblast “used” these types of machines, but he did not describe who built and designed them. Instead, he remarked on how “in spite of [the machines’] simplicity uncomplicatedness” construction of these machines is beyond the power of every peasant household, and requires the help of the local administration. The fact that scientists often did not make a point of mentioning the folk roots of these machines stood in stark contrast to the discoveries and inventions of agronomists whose names and places of discoveries litter the pages of agronomic texts and newspapers. However, it was not only that agronomists failed to emphasize the original source of these inventions. Publishing these ideas gave them the mark of science as well. Once a diagram was drawn and printed in an agronomic pamphlet, whatever its original source, the technology could then be placed into the category of agricultural science since scientists rarely credited the

570 Turgaiskaia Stepnaia Gazeta (Orenburg) April, 24 1896
571 Porchinskii, O Kobylkakh, 44-48.
573 Porchinskii, O Kobylkakh, 49.
They were not only writing peasants out of history and ignoring them and their innovations, they were actively expropriating their ideas and calling them their own.

The appropriation of peasant methods did not mean that agronomists had no innovations or new suggestions for dealing with locusts. Most agronomists suggested plowing as a way to defend against locusts, and the majority of agronomic advice discussed proper plowing in depth, although it sometimes seemed little more effective than other means of locust control, probably due to the large areas of unplowed steppe. Nevertheless, recommending plowing was a significant innovation for two reasons. First, the steel plows that agronomists recommended were a technology that they could claim some type of authority over (as opposed to traditional wooden plows), since the plowing was to take place at specific depths and in a manner in keeping with exacting scientific advice. Secondly, plowing fit in neatly with agronomic assumptions about how the steppe should be utilized, because it reinforced the fact that farmers should work plowed and planted fields that stayed in the same location every year.

In spite of plowing’s significance for the above reasons, its effectiveness appeared to be at times marginal, and most believed that it should be used in conjunction with other control methods. Nevertheless, because plowing fit within agronomists’ other ideas about what the steppe needed it was a central part of their advice. Additionally, the way agronomists talked about plowing further reinforced their authority as experts. Almost any advice on locusts began with a discussion of how agricultural scientists had discovered there were several types of locusts.

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574 For a similar process with chicken farming in the US South where women pioneered market farming of birds on a small domestic scale, and was eventually copied and scaled up by agribusiness see, Lu Ann Jones, *Mama Learned Us to Work: Farm Women in the New South* (Chapel Hill: University of North Carolina Press, 2002).

575 О вред причинаемов насекимі із семейства саранчевых, под названием кобылка и способах истребления ея с кратким наведением пол’зованія насекомоубийвовиащої жидкост’ю под названием “Локустисид.” (Омск, Tipografiia Irtysh, 1914), 7-8.

and that locusts laid their eggs in the ground.\textsuperscript{577} However, it was not until relatively later that agronomists paid much attention to the idea that different species of locusts might require different approaches, instead their advice was almost always identical regardless of the species. This raises the question of why they always mentioned it, even in pamphlets specifically targeting peasants.

More significant was the observation that locusts laid their eggs in the ground. Agronomists often erroneously claimed that before they had made this discovery, peasants believed that locusts came falling out of the sky, and were a punishment from God.\textsuperscript{578} The fact that at least one peasant was credited with leading agronomists to an egg infestation on the steppe however, makes this claim suspect.\textsuperscript{579} Nevertheless, this framing had the effect of distancing peasant knowledge about locusts to the realm of ineffective and irrational superstition, and again contributed to the creation of difference between peasant and scientists’ knowledge. Furthermore, centering the discussion on egg laying made it possible to reiterate that plowing was based on the scientific discovery that locusts lay eggs in the ground. It allowed agronomists to finally bring something new to the discussion: plowing. Once on the subject of plows, agronomists were on their home turf and were therefore willing to give even more specific advice including specific plows, typically heavy steel plows, whose wider adoption many agronomists had encouraged separate from the locust problem.\textsuperscript{580} Buying a new plow also tied peasant farmers closer into the networks of market relations that were also part of the agenda of scientific farming. Therefore, while not necessarily a primary concern, it was a welcome side

\textsuperscript{577} N. L. Skalozubov, \textit{O Kobylke, Kakoi ona prinosit vred zemledelyu i kak boroi’sia s neyu} (Tomsk, Parovaya tipografia P. I. Makushina, 1905), 4-5.
\textsuperscript{578} A. Nikoleva, \textit{O Kobylke i bor’be s nei} (1903), 1.
\textsuperscript{579} \textit{Kustanaiskoe steponoi khoziastvo} (Qostanay), May 11, 1914.
benefit because throughout the entire empire, and especially on the Kazakh steppe, agronomists bemoaned the lack of advanced technology employed by peasants.  

Agronomists did not simply encourage peasants to plow, they had specific ideas of when and how, and also to what ends. Agronomists did not only want peasants to adopt more technical and science-based farming practices because it fit into their worldview (although importantly, it did). Many agronomists were concerned that land in the steppe was quickly filling up with new peasant settlers. They worried that settlers and Kazakhs were using too much land and farming it too extensively. Therefore, they hoped that more intensive agricultural practices that were also more capital and science intensive, would allow for greater productivity for the empire, and also for more dense settlement that would help relieve pressure on overcrowded provinces in European Russia.

In addition to addressing land pressure, agronomists also believed that a move toward more intensive farming would help with locust control. Some agronomists even claimed that good agricultural practices and locust control were in fact the same set of practices. One went so far as to say that, “Locusts are not found in gubernia which practice proper agriculture, where there is not idle or empty land,” and that proper plowing and compact planting were not only good at protecting crops from locusts they could also “facilitate the transition from backward and unsound methods, or to say it another way from extensive to intensive farming.”

Similarly agronomists in Akmola Oblast encouraged farmers to decrease and consolidate plowed areas,

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582 TsGARK f. 64 op. 1 d. 6175 ll. 64 Report by I.I. Kiborta to the Akmola Oblast Agricultural Congress, 1-3 February 1914.
583 O vred prichiniaemov nasekymi, 6-7.
and leave behind the practice of scattered fields spread over the steppe with large areas of unplowed steppe in between. The agronomists hoped this would allow for an easier defense of planted crops while the locusts ravaged the open steppe.\textsuperscript{584}

While nearly all steppe agronomists hoped to encourage more intensive agriculture, they were not monolithic, and often differed in their ideas about how to achieve these ends. Part of the way some agronomists proposed making peasant agriculture more productive and intensive beyond better machinery and intensive plowing was by planting more winter rye instead of spring wheat. This was because winter rye could be harvested earlier in the spring, which meant it was in less danger of being harmed by a summer drought or by locusts if it was harvested early enough. Winter rye also had the added benefit of fall plowing and planting, which agronomists believed was most effective at disrupting and killing locust larvae buried in the ground.\textsuperscript{585}

Therefore, many agronomists recommended fall plowing for winter wheat to a depth of 3.5-4 vershok (1 vershok equals 1 ¾ inches) and to fully turn the ground over to be sure and expose any locust eggs.\textsuperscript{586}

While winter wheat with fall plowing held great potential for locust control, it is also a less valuable crop than spring wheat. Most peasant settlers to the Kazakh steppe came from the provinces of South Russia, and tended to prefer to eat wheat bread and so they had sold rye on the market. Since the distance to markets was much greater on the Kazakh steppe, winter rye held little appeal as the cost of transport.\textsuperscript{587} Had agronomists been solely concerned with encouraging farmers to maximize quick profits and expand cash crop production they might have

\textsuperscript{584} TsGARK f. 64 op. 1 d. 6157 ll. 51 Zhurnal Obshago prisustviia Akmolinskago Oblastnogo Pravleniia po Krest’ianskim delam 8 August 1913.

\textsuperscript{585} I. A. Porchinskii \textit{O Kobytkakh}, 32-35.

\textsuperscript{586} TsGARK f. 64 op. 1 d. 6157 ll. 51 Zhurnal Obshago prisustviia Akmolinskago Oblastnogo Pravleniia po Krest’ianskim delam, 8 August 1913.

\textsuperscript{587} TsGARK f. 64 op. 1 d. 6157 ll. 20 Otchet o deiatel’nosti agronomicheskoi organizatsii v Akmolinskoj oblasti za 1913 god, 31 January 1914.
favored spring wheat over winter rye, which most peasant settlers already favored. However, many agronomists took the position of discouraging spring wheat at the expense of less profitable rye.

These agronomists wanted to encourage more winter rye production not only because of its locust control benefits, but also because they hoped that growing winter rye would free up space and time for peasants to produce more hay. Nearly all agronomists and officials frequently bemoaned the fact that large amounts of land on the open steppe discouraged the production of hay and fodder on the farm. Open land meant that peasants could simply rent out steppe pasture, and the availability of cheap land for rent nearby meant that there was little incentive to plant and tend pasture or cut hay. This was especially true because hay cutting often intersected with peak labor times for spring wheat. Some agronomists hoped that if peasants switched to winter wheat they would have more time in the spring and summer and to plant pasture and harvest hay. This hay could potentially be fed to improved livestock which could be kept either as dairy animals, or sold for a much higher price than either spring wheat or winter rye.588

In the pre-chemical spraying campaign era, agronomic advice was not strictly a question of effective versus ineffective science, nor was it a question of expanding market relations versus self-sufficiency. To understand how knowledge about locust control was created and deployed, it is also useful to think of early locust control as a kind of technopolitics which Edwards and Hecht describe as a “hybrid form of power [that] has cultural, institutional, and technological dimensions.”589 While most historians use technopolitical power to explain twentieth century phenomenon, as an analytical lens it is useful in helping to illustrate how steppe agronomists

588 TsGARK f. 64 op. 1 d. 6175 ll. 64 Report by I.I. Kiborta to the Akmola Oblast Agricultural Congress, 1-3 February 1914.
were not simply choosing what kind of advice to give based only on scientific research in a vacuum free of other influences. Additionally, the technostate was beginning to form (although still incomplete) already in the late imperial period on the steppe.

Furthermore, a technopolitical lens offers important insight even into understanding the period before the technostate was fully formed. If the questions of plowing and spring wheat were considered using only the lens of environment, technology, or the development of capitalism, the policies and conflicting advice of agronomists can appear to have little intellectual coherence. Similarly, one fruitful way some scholars have attempted to make sense of the bureaucracy’s role in settlement is by focusing on the question of professionalization, and the work of those like Willard Sunderland and Peter Holquist in this area is invaluable. However, locust control was about more than only the internal workings of the bureaucracy. The advice agronomists gave was not only made to combat the locust or because of bureaucratic culture, nor was it given simply to encourage peasants to cash in quickly on spring wheat, or conversely to engage in more intensive diversified animal husbandry. It was all of these impulses and forces working themselves out while attempting to administer and transform the steppe in a colonial context. To put it another way, agronomists on the steppe were creating knowledge that created and in turn was created by their power in their roles as both imperial officials and scientists, and neither identity was guaranteed to have the upper hand. Furthermore, the projects the agronomists were developing were not entirely of their own making. There is a certain instability in technopolitics because the project is neither fully political nor technological. Its creators include both scientists and administrators in addition to peasants and nomads, and as Timothy Mitchell argued, non-human actors like mosquitoes and disease, or in this case, non-human actors like mosquitoes and disease, or in this case, non-human actors like mosquitoes and disease, or in this case, non-human actors like mosquitoes and disease, or in this case, non-human actors like mosquitoes and disease, or in this case.

locusts.\textsuperscript{591} It is this interaction of human and non-human with culture, economics, and other forces that creates the instability and contradictions of technopolitics that technopolitical power is so effective at obscuring.

**Biological Control**

In spite of their best efforts, imperial agronomists and scientists recognized that mechanical or physical control of locusts was often ineffective, even when practiced scientifically and utilizing several methods such as plowing, compact planting, and hand picking. Therefore, many agricultural scientists sought other means of addressing the problem that potentially threatened the existence and legitimacy of the settler colonial technostate. Over the course of several years on the eve of the First World War, some agricultural scientists became convinced that parasitic bacteria offered the best hope at protecting crops and destroying the locust. Examining the story of this failed experiment reveals that rather than a peripheral backwater, the Kazakh steppe was an important part of a transnational network of innovative science and scientific debates. This contradictory status of the steppe as both peripheral and underdeveloped in the eyes of agronomists and officials and at the forefront of scientific knowledge creation and experimentation is an important aspect of the steppe’s role in the nascent settler colonial technostate and reflects a need for an examination of this tension found in many frontier technostates. This ambivalent status of the settler colony that understood the steppe as once a vacant underdeveloped region, and also the site of a utopian project uncovers a connection between the utopianism of both the settler colony project and of western science as an ideology.

Finding mechanical controls ineffective scientists around the globe at the beginning of the twentieth century began searching for alternatives. On the Kazakh steppe, two of these alternatives eventually found themselves as competing solutions to the locust problem. These two alternatives were biological controls that sought to use bacteria to control the locusts, and chemical controls that sprayed chemical pesticides. However, both approaches represent an important difference from mechanical control as they were an opportunity not just to mitigate the problem, but rather in many instances they sought outright extermination. While chemical controls eventually won out as the primary means of control in the debate on the Kazakh steppe, this outcome was not at all certain at the dawn of the twentieth century and reveal an important aspect of historical contingency in the steppe settlement story. Furthermore, examining the claims of biological control and its competition with chemical controls uncovers the story of the settler colonial technostate’s attempts at legitimacy and also the role of steppe science on both empire-wide and global scales.

Bacteriological control of locusts began in Central and South America with the work of Canadian-born Felix d’Herelle. D’Herelle who later became famous during the First World War as one of the discoverers of bacteriophage, work that he continued in Soviet Georgia with the famed microbiologist George Eliva. While the later connection to the Soviet Union is well known, d’Herelle had an earlier role in the development of science in the Russian empire. In 1910 he was working in Mexico on a project to turn sisal into alcohol when a locust invasion arrived in the Yucatan, curious, he collected dead locusts that he noticed, “sick locusts, easily picked out since their principal symptom was an abundant blackish diarrhea.”

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investigated the bacteria in the locusts stomach and isolated the “locust coccobacilli” which he later argued was his first observation of bacteriophage. Ultimately, he went on to test his locust killing bacteria in Argentina and Tunisia.\footnote{Eric C. Keen “Felix d’Herelle and Our Microbial Future” \textit{Future Microbiology} 7, 12 (December 2012): 1337.}

Word of d’Herelle’s experiments eventually reached Sergei Sergeivich Merezhkovskii, the head of the Agricultural Bacteriological Laboratory for the Ministry of Agriculture in St. Petersburg.\footnote{Rossiskii Gosudarstvennyi istoricheskii arkhiv [Russian State Historical Archive] hereafter referred to as RGIA.} The laboratory had been established in 1891 to conduct, “battle against agricultural pests” similar to d’Herelle’s own work several decades later.\footnote{RGIA f. 462, op. 1, d. 22, “Perepiska s yentomologicheskimi stantsiami, agronomami i dr. uchrezhdeniami i litsami o vysyke kul’tur batsili i ob organizatsii issledovani po izucheniyu bakteriologicheskih metodov dlia istreblenii saranchi” saranchi.”} By 1910, as head of the laboratory, Merezhkovskii had already conducted several successful experiments into utilizing a strain of salmonella bacteria that was harmless to humans in order to kill rodents. However, his main challenge was not isolating a bacteria that was effective and harmless to humans, but rather keeping that bacteria alive in the natural environment long enough for mice and groundhogs to eat it.\footnote{GNU Vserossiiskii nauchno-issledovatel’skii institute sel’skokhoziastvennoi mikrobiologii http://www.arriam.spb.ru/rus/history.html.} In spite of his own similar experience—or perhaps because of it—Merezhkovskii seemed at first to have been skeptical of d’Herelle’s claims. However, the appeal of a bacteria that was harmless to humans and that could defeat the locusts in the face of the powerlessness of the imperial agronomic bureaucracy was too great. By the spring of 1912, Merezhkovskii was in communication with Pierre Paul Emile Roux, the director of the Pasteur Institute in Paris in search of a sample of d’Herelle’s locust killing bacteria.\footnote{“S. S. Merezhkovskii” \textit{Bolshaya Medizinskaya Encyclopedia}. (Moscow: Sovietskaia Entsiklopediia, 1970).}

In the winter of 1913, Merezhkovskii, still unable to obtain a sample of d’Herelle’s bacteria cast a wider net in his search, and thereby connected the battle against locusts on the
Kazakh steppe to a global network of imperial scientists working on the same problem. During the spring, d’Herelle had also been busy, after Mexico, he had attached himself to the Pasteur Institute in Paris, and through this connection, although unpaid, parlayed this work into a locust control project using bacteriological control in Argentina. After Argentina, where he claimed success, but local authorities said his work was ineffective, he moved to French North Africa to combat locusts using the same methods he claimed success with in Argentina.599 Merezhkovskii, having apparently received no answer from his original request from Professor Roux at the Pasteur Institute, next tried directly contacting the Argentinian Ministry of Agriculture. The Argentinian’s appear to have been happy to oblige and supplied Merezhkovskii with some samples of the bacteria. However, perhaps sensing d’Herelle’s claims might have been overblown, he also requested the ministry send him copies of all the reports on the “question of the bacteriological destruction of the locust.”

In addition to contacting the Argentinian Ministry of Agriculture, Merezhkovskii also contacted the head of the Pasteur Institute’s office in Algeria, Musapha-Alger.601 It was perhaps through this connection that at some point in 1913 Merezhkovskii was able to travel to Algeria where he observed d’Herelle’s experiments first hand.602 However, he had not given up on the Paris office in his attempt to collect a sample. In an apparent attempt at using his personal networks in the Russian scientific community, he wrote to Ilya Mechnikov, the famed Russian zoologist who had left his laboratory in Odessa for Paris in 1888.603 In this communication,

599 Eric C. Keen “Felix d’Herelle and Our Microbial Future”, 1337.
602 RGIA f. 462, op. 1, d. 25, ll. 32 Otchet Laboratorii ob izrashkodovanii sredstve, assignovannykh dlia bor’by s gryznami, dlia issledovaniia plodovykh I yagodnykh napitkov I metodov bor’by s gryznami, Undated.
Merezhkovskii also asked Mechnikov to confirm a rumor that the Pasteur Institute was sending the bacteria even to private individuals, something that he believed was a bad idea.604

Whether it was through his personal appeal, or his trip to the Algerian laboratory, eventually in the spring or early summer of 1913, Merezhkovskii received samples of d’Herelle’s bacteria from the Pasteur Institute.605 The breadth of scientists that Merezhkovskii was in contact with to obtain the bacteria is indicative of the broad network of expertise closely tied to colonial apparatuses like the Pasteur Institute.606 This global network of colonial science and scientists did not always have a strict allegiance only to their own nation, and the involvement of Russian imperial agronomy with the French underlines the transnational nature of the colonial sciences with power centered in the global north. Russian imperial science and the global network of locust control scientists in the early twentieth century shares another connection through Merezhkovskii’s work. The father of modern locust control, Boris Uvarov, who Merezhkovskii communicated with as part of his work on locusts in the North Caucuses later left Russia and moved to Great Britain where he founded the Anti-Locust Research Centre in London. This center was the central research institution for locust control projects in the British Empire in the post-World War Two period. In addition to his locust experience on the North Caucasus steppe, Uvarov also grew up in Uralsk on the Kazakh steppe and was certainly already familiar with locusts from childhood.607

604 RGIA F. 462, op.1, d. 22, ll. 4. Merezhkovskii communication with Ilya Mechnikov. March 1, 1913.
605 RGIA f. 462, op.1, d. 22, ll. 8. Merezhkovskii communication with the Pasteur Institute. August 7, 1913.
607 RGIA f. 462, op. 1, d. 22, ll. 9. Merezhkovskii communication with Boris Uvarov. August 8, 1913. On Uvarov’s early life see and work in Russia and Central Asia see: A. A. Fedotova et. al, “Archival Research Reveals the True
In addition to illustrating the ease with which colonial scientists crossed imperial boundaries and created knowledge in the aid of colonialism, Merezhkovskii’s work also shows how, in Veracini’s words, “Settler colonialism as a mode of domination things geopolitically.”\textsuperscript{608} The regions that were most interested in d’Herelle’s bacteria like North Africa, Argentina, or the steppe, were typically settler colonial projects. The parallels between Argentina and the steppe are particularly interesting because both the Argentinian pampas and the steppe were regions that were being settled by non-indigenous settlers during roughly the same time period, and with roughly the same goals of securing a peripheral region and expanding wheat production.\textsuperscript{609} In fact, it was this increase and desire of authorities in Russia and Argentina to extend sedentary agriculture and settlement that caused the locusts threat. The communication between Merezhkovskii and the Argentinians make clear this connection is more than only a question of environment but also one that was linked to policy choice and ideology.\textsuperscript{610}

Simultaneous to his attempts to secure the sample bacteria across the globe, Merezhkovskii was busy working with the imperial Russian agronomic bureaucracy on its own experiments. During the spring and summer of 1913, he was in contact with numerous officials


\textsuperscript{610}A further connection to the Russian Empire was the project of Jewish agricultural settlement in Argentina in the late 19th century. Ironically, at the same time some in the Russian Empire were attempting to encourage settlement in Central Asia, large numbers of its subjects were leaving the Empire and not only for cities in North America, but also for projects like Maurice de Hirsch’s Jewish Colonization Association that purchased 1.5 million acres of land in Argentina to create agricultural settlements for Russian Jews. See: Morton D. Winsberg, “Jewish Agricultural Settlement in Argentina” Geographical Review 54 no. 4 (Oct. 1964): 487-501, Victor A. Mirelman, “A Note on Jewish Settlement in Argentina” Jewish Social Studies 33 no. 1 (Jan. 1971): 3-12.
on the Kazakh steppe as well as other regions, seeking test sites. In his communications with potential test sites, Merezhkovskii requested that the agronomists identify one or more fifty square kilometer test sites that were not more than one to two hours ride from a site that had seen a locust outbreak. While Merezhkovskii did not limit his search to the Kazakh steppe, he did specifically seek out agronomists in Turgai, Akmola, and Semipalatinsk oblasts to test d’Herelle’s bacteria.611

All of the steppe scientists contacted by Merezhkovskii responded enthusiastically to his questions about testing the bacteria in their region.612 The Turgai oblast agronomist, suggested a site near Zatobolsk whose land was “infested over a large area with locust eggs.” He went on to recommend the site as it was close to the town of Kostanay, where Merezhkovskii could stay. He also noted that while the local agronomic organization had planned on conducting an anti-locust pesticide spraying campaign, they had no plans for this site and his help would be most welcome.613 This willingness on the part of the local agronomist to use any and all means at his disposal to combat the locust indicates that his main concern was not necessarily discerning the superiority of the chemical or the biological control method, he simply hoped for something that would work.

While the outbreak of war in 1914 meant that the records of Merezhkovskii’s experiments in the steppe are incomplete, it is clear that at least one test site did receive samples of d’Herelle’s bacteria. The head of the Omsk Veterinary Laboratory, a man named Kuleshov, already had a working relationship with Merezhkovskii before word of d’Herelle’s experiments

611 RGIA f. 462, op. 1, d. 22, ll. 31-32, 69-70, 83, 85-86.
612 Merezhkovskii was less enthusiastic about the effectiveness of the bacteria. In part because he believed that there was no one single strain of d’Herelle bacteria, instead he believed his research showed that the Algerian, Parisian, and Argentinian bacteria were three different unrelated types. RGIA f. 462 op. 1 d. 25 ll. 26 Report from the Bacteriological Laboratory to the Ministry of Agriculture 1st Department 17 May 1913.
613 RGIA f. 462, op. 1, d. 22, ll. 83. Merezhkovskii communication with the Turgai Oblast Agronomist September 23, 1913.
arrived in Russia. Merezhkovskii’s own work, and indeed the primary work of the St. Petersburg laboratory had focused on using bacteria to infect rodents. Most of the attention was focused on mice and rats as grain thieves and carriers of disease. However, on the steppe, another rodent, the groundhog, was a serious pest as well. Groundhogs were a problem because they destroyed crops, but also because they were carriers of plague and other diseases, therefore, much of the steppe veterinary bureaucracy was concerned with controlling them, and the scientists at the laboratory in Omsk were among them. They had been conducting experiments on mice on Merezhkovskii’s behalf that they were quite hopeful about. Kuleshov wanted Merezhkovskii’s permission and advice on how to utilize the same bacteria on groundhogs.\textsuperscript{614} However, Merezhkovskii “could not yet recommend” this use of the bacteria. Nevertheless, he hoped they would carefully utilize the seven vials of d’Herelle’s bacteria he had sent them to test on locusts, and asked them to recommend additional sites where the bacteria could be tested.\textsuperscript{615}

While Merezhkovskii was interested in additional sites near Omsk, this was not because he had a lack of willing volunteers. In fact, the Semipalatinsk agronomic bureaucracy was desperate for help in combatting the locust. However, this was not because they had been inactively waiting for help from St. Petersburg, rather they had themselves been busy experimenting on and battling with locusts. According to the Semipalatinsk oblast head agronomist, the region had “long suffered from locusts, and therefore such measures [as bacteriological control] would be warmly welcomed by both the local administration and the local agronomic organization.” He went on to offer Merezhkovskii the use of the agricultural and milk testing laboratories as well as the former school for lodging.\textsuperscript{616}

\textsuperscript{614} RGIA f. 462, op. 1, d. 22, ll. 32. Merezhkovskii communication with Kuleshov, June 1, 1913.
\textsuperscript{615} Ibid., 31.
\textsuperscript{616} RGIA f. 462 op. 1, d. 22, ll. 85 Merezhkovskii communication with the Semipalatinsk Agronomist September 9, 1913.
In spite of the oblast agronomist’s enthusiasm for Merezhkovskii’s help, he did raise questions about the effectiveness of the bacteria. He reported to Merezhkovskii that he had already seen the bacteria at work at the laboratory in Omsk when he had visited Kuleshov. The laboratory had a locust under glass that had been infected with the bacteria and was still alive and eating grass after 10 days. He also indicated that he had himself written to scientists in Paris (presumably at the Pasteur Institute) to inquire about the most up to date scientific literature on the topic. Finally, he noted that he and his associates were already beginning experiments with the bacteria. While he did not indicate the source of the bacteria, it appears it may have been from his trip to Omsk.  

This correspondence does not indicate a relationship in which all information and direction flowed from the central laboratory in the capital. Rather, it shows that agricultural scientists working in a peripheral region were—both through St. Petersburg and on their own—in close communication with a global network of scientists, while simultaneously creating their own localized networks of knowledge and connection on the steppe. In fact, if there was a client in this relationship, it was Merezhkovskii who had come rather late to the study of locusts. For example, the scientists in Semipalatinsk indicated they had been undertaking serious study of the locust problem and attempting to combat it first starting in 1908, and they gave Merezhkovskii specific information about the species of locusts to be found in the region, indicating that most of the locusts were Italian locusts.

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617 Ibid., 86.
618 RGIA f. 462 op. 1, d. 22, ll. 69 Merezhkovskii communication with the Semipalatinsk Oblast Agronomist September 16, 1913.
In early November 1913, the Military Economic Board of the Siberian Cossack Host met in Omsk to discuss the failures of the previous two years of campaigns against the locust.619 During the meeting, the members commented that attempts to control locusts through spraying the insecticide “Paris Green” could only “protect crops against locusts, and the complete destruction of the locusts with this method is not possible.”620 Bemoaning the “enormous harm to crops” caused by the locusts, the board was interested in new ways of combatting locusts, especially if they allowed these military minds the opportunity to destroy rather than simply control their enemy. In search of new methods, they had summoned the head of the agronomic department who reported he had read about experiments carried out near Baku under the command of the Viceroy of the Caucuses, Illarion Vorontsov-Dashkov. These experiments involved using samples of d’Herelle’s bacteria. The article itself had been shared with the Cossack head agronomist by the Governor General of Semipalatinsk Oblast, who had been informed of the experiments in Baku by his chief agronomist at a meeting in Zaisan. Armed with this knowledge the agronomists of Semipalatinsk oblast and his Cossack counterpart petitioned the head of the Russian Society of Acclimatization, N.I Babushkin, who had conducted the experiments in Baku, to travel to Omsk and report on the possibility of conducting similar bacteriological control experiments.621 Babushkin arrived in Omsk on August 7, and that day spoke to a meeting organized by the Cossack administration, at their headquarters. Also invited to the meeting were representatives of the Akmola and Semipalatinsk agronomic organizations, Kuleshov, the head

619 The Siberian Cossack Host had two executive bodies. Military affairs were under the command of the general headquarters of the Omsk Military District, and administrative and economic affairs were directed by the Military Economic Board which was also staffed by Cossack officers appointed by the Ataman of the Cossack Army.  
620 RGIA f. 462 op. 1, d. 22, ll. 99 Zhurnal Prisustviia Voiskovogo Khoziastvennago Pravleniia Sibirskago kazach’ago voiska, November 2, 1913.  
621 Ibid., 100-101.
of the Omsk Veterinary Laboratory, and officials in the Cossack administration along with members of the local agronomic organizations. 622 This wide array of representatives was in part a recognition of the problem of locusts not adhering to administrative boundaries. 623 Officials often reported that effective locust control would be impossible without input and activity from across administrative borders. 624 The experiments were to be conducted under the direction of Babushkin and Kuleshov, but with the involvement of the agronomic staff of Akmola and Semipalatinsk oblasts in addition to the Siberian Cossack agronomic staff. 625

The planned experiments for the spring of 1914 consisted of creating a “broth” in which scientists could grow larger numbers of bacteria. An area of 1,000 desyatins of military land in Pavlodar uezd where there was a major locust infestation was to be fenced off for the experiment. Meanwhile, Kuleshov set to work brewing 3,000 litres of broth filled with d’Herelle’s bacteria. Babushkin, and four university students from Moscow were to conduct the experiments. By the fall of 1913, Kuleshov was already brewing broth and beginning to test it on locusts, both by infecting individuals, and by spreading the broth on the steppe, and he seemed happy with the results, however the outbreak of war meant the experiments were limited. 626

Bacterial control, while promising, was limited in its success. Some sceptics like Merezhkovskii believed this was because the bacteria mutated over time and became less effective at killing locusts. 627 Nevertheless, these failed experiments offer useful insight into the

622 Ibid., 101-102.
623 On the problem of locusts crossing and defying borders see Samuel Dolbee, “The Locust and the Starling: People, Insects, and Disease in the Late Ottoman Jazira and After, 1860-1940” (PhD diss., New York University, 2017).
624 TsGARK f. 64 op. 1 d. 6157 ll. 47 Zhurnal Obshago prisustviia Akmolinskago Oblastnogo Pravleniia po Krest’ianskim delam, TsGARK f. 64 op. 1 d. 6157 ll. 38 Report of the Chair of the War Economic Board of Siberian Cossack Host, 20 July 1913.
625 RGIA f. 462 op. 1, d. 22, ll. 99-103 Zhurnal Prisustviia Voiskovogo Khoziaistvennago Pravlenia Sibirskago kazach ’iago voiska, November 4, 1913.
626 Ibid., ll. 100.
627 Ibid., ll. 33.
work, outlook and effects of steppe agronomy as a technopolitical and settler colonial project.

Additionally, because d’Herelle’s bacteria lends itself to the sharing of information and materials, it shows how even scientific collaboration between scientists, and a levelling of the hierarchy between center and periphery could further the colonial project. Finally, the levels of deep and applied local knowledge being created not in the center but in peripheral regions supports Marina Loskutova and Anasatsia Fedotova’s work on the role of scientists working in South Russia grain growing regions. Their work “[examines] the role of networks that connected naturalists and agriculturalists, academic scholars, state officials, and local public activists in the nineteenth-century Russian empire. These networks enabled the circulation of specimens, observations, research guidelines, and farming recommendations, thus ultimately leading to the advancement of knowledge about insect.”628 While the story of biological control in a later period shows a similar mix of actors and points away from a top down center-periphery relationship, it also adds a global dimension. Addressing the problem of locusts in the steppe was not only a case of local networks, but of localized knowledge networks connected to a global conversation that was deeply imbedded in colonial power and ideologies. However, with the coming of chemical control, these networks would not survive in their dispersed form. Instead, locust control, like water, plant and animal breeding shifted towards a more centralized agronomic and technopolitical power on the Kazakh steppe.

In spite of the potential of bacteriological control, spraying pesticides was the only effective method of killing large numbers of locusts before 1917. Nevertheless, there were still some voices within the agronomic and administrative bureaucracy of the Siberian Cossack host

and the Akmola administration who believed bacteriological control was the best path forward. While they were given some support for smaller experimental projects like the one led by Babushkin described above, these projects were much smaller than the large chemical spraying campaigns that emerged as the preferred method of locust control by 1914.

**Chemical Control**

By 1905, pesticide spraying to protect crops against locusts was relatively widespread agronomic advice. Several pamphlets had been produced to advise peasant settlers on how to defend against locusts, and spraying was usually part of the advice. However, it was only suggested in conjunction with other practices, and usually only as a last resort. While these pamphlets often included information on horse drawn sprayers, most of the attention was focused on smaller backpack sprayers, indicating that the advice was mostly for peasants who would only spray a few acres. Therefore, it was not the practice of chemical spraying that separates the 1913 and 1914 anti-locust campaigns in Turgai and Akmola oblasts and the Siberian Cossack lands from earlier locust control attempts. The technologies were in fact largely the same. However, they were fundamentally different in their scale, scope, and vision, and in the resources and plans required to carry them out.

While officials and farmers had been battling locusts in Turgai for years, 1913 marked a significant change, especially in the administrative response. The Turgai-Uralsk Resettlement district carried out the largest, and best documented campaign, but similar campaigns took place

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629 TsGARK f. 64 op. 1 d. 6157 ll. 46 Correspondence of the Head Agronomist of the Siberian Cossack Host 7 August 1913.
631 The journal of the Moscow Society of Agriculture published a story encouraging the use of spraying as a means of locust control in June 1901. This article included advice on using sprayers made in the United States that had been imported to Russia because there were still too few effective sprayers being built within the empire. However, the wider spread of chemical sprays using imported machinery was already underway in grain producing regions like Ukraine when the Moscow Society recommended their use. *Vestnik Sel’skogo Khoziastvo* June 21, 1901.
in both Akmola and in the lands of the Siberian Cossack Host during the same period. During the spring of 1913, in response to ever increasing crop loses to the locust, the Governor General of Turgai Oblast ordered a survey of the extent of locust infestation. The results alarmed officials because the number and extent of the eggs found indicated that 1914 would be worse than the already difficult 1913.

In response to the coming calamity, the administration called in an expert from the Ministry of Agriculture in St. Petersburg, S. A. Zhurin. His plan for addressing the locust threat consisted of two parts to be conducted simultaneously. The first part of the plan was to study and record the spread and infestation of the locusts, the second part was a massive “continuous” insecticide spraying program. Zhurin focused his efforts on the northern 2/3 of Qostanay uezd, although there was a relatively large mapping project in Aktobe uezd as well. The plan centered on protecting the 138,590 desyatins of cultivated wheat and rye in Qostanay uezd, the vast majority of which was cultivated by peasant settlers. Zhurin and others felt that the greatest threat to these cultivated lands were the large areas of uncultivated steppe. Therefore, they focused most of their attention on the areas nearest peasant settlement districts, and largely ignored cultivated Kazakh areas, saying that these areas were too far from railway lines, and too widely dispersed to be worthwhile. In other regions, similar studies of the extent of locust egg

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632 TsGARK, f. 64 op. 1, d. 6175, “Otchet o deiatel’nosti agronomicheskoi organizatsii v Akmolinskoi oblasti za 1913 god” 31 January 1914.
633 S. A. Zhurin, Otchet zavedvyayuschago rabotami protivosaranchevoi ekspeditsii, 1914, 2
634 RGIA f. 391 op. 5 d. 1028, ll. 2, “O bor’be s kobylkoyu i drugimi vrediteliami v sel’skom khoziaistve Turgaisk-Ural’skogo raion,” 31 January 1914.
635 Zhurin, Otchet, 24-29.
636 1 desiatin equals 1.1 hectares.
637 TsGARK f. 25, op. 1, d. 311, ll. 6, Zhurnal soedinennogo zasedaniia obshego prisustviia Turgaiskogo oblastnogo pravleniiia i oblastnogo agronomicheskogo soveshchaniia za ianvaria, January 1915.
638 Zhurin, Otchet, 12.
infestation were also carried out, typically before spraying campaigns started in the late spring and early summer.\textsuperscript{639}

Zhurin proposed to concentrate his efforts on 30,000 desiatins of land that would buffer more densely cultivated areas from the open steppe. This area was then divided up into 36 districts. Each district was overseen by a district head, nearly all of whom were students, mostly in the natural sciences, at universities in Moscow or St. Petersburg who were brought to the region to oversee the work. While at first the creation of ordered districts might seem an innovation, even pre-conquest locust control had divided lands to be protected into plots to gather, trample, or burn locusts.\textsuperscript{640} The district heads were responsible for visiting sites of locust infestation, and determining the amount of labor needed to deal with the problem. They were in turn overseen by seven instructors, all of whom were also students (though presumably more senior). Zhurin was at the head of the entire operation, which he guided with the help of three assistants who were also students. Spread out over dozens of miles, these workers main job was to locate and record locust infestations, attempt to identify the species of locust, and to record what damage they had done and what plants the insects ate first.\textsuperscript{641}

However, since the students were not locals, they needed local assistance. This help was supplied by the peasant headmen (\textit{nachalniki}). They served as intermediaries who told the students where the locusts usually were, and they also reported and relayed new locust sightings.\textsuperscript{642} The headmen were also often the ones responsible for gathering up the work teams

\textsuperscript{639} TsGARK f. 64 op. 1 d. 6157 ll. 8, Correspondence between the Governor General of Semipalatinsk and the Chancellery of the Governor General of the Steppe, 8 October 1910. Also ll. 47 \textit{Zhurnal Obshago prisustviia Akmolinskogo Oblastnogo Pravleniia po Krest'ianskim delam}, 8 August 1913.

\textsuperscript{640} TsGARK f. 64, op. 1, d. 6157 ll. 14 Communication between the Semirechie Military Governor and the Steppe General Governor 23 November 1910.


\textsuperscript{642} TsGARK f. 64 op. 1 d. 6157 ll. 3, Correspondence between the Chief Agronomist of the Governor Generalship and the Semipalatinsk Oblast Agronomist, dated 20 April 1910.
to do the work of spraying, using hopper dozers, and marking off lands, although, the actual hiring of laborers was the responsibility of the instructors. Finally, they were also given responsibility for doing bookkeeping, and the plans for the 1915 campaign included extra money to pay and train peasant nachalniks.

The anti-locust campaigns illustrate an ambiguous relationship between the center and periphery. While local knowledge of infestations and local labor was essential to the success of the campaigns, there was little local power, and in fact little education. Earlier efforts had focused on pamphlets to educate peasants about how to control locusts on their own land, the chemical spraying campaigns instead treated the campaigns themselves as the education. Several agronomists commented on how it was best to keep peasants out of the work except as hired laborers, and let the power of poison speak for itself. In Semipalatinsk, one agronomist remarked that it was, “best to let the peasants be spectators, since the act of spraying will be the best means of dispersing any prejudices.”

The districts were not set up only to observe the locusts. Based on the incoming data, as well as the data from 1913, Zhurin had ordered 60 horse drawn, and 300 hand sprayers to attack infestations and protect crops. The spraying eventually covered 19,885 desiatins (over half the area under Zhurin’s project in Qostanay) and sprayed 722 poods of Swiss green and 906 poods of sodium arsenate. These numbers totaled to nearly 32 tons of insecticide over an area of 54,270 acres. The environmental impact of such intense spraying can only be guessed at,

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643 Zhurnal Soedinennago Zasedaniia, 3.
644 TsGARK f. 25, op. 1, d. 311, ll. 1, Zhurnal soedinennogo zasedaniia obshego prisustviia Turgaiskogo oblastnogo pravlenia i oblastnogo agronomicheskogo soveshania za ianvarya January 1915.
645 Skalozubov, O Kobylke.
646 TsGARK, f. 64, op. 1, d. 6157, ll. 24, Correspondence between Semipalatinsk Agronomist and the Ministry of Agriculture, dated 19 December 1910.
647 Zhurin, Otchet, 2.
648 1 pood equals 36.11 pounds.
649 Ibid., 14.
however, given that the pesticides being used were general pesticides, these campaigns were killing more than only locusts.

The machinery and chemicals, like the student administrators had to be brought to the steppe, which was no small task. The insecticide came from factories in another imperial periphery, the Baltics, and the 32 tons brought to the steppe were made possible because of the newly created railways that penetrated the region. However, when war broke out, this connection to the Baltics via an overused railway line led to difficulties in transporting the pesticides from Riga.\(^{650}\) Additionally, the price of chemicals increased from three to four times after the outbreak of war, and many chemicals were simply unavailable.\(^{651}\) The increased demand for these locust poisons is a chilling reminder of their toxicity to humans, and an eerie parallel between the militaristic campaigns against the locust and the use of poison gas during the Great War.\(^{652}\)

In addition to the parallel with the modern technopolitical approach to warfare, Zhurin’s plans in Qostanay uezd also illustrate how the anti-locust campaign was not meant to help all steppe residents to the same extent. While technopolitics helps explain some of the decisions of administrators and agronomists, on its own it can miss the fundamental underlying reality of the Kazakh steppe as a settler colonial region. This meant it protected the interests of the settler colonial project with its close ties to settled agriculture at the expense or neglect of indigenous Kazakhs. However, it should be noted that it is an overly simplistic categorization to associate Kazakhs with nomadism and peasants with sedentary grain growing. In fact large numbers of

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\(^{650}\) TsGARK f.64, op. 1, d. 6157, ll. 118-121, Correspondence between the Steppe General Governorship Agronomy Section and Ministries of War and Railways, January 1915.

\(^{651}\) TsGARK f. 64 op. 1 d. 6157 ll. 118 Correspondence between Semipalatinsk Governor and the Governor General of the Steppe 21 January 1915.

\(^{652}\) Although less well-known and less prevalent, the Eastern Front also saw the deployment of chemical weapons by both the Russian Empire and the Central Powers, see: Steven J. Main “Gas on the Eastern Front During the First World War (1915-1917)” *Journal of Slavic Military Studies* no 28 (2015): 99-132.
Kazakhs were engaged in sedentary agriculture, and even planted grain. Conversely, many peasants practiced extensive animal husbandry on rented land.\(^{653}\) Therefore, locust control that protected grain producing regions is more complicated than a simple Kazakh versus peasant binary. Nevertheless, the types of grain growing, and the regions that were protected were overwhelmingly made up of peasant settler regions, not Kazakh auls. Of the 58 peasant villages and 44 Kazakh auls where the work was supposed to be carried out, it was fulfilled on all peasant lands, and only fulfilled in the areas around 25 of the Kazakh auls.\(^{654}\) The tendency for anti-locust campaigns to overwhelming help white settlers, and ignore indigenous communities is not unique to the Russian Empire on the steppe and has been described elsewhere.\(^{655}\)

Zhurin explained this discrepancy and preference for protecting peasant over Kazakh crops by arguing that to be effective, the sprayers had to stay in one place and spray an area several times because the locusts did not hatch all at once. This, “riveted the detachment in one place, so as not to leave the work half-finished and ruin the work already completed.” He also blamed the dispersed nature of Kazakh settlements and cultivated lands, saying it made it harder to reach these areas and also that it made it less efficient to spray them.\(^{656}\) Therefore, one of the possible Kazakh adaptations to the locust (smaller dispersed plots of cultivated land) was being used against them, signifying that there would now be one way of farming that would be protected, and those practicing dispersed farming would be left to face the locusts alone.\(^{657}\)

\(^{653}\) TsGARK f. 64 op. 1 d. 6175 ll. 64 Zhurnal Obshago prisustviia Akmolinskago Oblastnogo Pravleniia po Krest ianskim delam, 8 August 1913.

\(^{654}\) Zhurin, Otchet, 12.


\(^{656}\) Zhurin, Otchet, 12.

\(^{657}\) By this period in the regions where the spraying campaigns took place, the vast majority of Kazakhs were semi-nomadic and raised crops alongside practicing curtailed animal husbandry, although animal husbandry was the main livelihood for most. On changes to Kazakh agriculture and economy see, Aldashve and Guirkinger. "Colonization and Changing Social Structure: Kazakhstan 1896-1910."
Zhurin also did not think that the Kazakh recognized the locust for the threat they were. He said that they usually failed to observe or report the locust until they were actually eating their crops, and complained that they did not see locusts in the steppe beside planted fields as a problem. Zhurin was not alone in making this complaint as other agronomists also had the same observation, however, they were usually complaining about Russian peasant settlers, not Kazakhs. Additionally, Zhurin was less enthusiastic about protecting Kazakh lands because he believed they were lazy. In his report Zhurin said, “The Kazakhs are bad workers, they come to work at nine or ten o’clock, which they consider to be very early, and at three of four o’clock they ask to go home.” In other regions like Akmola, it was not the Kazakhs who were considered lazy, but rather peasant settlers, and agronomists frequently highlighted the need for paid labor to conduct the work of the campaigns properly.

The fact that Zhurin acknowledged anti-locust work required large amounts of local labor was evident in his remarks about the Kazakhs unwillingness to do it. However, Zhurin assumed this was because of a defect in Kazakh character. In doing so, Zhurin overlooked another reasonable, and more likely explanation. Kazakhs could see that the whole undertaking was of more benefit, and constructed to help peasant settlers and not themselves. While some Kazakhs did request aid in dealing with the locusts, they were often ignored or dismissed. In fact, imperial officials themselves never hid the fact that the locust campaigns were carried out “to protect the crops of settlers especially.”

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658 TsGARK f. 64, op. 1, d. 6157, ll. 25. Correspondence between the Semipalatinsk Oblast Agronomist and the Ministry of Agriculture, dated 19 December 1911.
659 Zhurin, Otchet, 13.
660 TsGARK f. 64, op. 1, d. 6175, ll. 58, Otchet o deiatel’nosti agronomicheskoi organizatsii v Akmolinskoj oblasti za 1913 god 31 January 1914.
661 Zhurin, Otchet, 13.
662 TsGARK f. 25, op. 1, d. 311 ll. 6, Zhurnal soedinennogo zasedaniia obshego prisustviia Turgaiskogo oblastnogo pravlenii I oblastnogo agronomicheskogo soveshchaniia za ianvaria January 1915.
In large part because of Kazakh unwillingness to engage with the spraying campaign, in 1914 in Akmola Oblast, the government instituted a new law. They criminalized interference in the spraying campaigns, and made it a punishable offense to fail to report a locust infestation.\(^6\)\(^6\)\(^3\) This change likely indicates that some Kazakhs and peasant settlers were interfering with the spraying. The interference probably occurred because after spraying, livestock had to be kept out of the sprayed areas for several days. During times of locust swarms, this could be significant as pasture was harder to find, and it is reasonable that this would breed resentment among Kazakhs especially who got little out of the campaigns, possibly leading them to sabotage the work. While the 1916 revolt had many causes, projects like anti-locust spraying campaigns, which alienated Kazakhs and privileged peasant settlers certainly contributed to the feeling of alienation and unfair treatment among Kazakhs.\(^6\)\(^4\)

Just as significant as criminalizing interference in the spraying campaigns was the fact that the decree also forced all residents to report locusts and dictated when they could cut hay. This action brought the potential for legal punishment against those who did not adhere to the new scientific and expert driven form of agriculture on the steppe. Before it was possible to ignore what agronomists were doing, and for the most part many Kazakhs and peasant settlers did just that. However, the decree signaled that it was no longer possible to ignore the agronomic bureaucracy, instead all residents were now legally compelled to take an active part in support of the technopolitical project as well as colonial administrative power.\(^6\)\(^5\)

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\(^6\)\(^3\) TsGARK f. 64, op. 1, d. 6157 ll. 85, *Ob’iavlenie Akmolinskogo Gubernatora*, 12 May 1914.

\(^6\)\(^4\) The revolt was sparked by a decree that Kazakhs (and all Muslim subjects in Central Asia) would no longer be exempted from the military service, however, this was only the “spark” that set off long simmering ethnic and religious tensions in Central Asia. The revolt was widespread but was particularly violent towards ethnic Slavs in Turgai and in the oasis regions in modern day Uzbekistan. It was violently suppressed by imperial forces and led to hundreds of thousands of deaths and refugees. On the revolt see, Edward Dennis Sokol, *The Revolt of 1916 in Russian Central Asia* (Baltimore: Johns Hopkins University Press, 2016).

\(^6\)\(^5\) Imperial administration and law had already long impacted indigenous animal husbandry on the steppe see, Virginia Martin “Barimta: Nomadic Custom, Imperial Crime.”
Wheat growing not only had the immense and invasive locust spraying campaign supporting it, it also was now being defended by the state criminalizing those who refused to help combat one of its greatest threats: the locust. It would be too great of a leap to say that there was a direct connection between criminalizing the refusal of some to be a part of the new agricultural system on the steppe, and the heavy-handed state power that came with Stalinist Collectivization. However, it is not too much to say that soviet developments should be seen less as a total break with the past than we might first assume. More importantly, the fact that the type of farming being supported on the steppe with the rule of law was sedentary wheat growing, and not animal husbandry or nomadism, illustrates a significant continuity in the use of state power on the steppe to bolster and support a particular type of agriculture that was neither indigenous nor particularly well suited to the ecology of the region.

**Conclusion**

In spite of the setbacks of weather, unenergetic laborers, and the poor quality and late delivery of spraying machinery, when the regional agricultural council met in 1915 to discuss the previous year and make plans for the 1915 campaign, most viewed it as overall a success. They even went so far as to commend Zhurin personally for overseeing the 1914 campaign and asked him to lead the 1915 campaign as well. It does not appear that the 1915 campaign was fully carried out, but the scope of work is impressive, especially when compared with the struggles and plans of imperial agronomy in the steppe in the 1880s. After commending Zhurin, the oblast agronomic council then stated that chemical spraying was the only effective means of locust control, thereby settling the long running debate with bacteriological control firmly in favor of insecticide. Otherwise, the 1915 plan made few changes to 1914, it consisted of the same system of districts and of focusing on protecting more densely planted areas, usually at the expense of
Kazakh lands. However, the increase in scope was impressive. During the previous year’s campaign, agronomists had identified 97,424 desiatins of land in the oblast as infected with locust eggs. Of this area, 72,629 desiatins, or over 300 square miles of the oblast was to be continuously sprayed with 5,628 poods (over 100 tons) of sodium arsenate. In order to oversee this expanded spraying program, the number of districts was expanded to 89 and the number of horse drawn sprayers to 172. According to the council, this plan represented a “permanent anti-locust organization” in the oblast.

With a permanent organization in place, agronomists and officials believed they had finally solved the problem of the locust. However, solving the problem in this way required sacrifices. Local agronomists gave up much of their autonomy and were now dependent on sprayers built in Ukraine and pesticides manufactured in the Baltic provinces. However, there were other sacrifices as well. Those who did not adhere to the assumptions of what made proper agriculture (usually Kazakhs), and those whose lands were too dispersed or distant from railway connections, would have to face the locust on their own. In short, they would be sacrificed because in the eyes of agricultural scientists, protecting them was inefficient. These sacrifices reveal the truth about technopolitics and settler colonialism.

Technopolitics promises stability based on a set of technologies that claim to be, but are in fact not, entirely new. What is more striking is rather than bringing stability for all, they often bring disruption for those who do not fit within official visions, and the new system is often quite vulnerable because of its complexity. However, technopolitics is not only about technology, it is also about how human factors like the imbalanced power relations between government officials,

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666 TsGARK f. 25, op. 1, d. 311 ll. 1, Zhurnal soedinennogo zasedaniia obshego prisustviia Turgaiskogo oblastnogo pravleniia i oblastnogo agronomicheskogo soveshancha za janvaria, January 1915.
667 Ibid, pg. 3.
668 Ibid., pg. 6.
peasant settlers, and Kazakh nomads became embedded in the technopolitical system and appear natural. The decision to leave some lands outside of the realm of protection was passed off as a rational and reasonable decision, because the Kazakhs were believed to be backward and not as deserving of defending. However, another reasonable and rational observer could look at the entire situation and question why the peasants and their wheat deserved the huge amounts of labor, money, frustration, and time that the empire went through in order to protect them. The same observer could see the pre-settlement era nomads as being much better adapted to the steppe environment, but the processes of technopolitics and settler colonial ideology have obscured this view.

Tracing locust control practices on the Kazakh steppe in the late empire reveals a complex story of continuity and change. While the technologies themselves did not change in any significant measure aside from the failed experiment of bacteriological control, the shifting approach reveals both the insects’ challenge to steppe agronomy and the relative impotency of agricultural science in the face of the locust. However, this impotency did not necessarily weaken the march of agronomy onto the steppe. As this dissertation has shown, the creation of steppe agronomy was not a victorious march where science, rationalism, and problem solving overcame the obstacles of a steppe environment and indigenous population hostile or ambivalent to sedentary grain agriculture. Instead, it is also a story of setbacks and defeats that included devastation by locusts, droughts, and a high percentage of peasant settlers who gave up and returned to European Russia. Nevertheless, steppe agronomists rarely seemed to tire of the task,

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669 It should be noted that some agronomists did not always embrace a view that Kazakh animal husbandry was backwards and deserved to be replaced, but these were minority (and sometimes Kazakh) voices, see Ian W. Campbell, *Knowledge and the Ends of Empire*. 
and the settler colonial project went ahead and continued to displace Kazakhs and the open steppe.

This chapter, and this entire dissertation is not an attempt to uncover effective or ineffective technologies or sciences, although it does closely examine how technologies and scientific practices were created, functioned, and implemented.\textsuperscript{670} It also does not seek to uncover a technological determinism that explains how agronomy worked on the steppe. Instead, its task is in many ways much simpler. By closely examining the science and technology of locust control, it seeks to understand and explain how those technologies interacted with people, the environment, bureaucracy, economics, and colonial power dynamics, and thus created the changes and lack of changes that occurred on the steppe. Just as early control methods that encouraged the intensive planting of grain crops was not only a recommendation to deal with locusts, but was driven by cultural chauvinism, professional identity, and economic theories, bacteriological control and chemical spraying campaigns were also created through complex interactions.

However, too much focus on the contingencies of science and technology, and indeed the insights of technopolitics also has the potential to obscure an important factor in the creation of locust control science on the Kazakh steppe. It can potentially ignore the somewhat controversial claim of this dissertation that the Russian experience on the Kazakh steppe was a case of settler colonialism. The eventual creation and implementation of widespread systematic chemical spraying campaigns underscores, as part of the settler colonial project, how steppe agronomy, as part of an imperial bureaucracy, adhered to what Patrick Wolfe called a “logic of elimination.”\textsuperscript{671}

\textsuperscript{671} Patrick Wolfe, \textit{Settler Colonialism and the Transformation of Anthropology} (London: Cassell, 1999).
Wolfe, and other theorists of settler colonialism do not mean elimination requires the killing or total destruction of indigenous populations, ecologies, and landscapes although it can.\(^{672}\) Settler colonialism simply requires the destruction of indigenous peoples and ecologies as a distinct culture and group as a goal, which can occur through assimilation or other means. The experience of the Kazakh steppe certainly fits this criteria even if the settler colonial state was unable to fully achieve it.

However, settler colonialism is not only a story of what happens to indigenous people. It is also a story of how the settler colonial polity and society set about destroying and replacing the indigenous with a new—and in their minds—better society. The dreams and goals of steppe agronomy, especially those that envisioned the total destruction of the locust either through bacteriological or chemical methods, are a significant corollary to settler colonialism’s goal of the destruction of the indigenous. In fact, the use of the locust as a kind of mascot by an Orenburg satirical journal “Kobylka” is reminiscent of the similar use of American Indians as town mascots in New England after they were no longer a threat.\(^{673}\)

Additionally, the need for locust control was innately tied up in the visions of Stolypin and proponents of resettlement who hoped that resettlement in Siberia could break the hold of the commune and turn peasants into an independent yeomanry. However, as is typically the case of settler colonial projects, it rarely turns out exactly as proponents had hoped. Peasant resettlement was costly, and the availability of open steppe meant that many peasant settlers took up extensive cattle or horse breeding rather than intensive farming, and the frequent loans of cash and grain in bad harvest years meant that most settlers were far from independent farmers.

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\(^{672}\) Patrick Wolfe, “Settler Colonialism and the Elimination of the Native”.
Similarly, chemical locust control was expensive, labor intensive, and often began too late in the season because of late deliveries of equipment and supplies. Therefore, imperial locust control never attained the total destruction of the locust and the free expansion of grain farming. Instead, these environmental, political, technological, social, and economic factors limited the effectiveness of the technology, as well as the settler colonial project, in spite of the growing size and importance of the bureaucracy who attempted to harness science and technology to achieve the aims of the nascent settler colonial technostate.
CHAPTER 8: CONCLUSION: “WE ALL HAVE ENOUGH, AND THERE IS NO REASON FOR THEFT”

In 1958, at the height of the Virgin Lands Campaign, when Nikita Khrushchev proposed the cultivation of over 25 million acres of previously uncultivated land in northern Kazakhstan and Siberia, the Soviet government published a book entitled *The Reclamation of Virgin Land in Semi-Deserts*. The author of the book was described as “one of the first to study the techniques of reclaiming virgin land in the semi-desert zone of Kazakhstan,” and was none other than Sokrat’ Chaianov, the first director of the Temirskii Experimental Field (described in Chapter Two of this dissertation). At the time the campaign was facing both successes and difficulties. While the harvests of 1954 and 1956 had been good, the 1955 harvest was a failure. What is more, the amount of new land to plow up and expand onto was shrinking on account of the scale of the project. (In an echo of peasant settlement, the campaign faced a similar problem of the best lands being cultivated first.)

If the Virgin Lands Campaign was to continue to expand as Khrushchev hoped, one direction was to expand onto less favorable—usually more arid—lands to the south and west. That was where Chaianov’s book came in, as it was explicitly about reclaiming virgin land in dry areas. However, given that much of the already cultivated area also faced a challenge of too little rainfall, Chaianov’s book was meant to be just as useful for those working on lands already part of the campaign or in other arid areas of the Soviet Union.  

Chaianov himself had not been back to the Kazakh steppe since he left the Temirskii farm before the Bolshevik Revolution to direct another experimental farm in Voronezh in European Russia. After narrowly avoiding being purged along with his more famous cousin

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Alexander Chainov, he worked at various universities before publishing this book in 1958. As part of the book, he returned to the region in 1954-55 and visited many of the sites including the old experimental field, now the Aktobe Oblast Agricultural Experiment Station. On the visit, in addition to seeing institutions like the Temirskii field still in operation, he also reconnected with some people who were still involved with agriculture including at least one head of a kolkhoz (collective farm). This continuity was not unusual. Much of the institutional infrastructure described in this dissertation during the Tsarist period continued to exist, often in slightly different form, far into the Soviet period. In many cases, like the Temirskii field, it even still exists today.\textsuperscript{675}

However, in addition to institutions, much of the physical infrastructure was also still in place including things like railroads, grain elevators, and wells. Knowledge infrastructure from an earlier period, including successful growing practices and approaches to animal husbandry, also remained intact. Finally, there was the human infrastructure that was what made this a settler colonial project. During the Tsarist period three million peasant settlers came to the steppe, most of whom stayed, and their descendants multiplied and made up large numbers of steppe inhabitants.\textsuperscript{676} There were of course later settlers that came with the Soviet project of industrializing Kazakhstan and during evacuations during the Second World War.\textsuperscript{677} However, these later arrivals built on the firm foundation of the infrastructures created by this earlier project of peasant settlement.

\textsuperscript{675} Official website of the Aktobe Experimental Farm. http://acxoc.kz/o-uac/.
\textsuperscript{676} Demko, \textit{The Russian Colonization of Kazakhstan}, 86.
\textsuperscript{677} In 1941, of the 1,523 “industrial enterprises” evacuated and rebuilt in the Soviet hinterland, 308 were moved to Kazakhstan and Central Asia, Sanford R. Lieberman, “The Evacuation of Industry in the Soviet Union During World War II” \textit{Soviet Studies} 35 no. 1 (Jan 1983), 91.
Patrick Wolfe wrote that in settler colonialism, “invasion is a structure not an event.” In the case of settler colonialism on the Kazakh steppe, part of the structures of invasion were the actual physical (infra)structures like railways and wells. Another part was intellectual and scientific like growing practices and crop and livestock varieties. Other aspects of this invasion structure were economic, such as land dispossession and supports for grain markets, in addition to peasant loans for mills, grain cleaning machinery or butter cooperatives. All of these were both part of—and were also meant to support—the human infrastructure of invasion—that is the actual peasant settlers and their descendants.

In 1925, one of those peasants, M. S. Petlina, wrote a letter to the editors of the newspaper Krestianskaia Gazeta (Peasant Newspaper). This letter was not necessarily meant to be published, but was instead a complaint to an official he hoped might care about the problems in his village, Tatarka, in Akmola Gubernia. Petlina pleaded that his village and the area around it be moved from being part of the Kirghiz Autonomous Socialist Soviet Republic which had been created in 1920. Petlina wanted it instead to become part of the Russian Soviet Federative Socialist Republic. He explained that this was in part due to geography. Although the village was supposed to be administered by officials in Petropavlsk, it was 450 versts away. Much closer was the larger city of Omsk, only 135 versts away, which villagers always passed through anyway when they had business in Petropavlsk.

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678 Patrick Wolfe, “Settler Colonialism and the Elimination of the Native,” 388.
679 In the Soviet period, the region was again reorganized, this time into Gubernias instead of Oblasts, this also included some boundary reorganization.
680 Somewhat confusingly, between 1920 and 1925, the area that makes up most of modern day Kazakhstan was identified by the name Kirghiz even though it had nothing to do with the lands of modern day Kyrgyzstan. It was eventually officially renamed the Kazakh Autonomous Socialist Soviet Republic between 1925 and 1936.
681 With another reorganization in 1936, Petlina’s hopes became a reality as it became part of Omsk Oblast in the Russian Soviet Federative Socialist Republic, and is today part of the Russian Federation.
However, Petlina’s concerns were not only about efficiency and rationalizing boundaries. Instead, he made it quite clear that his complaint was about being administered by Kazakhs. He wrote, “…in the Kazakh Region there are many thieves, and the thieves are the most distinguished and wealthy, and the police are made up of Kazakhs who will never change their laws given by Allah to those given to us by Christ.” He went on to say that Kazakh officials, which he referred to by the traditional name of “aksaqal” (white bone) instead of their official government titles, never prosecute a Kazakh for a crime and instead cover up for them. Frustrated, Petlina declared that, “there needs to be a police force of Russians to police the Kazakhs.”

It is clear that even after the revolution in 1917, in spite of the new Soviet government that promised an end to colonial domination, the structure of ethnic chauvinism that was at the heart of the imperial settlement project on the Kazakh steppe was still alive and well in the hearts and minds of at least some of the settlers. This was in part because, as settler colonialism is so effective at doing, indigenous dispossession, (and the role agricultural science played in it) was often obscured in a logic of its own making, a logic of “progress.” Therefore, it is crucial to understand all of these “infrastructures of invasion” being part of a process of simultaneous and mutually reinforced creation. It is not that peasant settlement created government grain silos or the other way around, instead they both are best understood as part of a process (settler colonialism) that was both created by and also created peasant settlers and grain silos.

In fact, the chauvinistic sentiments of Petlina should little surprise if we accept the notion that invasion is a structure. It does not simply go away because one set of settlers takes over from another. In fact, it is an open question if even indigenous political rule would immediately erase

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682 Rossiiskii gosudarstvennyi arkhiv ekonomiki, RGAE f. 396, op. 3, d. 78, l. 76, Letter from M.C. Petlina to the Editors of Krestianskaia Gazeta, 1925.
the settler colonial structure, although it is an important start. To address the deeply ingrained logic of settler colonialism in Petlina’s worldview would have required a deep rooting out of many things beyond simply giving Kazakhs political power. Instead, as this dissertation has argued, you cannot simply remove just one part of settler colonialism like railroads or agricultural schools and erase their impact. All of the structures: scientific, technological, economic, ethnic, environmental, demographic, and political were and are intertwined with the settler colonial project. Therefore, simply changing the political system from settler colonial to socialist republic (whether or not that political change even occurred is doubtful at best) would not mean the scientific, agricultural, or demographic realities on the ground were also suddenly transformed.

In addition to the ways dispossession was often hidden by the logic of settler colonialism, there was also obfuscation about how the agricultural science and agronomy that was meant to aid settlement was actually created and deployed. Therefore, on the steppe, there was a kind of double obfuscation occurring with regard to agricultural science, technology, and engineering. For example, steppe hydrologic infrastructure was often presented as rational, new, and thoroughly Russian. While in fact it relied heavily on Kazakh and peasant knowledge and labor and was often misguided by an irrational faith that its technical superiority could overcome the realities of aridity and salinity. Therefore, in order to uncover this double obfuscation, it is not enough to simply rely on the lens of settler colonialism, it is also necessary to critically analyze steppe agronomy utilizing the insights of technopolitics.

683 For a thought-provoking discussion of how political recognition by indigenous leadership can continue indigenous dispossession see Glen Sean Coulthard, Red Skin, White Masks: Rejecting the Colonial Politics of Recognition (Minneapolis: University of Minnesota Press, 2014).

684 My own path to understanding how oppressions are intertwined in their creation and deployment was first influenced by the work of Huey Newton who wrote, “Never convinced that destroying capitalism would automatically destroy racism, I felt, however, that we could not destroy racism without wiping out its economic foundation” Huey P. Newton and J. Herman Blake, Revolutionary Suicide (New York: Penguin, 2009), 69.
Perhaps tellingly, the ways settler colonialism and technopolitics act as both systems of power and the ways they obscure their very presence is quite similar. Timothy Mitchell has described technopolitics as,

…always a technical body, an alloy that must emerge from a process of manufacture whose ingredients are both human and nonhuman, both intentional and not, and in which the intentional or the human is always somewhat overrun by the unintended. But it is a particular form of manufacturing, a certain way of organizing the amalgam of human and nonhuman, things and ideas, so that the human, the intellectual, the realm of intentions and ideas seems to come first and the control and organize the nonhuman.\footnote{Mitchell, Rule of Experts, 42-43.}

In short, the process of technopolitics not only obscures developments on the ground to make it appear that something is happening that is not. It also makes it appear that those in power are in control, when in fact they are not. Much like settler colonialism, technopolitics can also obscure the role of contingency and of other actors besides those who claim to be in control of the process. This dissertation has attempted to uncover the role of these other actors and factors in creating the agricultural science, engineering, and agronomic work on the steppe in order to better explain not only how knowledge and technopolitical power operated in this particular settler colonial environment, but also to understand just how contingent much of this story was.

In the process it has attempted to hold the analytical frameworks of settler colonialism and technopolitics in tension with one another in order to create a balance between the real power that officials and settlers had on the steppe while also recognizing that they were not alone in exercising power and agency. Even more crucially, it shows that they were hardly able to enact their plans on a passive steppe environment or the Kazakh people. To put it another way, in this story we can see much truth in the adage that “more than one narrative can be true at the same time.” The steppe was, in the Tsarist period, at once the site of an early kind of top-down
“high modernism” described by James Scott and others while still remaining a place where the imperfect knowledge of officials, the realities of the steppe environment, as well as peasant and Kazakh resistance (or recalcitrance) all played important roles. It is these tensions between contingency and power, between structure and resistance, between human and non-human that created a complex historical process and dynamic.

However, in addition to the utility of these frameworks for understanding big questions, this dissertation has also sought to answer questions that are somewhat more rooted in the places of Kazakhstan and the Russian Empire. It has sought to tease out the stories and importance of much less prestigious and lesser known agricultural scientists like Chaianov the experimental farm director, Zhurin the locust expert, or Lisovskii and Nurbzhanov who both taught at the Zaisan agricultural school. The fact that individual scientists and officials often had a wide array of opinions and biases, yet in the end were still part of the dispossession of Kazakh nomads, is an important reminder of the limits of an individual’s ability to make change in a large bureaucratic system.

Conversely, these individuals and others also changed the story in important ways. For example, the resistance of the Kazakh student, Kumanov, at the Semipalatinsk agricultural school was part of the reason officials stopped encouraging Kazakhs to attend the agricultural schools. Also Vasily Benzin’s plant exploration trips in Central Asia increased the germplasm of rye and other plants for the entire globe. Rather obscure people played a crucial part of this story, and while their contributions are less clear and prevalent in the archival record, this dissertation has sought to capture pieces of those stories and fit them into a narrative about an incredibly vast and diverse region in a massive empire administered by a large and complex bureaucracy.
While this dissertation seeks to put individuals back into a broader story, it also illustrates how the Kazakh steppe region and environment played an important role in the development of agricultural science, bureaucratic systems, and social and economic change in the broader Russian Empire. The work of scientists like Chaianov or Benzin might have begun in the steppe, but it did not end there, and their work had implications and effects on other regions, even sometimes in other settler colonies beyond the boundaries of the Russian Empire. What is more, the Kazakh steppe was by no means peripheral to the empire, instead its wheat, animal products, as well as its role as a “safety valve” for peasant settlement tied it deeply into the story of the empire beyond just the connections of individual scientists and scientific studies in the region.

These networks illustrate how the Russian Empire operated as an empire: interconnected and drawing on all regions in ways that had both center-periphery aspects, and in ways that are better understood perhaps as ecological with different regions interacting in mutually beneficial and mutually destructive ways. Additionally, the connections between agricultural science on the steppe with those in other empires also illustrates how colonialism (and perhaps especially settler colonialism) was a global project. While settler colonies like the United States and Russia may have competed for dominance on the world grain market, their scientists were also part of supportive scientific communities.

However, in spite of these aspects of empire, contingency, and indigenous agency, what still stands out most is the longevity of the processes begun in the late nineteenth century and how they would forever change the landscape and people of the Kazakh steppe. While today Kazakhstan is a leading producer of wheat, it is also the site of environmental problems connected to that success including water scarcity and the ecological catastrophe of conventional chemical monoculture. With the coming of the Virgin Lands Campaign, the transition to this new
way of raising food on the steppe was complete. However, for those of us observing it from the future who recognize this same story told around the globe throughout the twentieth century, perhaps what is most astonishing is not the fact that it happened, it is how quickly and totally the costs and human impacts of this story have been erased or simply forgotten.

In 1955, when Chaianov returned to the steppe for the first time since he left the Temirskii Experimental Field before the revolution, he visited the kolkhoz, “Stalin” located nearby in Dzhurunskii raion. The farm was home to 150 families, and like most of the other kolkhozi in the region, it was created in part out of the consolidation of settler communities founded mostly before 1917. The Chairman of the farm, Grigorii Oleinikov was a man who Chaianov had first met in 1909. In the conclusion of his book, Chaianov described the Stalin kolkhoz under Oleinikov’s leadership. The farm had a one million ruble annual profit and contained several well-built buildings to house not only livestock, but also kolkhoz members at the club and library. Chaianov was keen to note that the 200 head of dairy cattle were milked not by hand, but by machines in new purpose-built milking barns. In addition, he happily noted that the farm kept two years of fodder in reserve in case of drought or crop failure.

It is clear that the things Chaianov was most excited about (a profitable farm, advanced technology, large-scale agriculture, stored fodder, and an educated and “cultured” rural population) reflected the hopes and worries of agronomists and officials (himself included) a half-century earlier. It is easy to see how Oleinikov and Chaianov, both of whom knew the steppe in a very different era at the start of the twentieth century, would be amazed and excited about the changes they had been part of some time earlier. This region in particular had gone from one of the most difficult to farm and least productive regions to a prosperous and sedentary rural community.
However, hidden in the excitement and accomplishments were real losses that had begun during the Tsarist period. Chief among these was the loss of Kazakh wealth, livelihood, and nomadic culture. Chaianov reported that there were no nomads left in the area although they had made up the majority of the population when he first arrived. While there were still many Kazakhs, many of whom probably even worked on the Stalin kolkhoz, they were not nomads. Their losses of livestock and culture were hidden in the profitability and “progress” that the kolkhoz represented. In commenting on how wealthy the kolkhoz members were, Chaianov told a story about how he walked through the village at midnight having just finished a lecture at the kolkhoz club. On his walk he noticed that no one in the village locked their doors. When he asked Oleinikov about this, the Chairman replied, “We all have enough, and there is no reason for theft.”

Oleinikov might not even have been lying exactly, however, it did obscure a darker truth. The reality was, the theft had already occurred. Over the nearly two centuries of Russian and then Soviet rule on the steppe much had been stolen from the Kazaks. This included of course the very land upon which Oleinikov issued his proclamation and where Chaianov delivered his lecture. However, as this dissertation has aimed to show, there was a theft of culture and knowledge about how and where to raise food in the challenging steppe environment.

Some of that theft was from peasant cultivators written out of the story by agronomists and officials, their invention of things like hopper dozers or snow wells quickly forgotten. Other thefts included seeds cultivated over millennia by farming communities in places like Taraz or Semirechye in today’s southern Kazakhstan; those indigenous communities were never justly compensated, even if the collectors purchased the seeds fairly. Finally, there were the thefts of

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knowledge about water and sites of arable land in the steppe as well as ways of raising livestock and breeds, all of which helped make peasant settler agriculture possible, and eventually (in the case of the Stalin kolkhoz) profitable on the steppe. While these thefts might sometimes have been small or legal, the fact that they were incorporated into a growing bureaucracy and state intent on settling more and more peasants from European Russia on the steppe meant that they helped contribute in concrete ways to the further dispossession of Kazakhs and theft of their lands. Therefore, while by the time Oleinikov mentioned the lack of theft, there were even Kazakhs potentially benefitting from the new system, his comment, just like the claims of agricultural scientists and officials on the steppe in an earlier period, obscured as much about history as it revealed about the present.
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