The Secret School of War: The Soviet-German Tank Academy at Kama

THESIS

Presented in Partial Fulfillment of the Requirements for the Degree Master of Arts in the Graduate School of The Ohio State University

By

Ian Johnson

Graduate Program in History

The Ohio State University

2012

Master's Examination Committee:

Jennifer Siegel, Advisor

Peter Mansoor

David Hoffmann
Abstract

This paper explores the period of military cooperation between the Weimar Period German Army (the Reichswehr), and the Soviet Union. Between 1922 and 1933, four facilities were built in Russia by the two governments, where a variety of training and technological exercises were conducted. These facilities were particularly focused on advances in chemical and biological weapons, airplanes and tanks.

The most influential of the four facilities was the tank testing and training grounds (*Panzertruppenschule* in the German) built along the Kama River, near Kazan in North-Central Russia. Led by German instructors, the school’s curriculum was based around lectures, war games, and technological testing. Soviet and German students studied and worked side by side; German officers in fact often wore the Soviet uniform while at the school, to show solidarity with their fellow officers. Among the German alumni of the school were many of the most famous practitioners of mobile warfare during the Second World War, such as Guderian, Manstein, Kleist and Model.

This system of education proved highly innovative. During seven years of operation, the school produced a number of extremely important technological and tactical innovations. Among the new technologies were a new tank chassis system, superior guns, and - perhaps most importantly - a radio that could function within a tank. Prior to Kama, tank officers would use flags to communicate with their units. The implementation of radios in tanks gave the Germans a tremendous advantage when they invaded France and Poland, neither of whose militaries had fully adopted an in-tank radio.

The tactical and operational developments at Kama were also profound. The Germans began to experiment with the use of tanks in the context of *Stosstruppen* (stormtrooper) infantry tactics from the First World War. The result, fully developed by the Wehrmacht under the Nazi Regime, would come to be known as “Blitzkrieg;” lightening fast war focused on penetration, encirclement and close coordination between airpower and mobile forces.

Kama played an integral role in the development of the German war machine during the interwar period, giving the Nazis the tools to rapidly develop a mobile tank corps which would prove nearly invincible at the beginning of World War II. This paper, using both German and Soviet archival material, explores this surprising period of cooperation between ideological and geopolitical opponents, who would soon be embroiled in the bloodiest war in human history.
Vita

May 2005 .......................................................Trinity School at River Ridget

2009................................................................B.A. History and Government, Claremont McKenna College

2012 to present ..............................................Graduate Teaching Associate, Department of History, The Ohio State University

Fields of Study

Major Field: History
Table of Contents

Abstract............................................................................................................................................. ii

Vita..................................................................................................................................................... iii

Fields of Study ................................................................................................................................... iii

CHAPTER 1: INTRODUCTION........................................................................................................... 1

CHAPTER 2: HISTORIOGRAPHY ..................................................................................................... 3

CHAPTER 3: THE “VORLÄUFIGE REICHSWEHR” ........................................................................ 6

CHAPTER 4: HANS VON SEECKT AND THE REICHSWEHR .................................................... 13

CHAPTER 5: THE BIRTH OF THE RED ARMY ................................................................................. 18

CHAPTER 6: TUKHACHEVSKII AND SOVIET STRATEGIC THOUGHT .................................. 23

CHAPTER 7: SOVIET-GERMAN DIPLOMATIC COOPERATION ............................................. 28

CHAPTER 8: CONSTRUCTION AND DEVELOPMENT, 1926-1929 ...................................... 33

CHAPTER 10: THE FIRST CLASS AT KAMA, 1929...................................................................... 39

CHAPTER 9: THE CRITICAL YEARS, 1931-1933 ......................................................................... 44

CHAPTER 11: THE TANKS AT KAMA.......................................................................................... 46

CHAPTER 12: INNOVATIONS WITH RADIO.............................................................................. 54

CHAPTER 13: CONCLUSION ......................................................................................................... 60

BIBLIOGRAPHY............................................................................................................................... 63

iv
CHAPTER 1: INTRODUCTION

In the early hours of June 22, 1941, the rumble of plane engines woke Soviet residents in Kiev, Odessa, Bialystock and dozens of other cities. Soon, explosions filled the air as wave after wave of German bombers attacked airbases, military installations and government buildings. It was the beginning of Operation Barbarossa, the largest military operation in the history of the world. More than three million German soldiers would be on Soviet soil by the end of the day. This expansion of Hitler’s war turned World War II into the bloodiest conflict in human history.

Two brief decades before, Germany lay prostrate, with foreign troops occupying her industrial heartland. The unstable Weimar government was forced to pay enormous reparations. The vaunted German army of World War I was completely dismantled by the Treaty of Versailles, reduced to only 100,000 men.¹ The victors forbade the production or purchase of aircraft, armored vehicles and submarines. Yet it was during this period that the Reichswehr began to rearm. How did the German military establishment rebuild its war machine so rapidly and so effectively?

This thesis offers a partial answer to that question. Between 1922 and 1933, the Germans began large-scale cooperation in training and technological development with

the Soviet Union. This thesis examines the role of the facility code-named “Kama”² in the rearmament and militarization of the Soviet Union and Germany between 1926 and 1933. Kama would become the central tank testing ground and training facility for both the Soviets and Weimar German governments during its time of operation.

To explore the role of Kama in the interwar development of both the Red Army and the Reichwehr, this thesis traces the development of the Soviet and German armies after World War I. Both militaries had complex security needs that they could not meet on their own. Following this background, the thesis will discuss the rise of two major intellectual influences in the German and Soviet armies, German General Hans von Seeckt and Soviet Marshal Mikhail Tukhachevskii. Their new ideas about mechanization, cadre development and army organization required the creation of a facility like Kama. The thesis then explores the diplomatic efforts that led to the establishment of the cooperative schools before delving into a detailed study of Kama’s curriculum and students during its period of operation. A final section provides details about the technological developments produced at the school. In conclusion, the thesis notes the influence of Kama’s students, technology and strategic thought on the development of the interwar militaries of the Soviet Union and Germany.

² The codename “KaMa” was a combination of the words “Kazan,” the city near which the facility was located, and “Malbrandt,” the German officer first assigned with assisting the Soviets in site selection. The name was later changed to “TEKO,” or “Technical Courses of the Society for Defense, Aviation and Construction of Chemical Weapons.”
CHAPTER 2: HISTORIOGRAPHY

Kama and the other Soviet-German cooperative projects in the Soviet Union have received relatively little attention from historians. This is in part a product of available source materials. Many German records were destroyed during World War II, and the Soviets were naturally reluctant to shed any light on their cooperation with Germany prior to the war. As a result, little literature appeared about Kama until the collapse of the Soviet Union. The material that did appear prior to 1991 sometimes relied on interviews or the autobiographies of German officers and confused basic facts related to Kama, such as Heinz Guderian’s role at the school or the number and types of tanks present there.

The early scholars who wrote about Kama were almost all diplomatic historians. Gerald Freund’s *Unholy Alliance* appeared in 1957, one of the first scholarly works to look at Soviet-German relations during the interwar period. 3 This work mentioned the facilities in the Soviet Union in passing. In the 1960s, a number of scholars released articles or monographs on Soviet-German cooperation, but most only tangentially touched on military exchanges. In 1966, F.L Carsten, in his study of the German military in the Weimar period, discussed the presence of schools in the Soviet Union. 4 In the same year, Karl-Heinz Niclauss published his dissertation, entitled *Die Sowjetunion und*

---

3 Gerald Freund, *Unholy alliance; Russian-German relations from the Treaty of Brest-Litovsk to the Treaty of Berlin* (London: Chatto and Windus, 1957)
Hitlers Machtergreifung. This work discussed the role of diplomatic cooperation with the Soviet Union in the rearmament of Germany during the Weimar period leading up to Hitler’s seizure of power.⁵

The end of the Cold War witnessed the publication of a number of detailed studies on Soviet-German military cooperation. In 1992, Yuri Dyakov and Tatyana Bushuyeva published the first major study (in Russian) of the four German facilities in the Soviet Union.⁶ Another Russian scholar, Aleksander Nekrich, completed Pariahs, Partners, Predators on the same topic in 1993, which appeared in English after his death.⁷ Both volumes focused on the role the Soviets had played in arming Germany for the Second World War, in part as a critique of the Soviet regime.⁸ Another important work in Russian is Sergey Gorlov’s Top Secret: Alliance Moscow-Berlin, 1920-1933, published in 2001.⁹

In the United States, only a handful of works have appeared on Soviet-German cooperation during this period, and fewer still which discuss the role of Kama itself. James Corum’s The Roots of Blitzkrieg, published in 1992, was among the first to argue for the significance of German facilities in the Soviet Union in the development of the

---

⁸ Nekrich had been persecuted by the Soviet State for his early scholarship on interwar Soviet military policy, which argued that the Soviets were unprepared for war in 1941 because of Stalin’s policies. Nekrich emigrated to the United States in 1976.
⁹ Sergey Alexeyvich Gorlov, Top Secret: Alliance Moscow-Berlin, 1920-1933 (Moscow: Olma Press, 2001). Gorlov, it should be noted, was formerly a state historian specializing in Soviet Diplomatic history. Perhaps as a result of this background, he offers a unique and thorough approach to the military cooperation undertaken in this period.
German army. Following it in 2003 was Mary Habeck’s Storm of Steel, which was the first work written in English to offer a thorough examination of the role of the Kama facility in interwar tank development.

This paper attempts to fill in a gap in this historiography. Most of the studies that have discussed Kama are either interested in Soviet moral culpability in rearming the Germans or are focused on the changes in strategic thought that came out of Kama, most of which did not occur there. Instead, I hope to rebuild an image of the school at Kama by reconstructing its curriculum, examining its students and instructors, and discussing the technological experiments conducted by its engineers. This approach allows a fascinating glimpse into the interwar military establishments in both countries, while also more fully revealing the role of Kama in the lead up to the Second World War.

CHAPTER 3: THE “VORLÄUFIGE REICHSWEHR”

To understand why the highly conservative Reichswehr pursued cooperation with the Soviets at Kama, it is necessary to look to the situation at the end of the First World War. The Treaty of Versailles that ended the war played a decisive role in the formation of the Reichswehr. It also required the Germans to find an ally. The Reichswehr was unable to pursue technological development on its own, hamstrung by the terms of the treaty limiting Germany’s possession of modern military equipment. The treaty also required a huge reduction in the size of the German army and a nearly complete dismissal of its senior officers; this left the Reichswehr with a young, dynamic officer corps. They emerged from the Allied-mandated purges with operational and tactical theories drawn from World War I and incorporating new technology, but they could not pursue these ideas within the boundaries of the Weimar Republic.

The victors of World War I hoped to prevent the possibility of another major war by the nearly total disarmament of Germany. However, fears in Great Britain and France that communism might triumph in Germany led them to permit the retention a small military force – the Reichswehr, or “Imperial Defense Force.” The victorious allies envisioned the Reichswehr as a police force that would prevent social unrest. German
military or political leadership never accepted this task. Instead, they saw the army in its traditional role of “preserving the sovereignty and authority of the state.”

The Reichswehr’s situation after the armistice was far more complicated than the Western allies initially perceived. The situation in late 1918 and early 1919 was highly unstable, as hundreds of thousands of German soldiers stationed in Russia returned home and demanded “soldier’s councils” and the right to elect officers. Other returning veterans joined armed right-wing organizations such as the Iron Division, which sought to provide security and protect national interests. Officers reacted quickly to preserve order in units with large numbers of leftists, forming Vertrauensträte, or “councils of trusted soldiers,” to curtail the influence of communist propaganda.

The army’s survival and drift towards the right led to a crisis within socialist and communist leadership circles. To decide their place in the new state, they organized a major socialist congress in Berlin shortly before the national elections, which were to be held on January 19th, 1919. It was widely attended, particularly by the formerly pro-war faction of the Sozialdemokratische Partei Deutschlands (SPD, or Social Democratic Party). At the Berlin Congress, the various socialist factions agreed to support the election of a National Assembly, rather than demand the formation of soviets. However, they also voted in favor of disbanding of the military. The congress passed the “Seven

---

13 Ibid, 4.
15 Ibid, 10.
Hamburg Points,” decreeing the end of the old military and the establishment of a national militia for defense and the election of officers of all ranks.\textsuperscript{16}

They presented this program to Socialist leader Friedrich Ebert, who was serving as chancellor and head of state in the interim period between the resignation of Kaiser Wilhelm and new national elections. The army was one of the few factors preventing Ebert’s fragile interim government from disintegrating. Realizing this, Ebert agreed to not enforce the Hamburg points in exchange for general support of Hindenburg and the Army for a new National Assembly. In a crucial telephone conversation, Hindenburg’s associate General Wilhelm Groener and Ebert agreed that the army would be at “the disposal of his [Ebert’s] government” in exchange for an understanding that the government would “fight against Bolshevism.”\textsuperscript{17} However, the army itself was beginning to disintegrate: military units rioted in Berlin in late December, seizing government buildings and looting other facilities.

In accordance with his agreement with Groener, Ebert announced his support for the continued existence of the military. He retained its officer corps and even extended recognition to the Freikorps and other volunteer associations, provided they would serve under the Military High Command.\textsuperscript{18} Ebert and the Social Democrats gave the military a considerable degree of autonomy in exchange for the support of the provisional government and aggressive action against the radical left, which was growing

\textsuperscript{16} Carsten, 19. It became known as the Hamburg Points because it was proposed by delegates from Hamburg, including military units from the city which had refused to serve within the military and demanded the election of their own officers.
\textsuperscript{17} Ibid, 11.
\textsuperscript{18} Ibid, 11-12.
increasingly violent. The remnants of the army and the moderate socialists had cemented an alliance that would define the Weimar Republic. A bloody period of street-fighting followed between the military and armed members of the Spartacists, Communists and radical left. The military’s victory in this conflict guaranteed their relative autonomy and power vis-à-vis the civilian government.

On January 19, 1919, the German government held the promised election of a national legislature. Socialists predominated, joining together with moderate and center-left factions in the Weimar Coalition. This coalition received 76.2% of the total vote. One of the Coalition’s first goals was the reformation of the army, now one of the pillars of the National Assembly’s preservation. To that end, the Reichstag passed a series of laws on March 6, 1919, reorganizing the army as the Vorläufige Reichswehr, or Provisional National Defense Force.

General Walther Reinhardt initially headed this new military establishment. An astute and unconventional officer, his sudden promotion came in part because of his political palatability to the socialists. Reinhardt wanted to “present the young republic with a young republican army.” This meant retaining officers who could serve as “strong and viable links between the old and the new…” but also emphasizing a new generation of military leadership.

---

19 Carsten, 11.
22 Mulligan, 63; Carsten, 30.
The Freikorps, associations of veterans mostly affiliated with the political right and far-right, were particularly vital to the preservation of the government in 1919. Composed of veterans, the Reichswehr drew heavily from these units to form its ranks after the enactment of the Treaty of Versailles. These units were disproportionately composed of officers and NCOs from the Imperial German Army of World War I. The limitations placed on the size of the military meant the retirement of most of the senior officers in the Reichswehr. Political reliability, meaning membership in the right or center-right, also led to the dismissal of a number of senior officers, particularly after the Kapp Putsch, explored in more detail below. As a result, the post-Versailles Reichswehr was a young army, dominated by NCOs and junior officers.

General Hans von Seeckt, war hero, recipient of the Pour Le Merite, and accomplished staff officer, supported Reinhardt in his reform efforts. He noted to his wife in a private letter that he was annoyed by the fierce criticisms of the “old army” of Reinhardt’s efforts, for “politics is the art of what is possible, not what is desirable.” Von Seeckt was aware of the immense challenges that Reinhardt faced, not least of which was the impending implementation of the victors’ demobilization of most of the Army. The Treaty of Versailles, whose provisions went into effect on January 10th, 1920, would define the bounds of Reinhardt’s reforms, along with those of his successors.

In 1919, before the signing of the Treaty of Versailles, the Provisional Reichswehr numbered 350,000 men, most of them former members of Freikorps units. The Treaty of Versailles required a reduction in this number to 100,000. When the

---

government attempted to disband some of the Freikorps units, rioting broke out. The
commandant of Berlin, General Luttwitz, led several Reichswehr brigades in seizing the
city on March 13, 1920. They proceeded to establish a new government nominally
under the control of monarchist politicians. The majority of the Reichswehr, while not
joining the revolt, refused to attack their comrades in arms, provoking a stalemate that
concluded with a general strike and the collapse of the Kapp Government.

The Putsch had dramatic consequences. The government did not punish most of
the rebels. To the contrary, some were rewarded by the government for laying down their
arms. In the Navy, a number of units had declared loyalty to the Weimar Government.
The government dismissed these units during the demobilization required by the Treaty
of Versailles, while those who had supported Kapp retained their positions in the
downsized Reichswehr. Some of these units became so independent that they designed
their own attire; two disloyal naval brigades, for instance, placed swastikas on their
uniforms, which they retained throughout the Weimar period.

The National Assembly lost much of its power to audit the military. As a result,
officers sympathetic to Kapp managed the culling process imposed by Versailles. These
men dismissed republican officers who were seen as loyal to the Weimar state, and thus
disloyal to the military. The army and navy emerged from the culling process composed
largely of officers on the right and the far right. Many were deeply suspicious of the
Weimar Republic. The seeds for future events had been sown.

---

24 Carsten, 99.
25 Carsten, 78-91.
26 Mulligan, 141.
On a personal level, the Kapp Putsch discredited Reinhardt. He had aggressively pursued military action against the Putsch leaders, the only senior military officer to do so.\textsuperscript{27} He resigned in disgust on March 13th, 1920, just as it was becoming clear that the Kapp Putsch would fail.\textsuperscript{28} Hans Von Seeckt, who had refused orders to fire on rebelling army units, was the favorite of the conservative military general staff. Even though the Socialist-led cabinet tried to reappoint Reinhardt to his position, Von Seeckt and other generals informed them that they would resign rather than continue to serve under Reinhardt, an ominous threat given the recent events of the Kapp Putsch. This was an about-face for Von Seeckt, who had supported Reinhardt up until the Putsch. He took advantage of this moment and maneuvered himself into a position of leadership. With Walther Reinhardt’s resignation, the Weimar Republic lost its greatest ally in the military, a “pragmatic republican,” who had fought in favor of the young state and tried to subordinate the military to civilian authority.\textsuperscript{29} He would reverse this trend.

\textsuperscript{27} Ibid, 139.
\textsuperscript{28} Reinhardt forfeited his position at the head of the Reichswehr, but remained in the German Army until 1927, when he retired.
\textsuperscript{29} Mulligan, 85.
CHAPTER 4: HANS VON SEECKT AND THE REICHSWEHR

Hans von Seeckt profited greatly from the Kapp Putsch. Through his leadership and writings, he would dominate the Reichswehr from 1919 to 1926, during the early phases of Kama’s development. Von Seeckt’s ideas on warfare created the need for a facility like Kama, as well as giving rise to the officers who would train and study there. His ideas on warfare, emphasizing training in new technology and the development of highly mobile forces, required a place to test, develop and train a new generation of officers and machines.

He also was the great proponent of an independent military, a crucial ingredient in the founding of Kama. Von Seeckt hid the Reichswehr’s activities in the Soviet Union from all but a handful of senior politicians. He wrote after his tenure had ended: “What do I ask from the army? The protection of the state. What do I ask in return from the state? Love for the army.”30 This meant money and autonomy. During his six years in office, his fellow officers described his actions as “surrounding the army with a Chinese Wall,” impermeable to the politicians.31

In doing so, Von Seeckt divorced the broader strategic doctrines of the Reichswehr from the actual interests of the Weimar Republic. Like his predecessors Von

Moltke and Von Schlieffen, he ignored grand strategy in favor of operational competence. Despite the lip service Von Seeckt paid to Clausewitz’s writings, the Reichswehr leader wrote that “the leadership of the army should singly devote itself to one goal: winning.” Explicitly, this meant the destruction of the enemy army, not the achievement of any political end.\textsuperscript{32} Von Seeckt like his predecessors divorced the means and the ends of warfare.\textsuperscript{33} This kind of thinking would haunt the German Army in World War II.

Despite his attitude towards grand strategy, Hans von Seeckt possessed a first rate military mind. Born in 1866, he was the scion of a noble Pomeranian house. By the time he took over the Reichswehr in 1920, he had served in the Prussian Army for more than 35 years. The three most important elements of his writings and reforms were the separation of civilian and military affairs, an emphasis on mobility, and the idea of cadre development.

Von Seeckt became best known for his tactical writings and emphasis on mobility. His experiences on the Eastern Front during World War I convinced him that numbers were not the decisive factor in modern warfare. Smaller German forces had repeatedly routed much larger Russian armies on the Eastern Front. Whereas the victorious Western allies drew the power of the defensive as the primary lesson of World War I, Von Seeckt saw “the key to future victory was mobility.”\textsuperscript{34} This was in part a

\textsuperscript{32} For more on the lack of strategy in German military culture: Isabel V. Hull, \textit{Absolute Destruction: Military Culture and the Practices of War in Imperial Germany} (Ithaca, NY: Cornell University, 2005).
\textsuperscript{34} Corum, 31.
product of circumstances. Given the task of defending Germany with a small force of
100,000 men, mobility alone offered the only real chance of success, though Von Seeckt
believed even with the best technology, the tiny Reichswehr could resist any neighboring
state for only a matter of weeks. Von Seeckt envisioned small, highly professional mobile
forces, where cooperation between aircraft and motor vehicles would maximize mobility
and chances of tactical success. Maintaining some consistency with his intellectual
antecedents, Von Seeckt also emphasized the power of encirclement enabled by
mobility.\textsuperscript{35}

Von Seeckt was still a man of his times. For instance, he fought to allow the
cavalry to keep lances, rather than shift entirely to firearms.\textsuperscript{36} As some critics have noted,
his tactics were not necessarily innovative; more accurately, they expanded the basic
ideas of the \textit{Stosstruppen} (stormtroopers) of World War I. Younger officers resented his
traditionalism; one wrote that “new developments were hindered nearly everywhere by
the rather rigid ideas regarding tradition which often amounted to an imitation of new
forms.”\textsuperscript{37}

While his writings on mobility were important, his ideas on cadre development
were his most lasting accomplishment. Cadre development was the intense cultivation of
a small, elite group of officers and NCOs who would become familiar with modern
technology and operations. In case of war, the Reichswehr would rapidly promote these
officers, filling the upper echelons of the military, and then training their replacements.

\textsuperscript{35} Weimarer Republik, “Gesetz über die Bildung einer vorläufigen Reichswehr [Vom 6. März 1919],”
\textsuperscript{36} Carsten, 213.
\textsuperscript{37} Ibid, 214.
Those officers would instill in the army a spirit and a “vocabulary” that would make the rapid expansion of the army much easier.\(^{38}\) Von Seeckt took advantage of loopholes in the Treaty of Versailles to create an army that was disproportionately composed of staff officers and non-commissioned officers: in 1922, almost 60% of the Reichswehr were officers or NCOs in 1922.\(^ {39}\)

Von Seeckt also noted that familiarity with new equipment was among the most important elements of cadre development. This meant Germany’s smaller army possessed a major advantage: “the smaller an army is, the easier it will be to arm them with modern equipment and weaponry, while it is nearly impossible to arm a permanent army of millions with the newest equipment.”\(^ {40}\) Von Seeckt sought to turn the Treaty of Versailles into an advantage through an emphasis on technology.

One of the greatest limitations on Von Seeckt’s vision was provisions in the Treaty of Versailles preventing the Germans from having access to tanks or military aircraft. This difficulty meant he could not give his officers the experience they needed in new technology and operations. He believed in the vital importance of these new arms, though even he did not realize the full potential of the tank on the battlefields of the future. While Germany could not build or buy tanks, Von Seeckt established a Motor Troops Inspectorate, which was headed by young officers with considerable experience with armored vehicles from World War I. Using “paper panzers” - automobiles with

\(^{38}\) Carsten, 61; 125. This new vocabulary was evident in *Heeresdienstvorschrift 487: Fuhrung und Gefecht der Verbundenen Waffen*, the major training manual first produced in 1921.

\(^{39}\) Ibid, 47.

wood and sacking added to give the rough appearance of a tank - these officers began experimenting with ideas of armored warfare.  

One of the most important of these young officers was Lieutenant Ernst Volckheim. He was only 25 years old in 1923, when he was permanently assigned - one of only two staff officers to hold the position - to the tactical and technological development of armored warfare. He published numerous books and articles, focusing on the operational penetrating power of the tank. He generally opposed orthodox thinking on armored vehicles, which emphasized the light tank as a replacement for cavalry in providing infantry support. Instead, Volckheim emphasized slower, more heavily armored medium tanks, armed with guns as powerful as the French 75 mm, which would enable a tank to destroy similarly armored vehicles in open battle. Volckheim would go on to teach at Kama from 1932 to 1933.

---

42 Ibid, 127.  
43 Ibid, 128.
CHAPTER 5: THE BIRTH OF THE RED ARMY

Radical developments within the Red Army during the same period also necessitated the creation of a facility like Kama. The international isolation of the Soviet state handicapped their development of technology and the mechanization of the army. The creation of new Soviet military doctrines in the 1920s also required the creation of a technologically advanced, highly trained mobile force, something that military pioneers within the Red Army did not believe they could create without the assistance of experts from outside of the Soviet Union.

When the Bolsheviks seized control of Moscow and Petrograd in 1917, the Russian army existed in little more than name. Most of the soldiers had gone home, and what leadership remained in uniform was decidedly anti-Communist. Lenin handed Leon Trotsky the reins of the military as People’s Commissar of War in March 1918. Trotsky promptly set about building a new military. He was more pragmatic than many other members of the Soviet leadership. Realizing the difficulty of building an army from scratch, Trotsky retained many senior tsarist military officers, creating a political commissariat to monitor them and ensure their loyalty to the state.

---

The Russian Civil War began with the organization of the Volunteer Army, a coalition of anti-Bolsheviks, in December 1917, in response to the October Revolution and the failure of the Krasnov-Kerensky Uprising. The Germans, who were still technically at war with Russia, began their advance to drive the Soviets out of the war in February 1918. The failure of the tattered remnants of the Russian army to put up any resistance forced Lenin to agree to the Treaty of Brest-Litovsk, and begin military reforms in preparation for the impending civil war. Lenin and Trotsky drew up plans for an advisory council comprised of Tsarist officers to function as a weakened version of the General Staff. However, the rest of the Communist leadership vehemently protested, arguing that to place such responsibility in the hands of noted counter-revolutionaries was dangerous.\footnote{Earl F. Ziemke, \textit{The Red Army, 1918-1941: From Vanguard of World Revolution to US Ally} (London: Frank Cass Press, 2004), 35.} Instead, they proposed the formation of an all-workers army led by one of their own. In early March, they reached a consensus. Lenin appointed Leon Trotsky as head of the Supreme Military Council on March 13, 1918.\footnote{Ziemke, 36.}

Trotsky realized that an all-workers army would be far too small to defeat the numerous enemies of the young Russian Socialist Federative Soviet Republic.\footnote{This was the official title of the Bolshevik state from the introduction of its first constitution from July 10th, 1918, until the end of the civil war and the official establishment of the Union of Soviet Socialist Republics on December 30th, 1922.} Mass conscription had already begun in February in Petrograd and Moscow. In March, Trotsky drew up plans for a draft among the peasant population. At the same time, sizeable anti-Bolshevik armies, led by Generals Denikin, Yudenich and Admiral Kolchak began to push back the raw conscripts of the Red Army on the three fronts. In May, when the
offensives began to gather steam, less than 10% of the Red Army had received any formal training; of those troops, only half were judged “combat-ready.” By July, the Red Army was suffering mass desertions and seemed in danger of dissolution. Trotsky responded by creating CHEKA’s Special Punitive Brigades to execute deserters and force units to remain at the front.

The Red Army’s fronts held through the dangerous summer months of 1918 and began the critical year of 1919 in relative control of the center of the country. In March 1919, the White Armies began their major offensive. The Red Army, better trained and armed than in the previous year and now led by two very competent officers (Mikhail Tukhachevskii and Mikhail Frunze) managed to halt the White spring offensives and assume the offensive themselves in May, 1919. Fierce fighting all summer led, by the fall, to the complete retreat of White armies to the south and east.

Warfare continued throughout 1920 in the Baltic States, the Far East, Ukraine and Poland, but the Communist Party in Russia was secure from November, 1919 onwards. The army had massively expanded; by mid-1920, there were 5.5 million soldiers in the Red Army making it the the largest military in the world. This was a product of necessity: the young Soviet Union found itself fighting on over a dozen fronts against a plethora of enemies, internal and external. However, the Red Army poorly organized its

---

48 Ibid, 42.
49 Ibid, 89-92.
50 Ziemke, 2.
draftees. Even at the end of the civil war, only 30% of all soldiers were organized into actual Red Army units, and only 600,000 were listed as combat-effective by Moscow.\(^{51}\)

The end of the war, along with massive famines and an economic crisis, caused Communist leadership to attempt to rapidly shrink the size of the military. Most orthodox Communists believed that a militia system was the only truly Marxist military organization. General Frunze reduced the military in size, but instead of turning it into a militia, it moved towards professionalism. In December, 1921, Frunze published “15 theses” on Unified Military Theory, which argued, among other things, that the Soviet Union was not yet capable of a militia system.\(^{52}\) Urbanization, industrialization and a strengthening of class consciousness would need to precede militia development.

Instead, Frunze proposed the creation of a cadre system comprised of elite officers well versed in “proletarian warfare.” This meant, among other things, an emphasis on technological knowledge, training in mobility and personal initiative.\(^{53}\) Conscript recruits would fill out the ranks after basic training. Such a system would also allow the Red Army to remain relatively small until a major threat developed; expansion could then proceed rapidly. By 1924, Frunze had created a doctrine that which looked very similar to that which Hans von Seeckt was developing simultaneously in Germany.

The officer corps was largely composed of former Tsarist officers, another product of necessity. At the outbreak of war, 75% of the Red Army’s officers at division level or above were former Tsarist officers; by the end of 1920, that number had risen to

---

\(^{53}\) Ibid, 47.
almost 83%.\textsuperscript{54} This situation created serious distrust of Red Army leadership among the political elites of the Communist Party. Cadre training offered a chance to refill these ranks with ideologically sound and militarily competent new officers. Due to Frunze’s doctrine and the need to replace older Tsarist officers, the Red Army began to emphasize large-scale professional military education. By 1925, the Red Army contained approximately 562,000 soldiers, with a disproportionate number of them officers and non-commissioned officers.\textsuperscript{55} Frunze wanted to have enough officers to enable the expansion of the Red Army to approximately 2 million men in the event of conflict.\textsuperscript{56}

The Red Army had a number of major deficiencies in 1920. The two greatest were the lack of trained, professional military officers (who were also politically acceptable to the Communist leadership) and a lack of modern equipment.\textsuperscript{57} The Russian military had been the least technologically advanced of the great powers before and during World War I. The Russian Civil War further reduced an already limited pool of human expertise and industrial capital. Deeply feared by the other major powers, the USSR found itself isolated from technological developments in Western Europe. Frunze’s ideas and Soviet technological needs encouraged the search for a suitable partner. By 1920, Germany and the Soviet Union had reached a series of agreements establishing the parameters of officer exchanges and the potential for the sharing of technology.

\textsuperscript{55} Ziemke, \textit{The Red Army}, 151.
\textsuperscript{56} Ibid, 151.
\textsuperscript{57} Ziemke, 4.
CHAPTER 6: TUKHACHEVSKII AND SOVIET STRATEGIC THOUGHT

While Von Seeckt was reshaping the Reichswehr and Frunze was pushing for change in the Red Army, a young, ambitious officer, and a close companion of Frunze’s, was beginning to imagine a new way of war. Frunze’s premature death in 1925 opened the door for this officer’s advancement. While Kliment Voroshilov, something of a traditionalist and a close ally of Stalin’s, took over the reins of the Red Army, Mikhail Tukhachevskii became the Soviet military’s most influential thinker and strategist. The ideas that he began to formulate, starting with a publication in 1920, became the foundation of Russian tank warfare. Like the innovations of Von Seeckt and Volckheim, they required an arena like Kama for testing and development.

Born in 1893 to an impoverished noble family, Mikhail Nikolaevich Tukhachevskii possessed an artistic temperament, but poverty meant his only route to a college education lay with the Tsarist Army. He distinguished himself in World War I, but was captured by the Germans. He escaped and returned to Russia a Marxist, just in time to offer his services to Trotsky in 1918. He served as one of the senior Red Army officers in the Russian Civil War, then (as Trotsky’s advisor) helped shape the Red Army afterward. He was assigned as Director for the Study of Strategy at the Red Army War

58 Richard Simpkin, Deep Battle: the Brainchild of Marshal Tukhachevskii, (London: Brassey’s Defense Publishers, 1987), 4-8. Tukhachevskii played both the piano and violin, and had actually made violins as a young man to help support his family financially. He, his father and brother traveled around their region performing concerts as a trio in his youth. A musical conservatory seemed likely in his future, but his family’s desperate financial straits prevented this.
College in May, 1924, a position that gave him an opportunity to begin writing books on his theory of warfare.\(^59\) He reached his zenith as Marshal of the Soviet Union, directing the reformation of the Red Army along his own theoretical lines in the mid-1930s.

Tukhachevskii’s major works reveal four principal themes: political warfare, “Deep Battle,” the concentration of armored vehicles, and what would later become known as “combined arms.” Tukhachevskii started nearly all of his works by writing that warfare itself is only a means to a political end; strategic considerations must inform tactical decisions.\(^60\) However, he also constantly noted that political leaders should not interfere in the execution of tactics, a bold argument in 1930s Moscow.

Clausewitz, a favorite of Lenin’s, became Tukhachevskii’s guiding influence on the nature of war. Unlike Von Seeckt, he always tied political ends to military means. In the 1920s, many Soviet officers advocated the concept of “mass psyche” and the use of class divisions in opposing armies to cause them to collapse.\(^61\) Tukhachevskii wrote that such concepts constituted “pernicious military idealism.”\(^62\) In 1924, he clarified his own stance: “an operation consists in the organized struggle of each of the armies to achieve the complete destruction of the opponent’s vital material strength… the destruction of the enemy is not the end, it is only the means.”\(^63\) For Tukhachevskii, modern war, dependent as it was upon technology and mass production, would invariably become a struggle of

---

\(^{59}\) Simpkin, 8.


\(^{62}\) Ibid, 81.

\(^{63}\) Ibid, 86.
attrition determined by superior economic organization. He noted that the better army (the German Army) lost during the First World War largely as a product of economic conditions. His early writings united Marxism with rational strategic thought against a tide of idealism within the Red Army.

Tukhachevskii’s second thesis, for which he is most famous, is the idea of “Deep Battle.” Beginning with his first book in 1924, he argued for the concentration of an offensive force at a narrow point, followed by a penetration of enemy lines and destruction of enemy logistics and communication. This would be followed by encirclement and annihilation of enemy units. This theory became the foundation of Field Manual PU-36, Tukhachevskii’s masterpiece. To achieve penetration and encirclement required the concentration of a mass force, a “Shock Army.”

Tukhachevskii’s third thesis, integral to “Deep Battle,” was the need to concentrate armored units into these “shock armies,” capable of racing behind enemy lines and capturing depots, cutting off lines of retreat and overrunning command posts. This force would be capable of using its superior speed to encircle enemy units and, in conjunction with air power, destroy them. This required the separation of tanks and mechanized units from main-line infantry units, and was, as a result, deeply opposed by many influential Red Army Commanders, such as the powerful Marshal Kliment

---


Voroshilov, who headed the Red Army from 1925 until 1934. Although Tukhachevskii included the idea in PU-36, it became a taboo concept after his execution in 1937.

His fourth major concept was the idea of combined force actions. He believed that modern warfare depended upon the successful relationship between all military branches, particularly emphasizing the need for close air support and communication between shock armies of armored vehicles and their infantry support units. A successful shock army would require the concentration of a “force many times superior to the enemy not only in infantry but in artillery, aviation, and other technical forces too.” 66 Perhaps most astutely, he argued that the increasing radius of new aircraft might encourage air forces to seek independence from ground forces and focus on strategic bombing. 67 Instead, he suggested that while bombing industrial centers should not be ruled out, air power would be more effective strategically in support of offensives and encircling actions.

One must read Tukhachevskii’s writings carefully. He was forced by circumstances to write in a polemical and esoteric style. One can see a clear transition from his most lucid works, written while Lenin lived, to more political, jargon-filled content written under Stalin. Tukhachevskii, like De Gaulle in France and Guderian in Germany, faced constant opposition from the military establishment, but triumphed by 1936, reforming the Red Army in line with his vision. After his execution, his ideas

67 Ibid, 94, 97.
remained buried until 1942, when they again became the foundation of Soviet military strategy.  

Tukhachevskii was also intimately involved with Kama. He visited German facilities in Russia; he also took a trip to Germany itself to see German tank designs and training methodology. He became one of the Soviet Union’s top experts on Soviet-German cooperation, and developed good relations with a number of German staff officers. That did not prevent him from publishing, with Stalin’s permission, an article in 1935 which stressed the plans of the Nazis to begin a war with France and Great Britain, then to turn on the Soviet Union. It revealed technical and tactical data about German military plans that were supposed to be a warning to the West, although it also wildly exaggerated the military capabilities of the Wehrmacht in 1935, probably intentionally. Tukhachevskii, who was concerned at the lack of major tactical developments in the West, seems to have feared the potential for crushing defeat if Germany brought her forces up to full strength and attacked France.

---

68 Tukhachevskii’s memory was fully rehabilitated by Nikita Khrushchev in January 1957.
69 Nekrich, 67.
70 Ibid, 87.
CHAPTER 7: SOVIET-GERMAN DIPLOMATIC COOPERATION

After World War I, the Germans and the Russians had many reasons to cooperate. Both military establishments were prevented by the international situation from developing the resources—particularly technological—to reach their respective security goals. Despite deep ideological differences, the stage was set for cooperation. A program of exchange with the Soviets was supported within the Weimar Republic first by Chancellor Joseph Wirth, a member of the moderate Catholic Deutsche Zentrumpartei; he became the first patron of the military projects in the Soviet Union.72 Later, while Foreign Secretary (1923-1929), Gustav Stresemann reluctantly allowed the continuation of the cooperation with the Soviet Union.

It was Reichswehr leaders rather than Weimar politicians who took the lead in cooperating with the Soviet Union. Hans Von Seeckt realized the advantages of exchange with the Soviets very early. Even as irregular German troops like the Iron Division were fighting the Communists in the Baltic States, Von Seeckt approached Soviet leadership through the Turkish émigré Enver Pasha.73 These early communications bore fruit, as the Germans provided intelligence on the Polish Army during the Soviet-Polish War.74

72 Ibid, 7.
74 Ibid.
In the spring of 1922, Soviet and German representatives attended an economic summit in Genoa, Italy. After the conclusion of the summit, Soviet and German delegates met at the nearby town of Rapallo. The Treaty of Rapallo was the product of their discussions, signed by representatives of each state on April 16, 1922. It would be the foundation of interwar German and Soviet relations.  

Its primary measures involved economic cooperation and normalization of diplomatic relations. However, a secret addendum to the treaty, signed on August 11, 1922, by senior German and Russian generals, paved the way for broad military cooperation between the two states. Importantly, this secret addendum included a provision allowing the Reichswehr to set up military bases in the Soviet Union.

Aviation was the first area of cooperation. The Germans built an aircraft plant near Moscow in 1923. Two year later, they established a flying school at Lipetsk, which would eventually train more than 1200 pilots. A chemical weapons facility was built and operating at Tomka by early 1926, producing such toxic agents as diphosgene and yperite. The Soviets, and Stalin in particular, were very satisfied with the results of the Tomka project, much of the expenditure for which had been covered by the Reichswehr. Voroshilov, head of the Red Army, wanted access to tanks and armored

---

76 Ibid.
77 Nekrich, 76-78.
78 Mueller, 113.
79 Nekrich, 50-51.
80 Vercamer, Pipes, 3.
81 Ibid.
cars, and pressed for cooperation in that area. The Soviets entered into a series of secret negotiations with the Germans in Moscow in October, 1926.82

Meanwhile, in Berlin, Von Seeckt and his staff had a decision to make. Their interest in developing mobile warfare required them to explore the use of tanks. However, the Treaty of Versailles banned the development or use of armored vehicles. At first, Von Seeckt and his staff used German contacts in Sweden to give his officers access to tanks. Famed Panzer General Heinz Guderian drove his first tank while on a trip in Sweden.83 However, Sweden was wary of international attention, and seemed unwilling to give the Germans the sorts of facilities they needed to pursue their experimentation with the tank.

As a result, von Seeckt decided instead to pursue an agreement with the Soviet Union. The Treaty of Rapallo Military provisionally established cooperation. A further agreement, the Treaty of Berlin, was signed in April 1926. This latter treaty guaranteed non-intervention and neutrality by both Germany and the Soviet Union in the event of war being declared against either state. It was accompanied by a loan of 300 million marks by the German government to the USSR in June of the same year.84

Both governments approached the new round of secret negotiations in the fall of 1926 with caution. The Weimar Republic’s leadership was worried at the prospect of being discovered by the British and French, while the Soviets were worried that the

82 Ibid, 55.
revelation of cooperation with “imperialists” would undermine their regime. \(^{85}\) Despite these concerns, in October, 1926, Reichswehr Colonel Hermann Von Der Lieth-Thomsen secretly began negotiations with Janis Berzins, the head of Red Army Intelligence. \(^{86}\) The two men signed an agreement which laid out the organization and founding of a tank school somewhere in the environs of Kazan in Tatarstan. \(^{87}\) They agreed that the Germans would cover the costs of construction, while the Soviets would handle the process of construction and any repairs. \(^{88}\) The facilities would operate for three years, with the possibility of an extension. \(^{89}\) Students would begin training in the summer of 1927, and tanks would be made available by the Germans as soon as possible for initial testing. \(^{90}\)

However, just a few months after the completion of this treaty, in December 1926, Social Democrats in Germany publicly released documents about the secret cooperative projects with the Soviets. Even worse, using this information, the *Manchester Guardian* published a number of articles further highlighting the illegal cooperation between the two states. \(^{91}\) Gustav Stresemann balked at the idea of moving forward after this revelation. The Soviets panicked, too. Ongoing talks at the highest levels of Soviet government discussed the liquidation of all cooperative projects with the Germans. \(^{92}\)

---


\(^{86}\) Sultanbekov, 36.

\(^{87}\) Ibid.

\(^{88}\) Ibid.

\(^{89}\) Ibid.


\(^{91}\) Nekrich, 16.

\(^{92}\) Gorlov, 36.
In the end, the military establishments of both countries prevented the elimination of the joint military projects, but as a result, funding and personnel were scarce for months, particularly from Germany. Construction at Kama proceeded slowly for a year and a half. It was not until February 6th, 1928, when Otto Gessler, the Defense Minister, convinced Stresemann to proceed with “active cooperation” with the Soviet Union.\(^93\)

It is important to note that the response within the Reichswehr to the scandal in December, 1926 was increased secrecy. Von Seeckt and his staff pushed for even less transparency towards the Reichstag, and the greatest degree of concealment from politicians about activities in Russia.\(^94\) A few years later, journalist and pacifist Carl von Ossietzky printed revelations related to the school at Lipetsk, for which he would be tried for treason; however, the impact of the information he released was limited by how little members of the Reichstag knew of Reichswehr activities.\(^95\)

\(^{93}\) Ibid, 22.

\(^{94}\) “Memo: Private Geldsammlungen,” April 8, 1927, Reichswehr, National Archive of Records Seized. Translated by the current author.

CHAPTER 8: CONSTRUCTION AND DEVELOPMENT, 1926-1929

After the completion of negotiations in Moscow during the fall of 1926, the Reichswehr dispatched Major A.D. Malbrandt to select, in cooperation with the Red Army, an appropriate location for a tank school. This team settled upon the city of Kazan, some 500 miles east of Moscow. Soviet officers decided that the central living facilities would be based out of Kargopol Barracks, an old Tsarist facility that had once housed the Fifth Dragoons Regiment.\(^{96}\)

After they made this initial selection von Seeckt dispatched three German engineers, led by Malbrandt, to explore the area around Kazan to find a suitable site for tank driving and maneuvers. They were accompanied by representatives from the Soviet Revolutionary Military Council.\(^{97}\) Together, they decided that a site some six miles from Kargopol Barracks could serve as the training and testing ground for the tanks. Plans were made for the construction of garages and other facilities there. The Soviets selected the name “Kama” shortly thereafter, a combination of the names Kazan and Malbrandt. This turned out to be a very poor code name, as a river near the site also bore the same

---

\(^{96}\) Gorlov, 33.

33

The terms of the treaty signed in October 1926 stipulated that the Germans would be in charge of training, but the running of the school would be conducted jointly. Thus, around this time, Soviet leadership selected as its representative at Kama an old Bolshevik named Josef Unshlikht. This was a telling choice, indicating the importance the Soviets assigned to the newly founded school. Unshlikht was a heavyweight within the Communist Party and important intelligence officer. He had been an acquaintance of Lenin, served as the deputy chairman of the NKVD and was one of the first men assigned to the GRU when the Soviet Central Committee created it in 1923. One of the primary reasons for his selection was his experience with Germany: He had been sent by Lenin to start a revolution there in 1923.

The German officer paired with Unshlikht was Oswald Lutz. Lutz was an early proponent of mobile warfare and the power of tanks, and, by rank at least, the head of the

---

98 Habeck, 81.
99 “Special’naja svodka o sostojanii «Tehnicheskikh kursov Osoaviahima» na 15 avgusta 1930 goda, Soveshheno sekretno.”
101 Mawdsley, White; 49, 72.
102 Ibid. Unschlikt’s personal background made him something of a strange choice. A Polish Jew, Unshlikht had been an original member of the Petrograd Soviet, had fought against the Germans in the Baltic and served in a variety of commissar roles during the Russian Civil War. After its conclusion, he was sent by Lenin to Germany in November, 1923 to organize a German CHEKA and bands of “Red Hundreds” to overthrow the Weimar Government (Madwsley, White, 49). He returned to the Soviet Union, his work unaccomplished, but was rewarded with a candidate position on the Central Committee of the Bolshevik Party, and in that position began to hold a portfolio of military supervision duties. After his supervisory role at Kama, Unshlikht would go on to command the Red Air Force until his arrest in June, 1937, during the Great Purges (Mawdsley, White, 49). While he was indeed an influential Soviet officer, his history of fighting Germans must have complicated his relationship with his German opposites.
103 Lutz served as a captain in the Bavarian Engineers Corps during World War I. The 100,000 man army retained him and gave him the position of Inspector of Mobile Troops, from which he promoted mobile
German armored forces at the beginning of World War II. Heinz Guderian served as his chief of staff beginning in 1931, a role he would use to become one of the German Army’s leading ideologues on Panzer warfare. Lutz visited Kama and supervised the selection of students and staff, but never resided there.

These two men became the supervisors of the work at Kama, and would play an important role in acquiring resources for the facility from their respective governments. However, because of political circumstances - particularly the scandal with the Social Democrats - little progress was made on the construction of the school during the first sixteen months of its existence. Almost no equipment was forthcoming from Germany in the winter of 1926 or the spring of 1927. The school found itself neglected by both militaries.

During these first few months of construction, only a handful of individuals were present at Kama. Major Malbrandt, who had selected the site, along with two assistants moved to Kazan a few weeks after the conclusion of the secret negotiations, in October, 1926. Throughout 1927, a number of civil and military engineers arrived from Germany, mostly singly or in pairs. Conrad Bauman, who would become an instructor, warfare and argued that it was tanks which had guaranteed the Allied victory. The rapid expansion of the German Army after Hitler’s victory led to his promotion to head of all Panzer troops; in this role, he supervised the rapid growth of Germany’s tank forces.


Gorlov, 35; “Special’naja svodka o sostojanii «Tehnicheskix kursov Osoaviahima» na 15 avgusta 1930 goda, Sovershennno sekretno.”

Vercamer, Pipes, 9.

Ibid.

Ibid.
arrived in April 1927. Georg Hoffman, a 28-year old engineer, arrived in July 1927, to take the position of Director of Production, supervising the engineers. His deputy, Walter Schulz, arrived later that year. Also present from the very beginning was a chief mechanic, Paul Lemke. Others trickled in throughout the year to the partially refurbished facilities at Kama. Their main task involved modifying a pair of agricultural tractors into self-propelled guns for testing and practice. These two models, the Hanomags, were very primitive, but allowed the German engineers to test mounted guns and armored plating.

On the Soviet side, members of the construction team were also present as early as October, 1926. Unshlikht placed an officer named Kadushin in charge of supervising construction. Within six months, Kadushin had gotten himself into trouble by refusing to reside at the Kargopol Barracks; he moved instead to a hotel in the city center. When one of his subordinates denounced him in May, 1927, Kadushin was dismissed immediately, officially for “mistakes and impolitic behavior.” He was replaced with a

---

110 “Donesenie nachal’niku Osobogo Otdela PP OGPU TR Vremennogo Nachal’nika 1 Otdelenija Osobogo Otdela Ahmetova.” Tatarstan Oblast Archives. 

112 It is interesting to note that the Soviets carefully monitored the political affiliations of all of these early arrivals. Georg Hofmann, for instance, was already enamored with Fascism before his arrival, and was carefully monitored by Soviet intelligence; they noted he had vacationed in Italy and been highly impressed with Mussolini, and spent time trying to convince his fellow students that the Nazis would improve things in Germany.

113 Hanomag is shorthand for Hannoversche Maschinenbau AG, a heavy machinery company that produced the tractors.

114 “Donesenie nachal’niku osobogo otdela PP OGPU TR vremennogo nachal’nika 1 otdelenija osobogo otdela Ahmetova.”

115 “Special’naja svodka o sostojanii «Tehnicheskih kursov Osoaviahima» na 15 avgusta 1930 goda, Sovershенно sekretno.”
“permanent representative” named Petrechenko, and construction resumed. Between October, 1926 and July, 1929, Kadushin and Petrechenko would supervise approximately 400 workers, who “repaired and altered old buildings and constructed new buildings, garages, workshops, etc.”

Kama received several important visitors in 1928 and early 1929 who brought money and attention from both the Red Army and the Reichswehr. Kliment Voroshilov, the head of the Red Army, organized a visit by senior members of the Reichswehr in August, 1928. Voroshilov hoped to advance the joint enterprises, some of which, like Kama, had not received the equipment from Germany necessary to reach full operational capacity. The head of this German delegation was Major general (and future Chief of Staff) Werner Von Blomberg. Blomberg visited Kama in late August, where he decided to remove several of the staff members, including Malbrandt. However, he was generally impressed by the progress of construction and the work of the German engineers. Based both on his visit and extended discussions with Voroshilov, Von Blomberg wrote a report arguing for the dispatch a number of tank prototypes to Kama as soon as possible.

He, like Voroshilov, realized the need for tank prototypes for any progress to be made at the facility. The necessity of getting the school operational led to a secret compromise: Germany’s Rheinmetall Corporation would export the tanks to the Soviet

116 Ibid.
117 Ibid.
119 Ibid, 264
120 Erickson, 264.
121 Ibid, 264.
Union under the guise of “tractors.” Included in the shipment, just in case, were a number of tractor “plows” to lend the cover story credibility. The first six tanks arrived in May, 1929.

122 Nekrich, 60.
123 Janis Berzins, “Memo on Liquidation of Facility at Kazan,” July 29th, 1933. Manuscripts and Archives Collection, Yale University. Translated by the current author.
CHAPTER 9: THE FIRST CLASS AT KAMA, 1929

By March 1929, construction was nearing completion and a number of German and Russian students arrived at Kama. There is some lack of clarity about the students who attended, particularly at this early stage. Surviving German records are contradictory on a handful of the names, and the Soviets did not record their own attendees except by first name.¹²⁵ By comparing and cross-referencing lists, however, we can uncover a fairly accurate picture of the German students at the school, particularly after 1930, when Soviet records of German students at Kama are much more thorough.

It can be said with certainty that in 1929, the Germans assembled a substantial engineering and mechanical team at Kama. There were at least three company engineers from Rheinmetall-Borsig and Daimler-Benz present, as well as an electrical engineer, a radio mechanic, an armorer, and several general mechanics.¹²⁶ The Soviets had some support staff present as well, though most of them had little to do with the workshops. The record indicates that on the Soviet side, there were a number of carpenters, a few instructors, a team of translators, painters, plumbers, janitors, electricians, cooks, and eight guards.¹²⁷ According to Soviet records, a number of skilled Russian workers carried

¹²⁵ Ibid.

¹²⁶ These Soviet Records are confirmed by individual combat records listed Axis Biographical Research.

¹²⁷ “Special’naja svodka o sostojanii «Tehnicheskikh kursov Osoaviahima» na 15 avgusta 1930 goda, Sovershenno sekretno.”
out the adaption and assembly of tank parts coming from Germany, under the supervision of German engineers.\textsuperscript{128}

Soviet records on Kama report one interesting figure who arrived around this time. Paul Bernhardi was a Russian-born German from the vicinity of St. Peters burg. He was apparently fluent in Russian, and was listed on the staff as a translator.\textsuperscript{129} However, the Soviets and Germans had a number of other individuals who performed most of the actual translation work in the classes offered at Kama. The Soviets were sure Bernhardi was a German military intelligence officer.\textsuperscript{130} His background in chemical engineering made his appointment as translator even more conspicuous, especially as he had also served as translator at Tomka, the chemical weapons plant. The Soviets noted on his personnel file in 1930 that “apparently, the appointment of Bernhardi is pure espionage.”\textsuperscript{131} They also noted that he had considerable influence over the German Director Radlmaier.

By the time Kama was fully operational, there were a total of forty five Germans at the base in Kazan, including nine women, most of whom were the wives of senior officers at the facility.\textsuperscript{132} It may have been that the Germans who had arrived earlier had been cavorting with local women, as there are notes in Russian records about “gifts” to

\textsuperscript{128} Ibid.
\textsuperscript{129} Ibid.
\textsuperscript{130} Ibid.
\textsuperscript{131} Ibid.
\textsuperscript{132} “Special’naja svodka o sostojanii «Tehnicheskikh kursov Osoaviahima» na 15 avgusta 1930 goda, Sovershenny sekretno.”
local citizens in Kazan by the first wave of German officers.\textsuperscript{133} Such activity may have encouraged the Soviets to allow the German officers to bring their wives with them.

By this time, the Soviets had a total of 131 staff and 10 students at Kama.\textsuperscript{134} A professor noted only as Nikolai Fedorovich handled the daily needs of the Russians and met with his German equivalents as needed. The Soviets also had a party secretary present who tried to prevent too much fraternization with the Germans.\textsuperscript{135} The Soviets complained about the Germans habit of giving gifts to workers and Soviet students. A paramedic named Smirnov was caught taking “gifts” and selling them on the black market. A 1930 intelligence report notes ominously that “we intend to bring Smirnov to justice as soon as we find a suitable candidate to replace him.”\textsuperscript{136}

Now that the school was fully staffed and armored vehicles began to arrive (the first in May, 1929), the German officers in charge of instruction began to put together a curriculum. The courses got underway on March 15, 1929, with 10 German and 10 Russian students.\textsuperscript{137} An interpreter was present in each session to translate for the German instructors. At least a few of the German training officers spoke some Russian, according to Soviet military intelligence records, which may have eased communication.\textsuperscript{138}

The first four-month session, which ran until mid-July, was, by necessity, a series of improvisations. This was in part a product of the delay in shipments from Germany;

\textsuperscript{133} Ibid.
\textsuperscript{134} Ibid.
\textsuperscript{135} Ibid.
\textsuperscript{136} Ibid.
\textsuperscript{137} Ibid.
\textsuperscript{138} “Special’naja svodka o sostojanii «Tehnicheskikh kursov Osoaviahima» na 15 avgusta 1930 goda, Sovershenno sekretno.”
courses were begun without most of the important military equipment. By the time the second four month course began during the summer of 1929, German officers had laid out a basic curriculum. They divided lessons between theory and practical training. The academic lessons focused on the mechanical elements of the tanks: Students memorized the varieties of tanks, the models of engines, weapons and ammunition types. Instructors conducted lectures on general platoon and company tactics of armored units. Courses were also offered on logistics, maintenance, basic repairs and communication with supporting infantry.

While these courses could be taught in classrooms, the real purpose of the facility at Kama was to provide hands-on experience in tank combat for officers, as well as an opportunity to test the vehicles’ capabilities. The major shipment of supplies from Germany, which arrived in May 1929 under the cover of the Rheinmetall Corporation, completely changed the experience of the students at the school. Six tanks arrived at Kama; these were medium tank prototypes the Reichswehr had ordered from Rheinmetall, Daimler-Benz and Krupp several years earlier. Captain Hans Pirner was in charge of supervising the production of these vehicles back in Germany. He appears to have accompanied them to Kama in 1929, though he is listed by Soviet sources as having been replaced by Rudolf Merz as Head of the Testing Department sometime in the

---

139 Gorlov, 34
140 Ibid.
141 Kurtukov.
143 “Special'naja svodka o sostojanii «Tehnicheskikh kursov Osoaviahima» na 15 avgusta 1930 goda, Sovershенно sekretno.”
spring of 1930.\textsuperscript{144} There were two of each tank prototype, differing in transmissions, suspensions and armament. Along with the tanks, six cars, four trucks, large amounts of radio equipment and specialized optical supplies also arrived.\textsuperscript{145}

This enabled, beginning in June, the first formal tank instruction. As most of the vehicles required five or six men to operate, mastering these machines took weeks of practice: “students mastered the skills of driver, tank commander, radio operator and gunner.”\textsuperscript{146} They then took turns commanding the vehicles, then small formations of tanks. Instructors gave the cadets an examination on November 15\textsuperscript{th} of that year, having to maneuver at night, overcome various earthen obstacles, and drive through water barriers.\textsuperscript{147}

Among the first men to pass this examination were Ritter Wilhelm von Thoma, who would go on to serve as a major-general on the Eastern Front and in North Africa, and Josef Harpe, who would run Kama from 1931 until its closure in 1933.\textsuperscript{148} Harpe served as a divisional and corps commander in World War II, before being promoted in 1944 to serve as the commander of Army Group North on the Eastern Front, one of the Wehrmacht’s most senior positions.\textsuperscript{149} Most of the students who passed this examination in November 1929, returned in 1930 for the spring session, completing their training at Kama by mid-summer.

\textsuperscript{144} Ibid.
\textsuperscript{145} Ibid.
\textsuperscript{146} Gorlov, 35.
\textsuperscript{147} Sultanbekov, 39.
\textsuperscript{149} German Generals, “Josef Harpe,” http://www.generals.dk/general/Harpe/Josef/Germany.html
CHAPTER 10: THE CRITICAL YEARS, 1931-1933

In the short time between 1930 and 1933, Kama expanded massively. Large numbers of new students arrived, accompanied by new machines and prototypes. Malbrandt finally returned to Germany in 1930, over a year after Blomberg had met him in Kazan and decided to recall him.\(^{150}\) He was replaced by Ludwig Ritter von Radlmaier, who ran the school from 1930 until the summer of 1931. He, in turn, was replaced by Josef Harpe, an alumnus of the school who stayed on through the school’s closure. These two men would become important Panzer commanders during the war. Harpe’s career has already been noted. Radlmaier would rise to the rank of Major general during the Second World War, commanding various Panzer units including the 4\(^{th}\) Panzer Division.\(^{151}\)

Between 1930 and 1933, an additional twenty German students attended the school. Soviet numbers increased more considerably: More than 100 students participated in the summer course in 1932.\(^{152}\) The Germans who attended the school were usually oberstleutnants (equivalent of a lieutenant colonel), and most were from units associated

\(^{150}\) Erickson, 264.
\(^{152}\) Gorlov, 37.
with the Inspectorate of Motorized Vehicles. The Soviets sent a mix of combat and staff officers, instructors from Soviet military academies and a number of engineers.

The training staff during this period expanded considerably to accommodate a new influx of materiel and students. By late 1930, there were nine academic instructors at Kama. The “Lehrgangsleiter” taught classes on tactics, supervised war games and oversaw the curriculum. Under him were three instructors, specializing in fire control, machine guns and radio communications, respectively. Also employed at the school was a team of radio technicians, who worked on engineering radios that could function in the difficult conditions of a moving tank. In addition, the school had five instructors who taught the students how to drive their vehicles. At various times, other instructors also joined the school to offer various special courses.

Captain Ernst Volckheim was the most important of these new instructors. He taught at the school from 1932 until its closure. He is seen by some historians, like James Corum, as the real genius behind German Panzer development. Volckheim published a number of articles in the interwar period arguing for the concentration of tanks and the use of medium and light tanks in encirclement maneuvers. He was perhaps the most important advocate of radios in tanks, a concept he had first written about in 1924.

---

153 “Special’naja svodka o sostojanii «Tehnicheskih kursov Osoaviahima» na 15 avgusta 1930 goda, Sovershenno sekretno.”
154 Ibid.
155 Ibid.
156 Ibid.
158 Ibid, 108.
Besides the training conducted at Kama, German mechanics were constantly at work in the camp’s garages, modifying and testing new equipment. At first, they had little with which to work: the first officers to arrive at Kama in the winter of 1926 had had to make due with a single, usually non-functioning tank prototype. The next summer, they received two commercial tractors, which they modified into self-propelled guns. But by 1929, the most advanced prototypes available were being brought to Kama. The famous Ferdinand Porsche had even designed one of Kama’s test-vehicles, his first major foray into tank design. Besides these early models, a total of eight different German and British tank models saw testing at Kama, mostly during the critical years of 1931-1933. These eight prototypes served as the models for almost all future German tank development, as well as having a huge impact on Soviet tank designs.

The Reichswehr secretly contracted with four companies to produce tank prototypes for the military between 1922 and 1926. Rheinmetall-Borsig, MAN, Krupp and Daimler-Benz received orders for two types of tanks: light tanks (10-12 tons) and medium tanks (up to 23 tons). They were also ordered to use the designation of

---

159 Sultanbekov, 36-38.
160 Ibid.
161 White, 48.
162 Ibid.
“tractor” in all communications and financial reports, to hide their real purpose, which was illegal under the Versailles Treaty.

The first step in tank development at Kama came in 1927. The Reichswehr engineers there began experimenting with turning commercial tractors into self-propelled armored guns. As noted earlier, the engineers made use of two tractors built by the Hanomag Corporation. The first attempted modification involved the addition of a 37 mm anti-tank gun mounted on a pedestal, which could only traverse 30 degrees. Mounted on the rear of the tractor was a machine gun. The vehicle itself, a 1922 model, had an engine about as powerful as a riding lawnmower today.

On their second attempt, the engineers used a higher powered tractor (with 50 horsepower) and equipped it with a 75mm gun. The move from 77 mm cannon, a standard gage for German artillery during World War I, to 75mm, was a permanent one for the Reichswehr. The 75 mm gun would become standard on many German vehicles - including the Sturmgeschutz and Mark IV Panzer - by the beginning of World War II. The gun pedestal on this model had full traverse, a move towards the turret designs of

---

165 White, 48.
166 Gorlov, 34-36.
later models.\textsuperscript{169} This second attempt by the German engineers at Kama was a step towards the self-propelled guns of World War II; in many ways, it was the ancestor of the Sturmgeschutz series of vehicles, which had a production run of over 10,500 vehicles.\textsuperscript{170}

However, by May 1929, German engineers no longer had to experiment on farming tractors. Six tanks, accompanied by a great deal of other equipment, finally reached Kama. The first model to reach Kama in 1929 was the Grosstraktor I. The Grosstraktor I had been conceived in 1925, when the Reichswehr gave Daimler-Benz, Krupp and Rheinmetall specifications for a medium tank that it wanted tested by 1929.\textsuperscript{171}

Each company produced a test model while working in cooperation, though Daimler Benz, under Ferdinand Porsche, worked on his prototype with greater relative independence from Krupp and Rheinmetall.\textsuperscript{172} With a weight of about 18 tons, these Grosstraktors were the first tanks to mount a 75mm gun in a rotating turret. They also had a limited amphibious capability, for the fording rivers and shallow bodies of water.\textsuperscript{173} With a crew of six, they were larger than most comparable British models, though they were still outclassed by the French Char B-1, a heavy tank of some 26 tons. By comparison, the most prominent turret-tank of World War I, the French Renault FT, weighed just 6.5 tons.\textsuperscript{174}

After the initiation of contracts with the Reichswehr, Rheinmetall began drawing up plans for a Grosstraktor II. Rheinmetall completed the first prototype in 1928, and was

\textsuperscript{169} This, it should be noted, was not entirely revolutionary, as the French had already designed a tank with a rotating turret in the First World War.
\textsuperscript{170} White, 35, 48.
\textsuperscript{171} Parada.
\textsuperscript{172} Ibid.
\textsuperscript{173} Ibid.
\textsuperscript{174} Peter Kempf, “Specifications of the Renault F-17,” 2009, Landships
and sent it to Kama for testing. It too bore a 75 mm gun, but mounted three, rather than one, machine gun.\textsuperscript{175} The overall dimensions were slightly larger, and the final, armed model weighed 21 tons.\textsuperscript{176} Its engineers designed it to compete with the British Medium Tank Mark III. It had a horsepower of 250 and a top speed of 12 miles per hour, about three times as fast as the common tank models of World War I.\textsuperscript{177} The Grosstraktor II took into account some of the design flaws of the Grosstraktor I, simplifying component parts and adding side access doors.\textsuperscript{178} A pair of Grosstraktor IIIs, with some minor modifications to its transmission and suspension, was also sent to Kama in 1931.\textsuperscript{179} Both of these latter used a purely coil spring suspension, abandoning Porsche’s leaf-style suspension.

With the tanks also came three new experimental armored cars. Daimler-Benz, C.D. Magirus and Büssing corporations produced these. They were designed as heavily armored personnel carriers and scout vehicles. Each had eight to ten wheels, and was intended to carry a large, domed armored platform to protect the troops inside. German instructors and mechanics tested these extensively at Kama between 1929 and 1930, but funding shortages meant that German officers directed their efforts towards tank development rather than armored cars.\textsuperscript{180} The Reichswehr decided to drop the designs,
though the SdKfz 231, a six-wheeled personnel carrier which Germany mass-produced during the war, was based on these three experimental designs.\footnote{Ibid, 35.}

German officers also tested two classes of Leichttraktor at Kama. The specifications were delivered to Krupp and Rheinmetall in 1928. The designs mandated a chassis which could be used to build a variety of other vehicles, such as troop carriers or self-propelled guns.\footnote{Parada.} Engineers intended these tanks to be manned by a four man crew, and powered by 100 hp engines. Krupp and Rheinmetall came up with nearly identical designs; the major difference, once again, being the suspension: Krupp used coil springs while Rheinmetall used leaf springs. Both used the 37 mm gun, which German engineers had tested in the Hanomag Tractor I back in 1927. Engineers at Kama added a machine gun to the rear of the tank in early testing. By the summer of 1930, both Rheinmetall and Krupp prototypes were at Kama, undergoing extensive testing.

The other type of tank that was at Kama was the Rader-Raupen Kampfwagen M-28.\footnote{Special’naja svodka o sostojanii «Tehnicheskih kursov Osoaviahima» na 15 avgusta 1930 goda, Sovershenno sekretno.”} Built by the German-Swedish consortium Merker, engineers drew up initial designs for a treader tank whose treads could be removed for fast road travel. This vehicle was the product of early German attempts to use Sweden as a base for tank development. Merker produced six prototypes by 1930, one of which the Reichswehr shipped to Kama for testing.\footnote{Thorlief Olsson, “Swedish Pansartrupperna,” 2003, Swedish Tanks, January 6, 2012. http://mailer.fsu.edu/~akirk/tanks/swe/Swedish.htm} The Germans did not like the model, and ended up not pursuing the multi-use chassis the Swedes had developed. It is probable that the road
conditions around Kama prevented the Germans from seeing the high speeds the tank could achieve on paved roadways; regardless, the L-30 was the only model at Kama which was not clearly utilized in future designs.\textsuperscript{185} The Swedes tried to develop it further, creating a more complicated, lighter version in the L-80, but eventually abandoned the design and purchased tanks from Czechoslovakia.\textsuperscript{186}

Other tanks appeared at Kama besides these German models. The most important of these were two light British tanks. In 1930, the Soviet Union bought a number of British Carden-Lloyd tankettes, two of which it shipped to Kama. Similar to the light tractors being tested by the Germans, these tankettes played a role in the development of the German Mark I Panzer.\textsuperscript{187} Soviet records also indicate that they tested their own light tanks in 1932, which appear to have been very similar to the Carden-Lloyd tankettes.\textsuperscript{188}

How influential were these prototypes in creating the tanks of the future? Most of the designs tested at Kama never saw action. However, they served as models for a new generation of mechanized vehicles which would become the basis of Germany’s panzer formations in World War II. Even the improvised Hanomag tractors would become the basis, in concept at least, of the Panzerjäger tank destroyer line.

Relatively early in the testing process at Kama, the officers working there decided that the 37mm and 75 mm cannon should be the standard gun gages, both of which became standard on nearly all German mechanized vehicles. Guns were not the great challenge in tank design, however: Engineers at Kama spent most of their time with tank

\textsuperscript{185} Ibid.
\textsuperscript{186} Ibid.
\textsuperscript{187} Gorlov, 34.
\textsuperscript{188} Ibid.
transmission and suspension issues, indicated by the number of different configurations of each that appeared during Kama’s operation. From Grosstraktor I to III, engineers made a number of changes: they increased armor thickness, shrank crew size, installed a new transmission system and altered the suspension. These changes became the basis for the medium Mark III and Mark IV tanks. The Grosstraktors and the later Panzer III shared almost identical dimensions.

The Leichttraktor tested at Kama was the model most ready for production. The VK-31, as it became known, would see mass production, running a few hundred models before being replaced with a new iteration, named the Panzer I. Plans to develop the Panzer I started almost as soon as the VK-31 began testing at Kama. The new design would be finalized by early 1934, and enter mass production in 1935. The Germans produced over 1,500 between 1935 and 1939. The VK-31 would see use with the first Panzer units in the Wehrmacht. The Panzer I would appear in combat in the Spanish Civil War as well as World War II. German engineers would modify it into the heavier Panzer II, which the Wehrmacht produced during the first years of the Second World War.

The influence on Russian design appears at first glance to have been less profound, since most of the engineering work at Kama was conducted by Germans on German vehicles. However, as noted, the Soviets dispatched a number of their own light

---

189 White, 48.
190 Ibid.
191 Chamberlin, Doyle, 18.
192 Ibid.
193 Chamberlin, Doyle; 18-19.
194 Ibid, 28.
tanks to participate in maneuvers in 1932. Further, the records indicate that the testing at Kama did have profound effects on Soviet tank design. The head of Soviet mechanization within the Red Army, M.I. Gryaznov, wrote a report to the Politburo noting tersely that the following developments had been gained from the camp at Kama: “T-28: the use of a Krupp running suspension; in T-28 and T-35: the internal deployment of a team at the bow; in T-26, BT, T-28: welded chassis of German tanks, optical monitoring devices, gun sights, and the idea of combining electronic components with the machine gun.” These were significant developments, representing fundamental advances in Soviet armored technology. They also suggest that Russian engineers carefully studied German designs much while at Kama.

Even more profoundly, the testing and development that went on at Kama validated Tukhachevskii’s concept of mobile warfare, “Deep Battle.” After large scale tactical exercises conducted at Kama in 1932, the Soviets organized their first armored corps, based along German lines. The Russians began to concentrate their armored units together, as Tukhachevskii had argued. The technological and tactical ramifications on the Soviet military were profound, even if Stalin destroyed the personnel at Kama and many of the tactical developments during the military purges in 1937 and 1938.

195 Gorlov, 35.
196 Bulat Sultanbekov, 37.
197 Gorlov, 38.
198 Ibid, 38.
CHAPTER 12: INNOVATIONS WITH RADIO

One of the greatest achievements at Kama was the development of a radio that could function within a tank. From its inception, the Reichswehr devoted considerable resources towards radio development, in part because it was one of the few technologies not forbidden by the Treaty of Versailles. German radio production during the 1920s kept up with, and in some areas surpassed the developments ongoing in Great Britain and the United States.\textsuperscript{199} However, the Treaty of Versailles handicapped the Reichswehr’s ability to test radios in vehicles and aircraft. At the end of World War I, there were no two-way radios capable of withstanding the stresses of tank movement.

The technical problem was more complex than it would appear at first. Radios in the 1910s were made with crystals that required relative stability. Putting a standard commercial radio in a tank would have resulted in these crystals breaking, thus rendering the unit ineffective.\textsuperscript{200} In 1929, at Kama, German engineers discovered a way to mount relatively small two way radios into each tank, with enormous repercussions.

The key innovation required for stable transmission and reception was the vacuum tube.\textsuperscript{201} Lee de Forest, a radio pioneer in the United States, invented the De Forest Audion in 1906, a low-vacuum tube that could amplify electronic signals. De Forest was a radio pioneer in the United States, and his invention revolutionized radio technology. The De Forest Audion was a major advancement in radio technology, enabling the development of more robust and reliable radio systems for military and civilian use.

\textsuperscript{199} Macksey, 119.
\textsuperscript{201} Aitken, 202-206.
Forest further discovered in 1912 that his Audion could oscillate if a certain electrical current was run through it. This meant that an audion could transmit, as well as receive sound. However, the development of this technology into a working, stable and portable radio was not completed until the 1920s.

After the First World War, the Reichswehr’s Inspectorate of Communication Troops (IN-7) supervised a broad range of radio research, most of it conducted by private companies. German civilian researchers produced a number of breakthroughs in “ultra-short wave” transmission in the early 1920s, which were almost immediately co-opted by the Reichswehr. When the Reichswehr put in its orders for tank prototypes beginning in 1922, they required that every unit have a radio mount, even though the technology for stable transmission from a tank had not yet been developed. Ernst Volckheim, later a student at Kama, was likely the inspiration behind this remarkable foresight, as he was working in the Reichswehr’s Weapons Office when the Reichswehr placed the orders.

There were two major corporate competitors in the field of military radio production. During World War I, Telefunken was the major German producer of military radios. The company’s leadership took for granted that Telefunken would win the bidding for any major contracts in the interwar period as well. However, it was an American manufacturing firm, International Telephone & Telegraph Corporation which

---

202 Ibid, 239.
203 Ibid, 239.
204 The first commercially manufactured Audion Tube Radios entered mass production in 1924, but required significant modification before they were of use in military applications.
205 Corum, 108.
206 Ibid.
207 Ibid.
would begin developing radios that met the Reichswehr’s needs. ITT offered these radios for sale to the Reichswehr through a German subsidiary.\textsuperscript{209}

The German government must have been purchased some by 1929, as the Soviets noted the presence at Kama of a number of receivers and transmitters, a product made by ITT’s German subsidiary, Lorenz.\textsuperscript{210} This radio was almost certainly the main unit being tested in the tanks at Kama, as a few years later, Lorenz won the huge military contracts to build radios for both the Luftwaffe and the Wehrmacht. Likely as a result of positive testing at Kama, Lorenz won the bidding for exclusive production of the FuG 5 and FuG 10 Radio in 1937.\textsuperscript{211} This radio was designed “like a battleship,” sturdy, with a number of modules divided by steel compartments.\textsuperscript{212} This meant the radio was difficult to damage and easy to fix, though it was very heavy.

How much of the FuG’s development took place at Kama? The Soviets recorded the presence of radio technicians, or “Funktechnik,” at the school as early as 1929, when the Lorenz radios likely arrived.\textsuperscript{213} This suggests that members of the general staff foresaw radio communication as a primary means of communication within tactical armored formations. The British had demonstrated the potential to communicate with a tank via radio as early as 1924, but mass two-way communication was still relatively

\textsuperscript{209} Rollema, 22-23.
\textsuperscript{210} Janis Berzins, “Memo on Liquidation of Facility at Kazan,” July 29th, 1933. Manuscripts and Archives Collection, Yale University. Translated by the current author.
\textsuperscript{211} Rollema, 21-23. Note: In addition to Lorenz, the Telefunken Company would end up producing FuG Units throughout the war, when the German government forced Lorenz to share its technical information.
\textsuperscript{212} Ibid, 23.
\textsuperscript{213} Special’naja svodka o sostojanii «Tehnicheskih kursov Osoaviahima» na 15 avgusta 1930 goda, Sovershenno sekretno.”
unknown in the late 1920s. Kama was likely one of the first places in the world to test the mass coordination of armored units with radio devices. This runs counter to the longstanding notion that the British were the real pioneers in tank radio communications.

Janis Berzins, the head of the GRU (Red Army Intelligence) wrote to Marshal Mikhail Tukhachevskii in September, 1931 to discuss developments at Kama. He noted that the tactical studies had been of immense value in revealing the importance of radios. He wrote that “the tactics of the tank vehicles depend on communication. There are three means of such communication: radio, signal flags and tracer shells.” He noted that the field exercises had clearly demonstrated that radio was the most efficient means of command and control, but that the technology had not yet been perfected. He ended his notes on the tactical exercises at Kazan with a recommendation: “Management and command ought to be given by radio. However, right now, this special radio is still in testing mode and often crashes...” It would take several more years of development, but by 1937, these problems had been solved.

When Hitler rose to power, he immediately ordered the camp to be shut down. The Germans requested the Soviet return much of their materiel at Kama. The Soviets inventoried the items present, and noted that there were more than 120 radio receivers and transmitters, including small mobile “satchel” receivers, and five experimental

---

215 Macksey, 84-88.
216 Janis Berzins, “Report #2 on the Tank Courses at Kazan,” Manuscripts and Archives Collection, Yale University. Translated by the current author.
217 Ibid.
Lorentz transmitters and receivers. The quantity of equipment demonstrates the significance the Germans attached to radio development. It paid off: The first tanks manufactured in 1933 used Lorenz FuG 2 and FuG 6 models, which were probably the same models as the receivers tested at Kama. The latter, used in command vehicles, could transmit, while the former could only receive.

These radios were underpowered, and would soon be upgraded to the FuG 5 and FuG 10, both of which could receive and transmit. These new radios became the standard tank radio of World War II. In 1944, a restricted American intelligence report called the FuG 10 Radio “a remarkably high standard of planning and production,” and noted that it did not require crystals, giving it greater reliability of performance in tanks and other mechanized vehicles. This superiority in radio technology enjoyed by Germany at the beginning of World War II may be partially credited to the testing at Kama.

The importance of the radio in tactical command and control was clear to the Germans. In the first great tank battle of World War II, on the plains of Belgium, the Germans wreaked havoc upon French tank formations, whose officers could effectively give no commands once they had engaged the enemy. Encircling and destroying such tanks proved easy, despite the fact that the best French tanks were technologically superior to their German opponents. One historian noted the French difficulties without

---

218 Janis Berzins, “Memo on Liquidation of Facility at Kazan,” July 29th, 1933. Manuscripts and Archives Collection, Yale University. Translated by the current author.
219 Chamberlin, Doyle, 254.
radio communication during battle in 1940: The French commanding officer, “lacking radio….ceased in practice to command his unit from the moment he himself opened fire.”\textsuperscript{222} German vehicles quickly surrounded his platoon.

At the beginning of the war the Soviets, like the French, had failed to equip most of their tanks with radios.\textsuperscript{223} This seems surprising, given the importance ascribed the radio by Berzins and Tukhachevskii.\textsuperscript{224} The Great Purges seem to have claimed the Soviet tank radio as another of its victims. In 1941, signal flags were still the primary Russian means of communication in battle. This meant in practice meant there was no tactical coordination among Soviet tank units, as the dust alone obscured the vision between units even before the opening of combat. The result was chaos, particularly in the enormous armored formations the Soviets tried to employ against the Germans. It took the rigors of combat before the Soviets finally began to equip all of their vehicles with radios.

\textsuperscript{223} Miller, Collins.
\textsuperscript{224} Tukhachevskii wrote extensively on the need for quick and effective communication throughout all levels of the military. The radio was necessary to make “Deep Battle” feasible.
CHAPTER 13: CONCLUSION

As has been noted, it is difficult to judge the influence of Kama on the ranks of the combat leaders of World War II. There is a lack of clarity about who exactly attended the school, particularly on the Soviet side. Of the thirty German attendees, we can be reasonably certain of about 27 names.\footnote{225} Of those, seventeen reached the rank of General Major - a divisional commander in the Wehrmacht - or above.\footnote{226} When one considers that almost all of them served within Panzer Divisions, and that Hitler invaded the Soviet Union with 18 Panzer Divisions, it becomes apparent that the leadership of the Hitler’s Panzer forces was hugely influenced by Kama. Most of those who did not reach so high a rank died in combat between 1939 and 1942, usually while serving as battalion commanders in Panzer divisions.\footnote{227}

The Russian alumni of Kama were far less influential in the Red Army. The military purges, which swept away so many of the Soviet Union’s most competent military leaders, wiped out the cadres trained at Kama. According to the memoirs of an officer I. Dubinsky who worked at Kama in the late 1930s (after the purges), everyone he knew who had been involved with Kama had been purged by 1938.\footnote{228} This included

\footnote{225} Kurtukov. \footnote{226} Ibid. \footnote{227} Miller, Collins. \footnote{228} Special’naja svodka o sostojanii «Tehnicheskikh kursov Osoaviahima» na 15 avgusta 1930 goda, Sovershenno sekretno.”

60
plumbers, janitors and even waitresses at the camp mess hall. Tukhachevskii, who had been the major proponent of Kama, was one of the first to suffer in the purges: he was arrested in May, 1937, and executed within three weeks. However, Kama remained open after 1933, serving as a tank testing ground and training school, and the possibility that some of its many students survived remains a possibility. It can be said for certain that the USSR profited in terms of technological development from Kama, even if it failed to develop the human resources that Germany did.

By 1933, Hitler began to close all four of the German facilities on Russian soil. The Germans had no need for them once they felt confident enough to ignore the Versailles Treaty and its enforcers. The Soviets, on the other hand, desired continued cooperation and resisted the closure of the schools, going so far as retard the return of industrial equipment from all of the facilities. The Red Army, believing it still had a great deal to learn from the Germans, ended up converting Kama into their own tank school, and set up a German-based curriculum; however, such efforts were also extinguished in the military purges of 1937-1938.

The cooperative schools in Russia lasted little more than a decade; at Kama, the school only trained students for four years. Yet the results were immensely important in the fostering of new ideas and technology. The Germans profited greatly from Kama: that “German industry was able to begin large-scale production of tanks almost as soon as Hitler decided to rearm was directly due to the testing and decision making by industry

\[229\] Ibid.
\[230\] Habeck, 186.
and the army at Kazan. With a competent core of staff officers and much improved
tank designs, the Germans were ready to use the innovative tactics drawn up in training
exercises at Kama.

Strategic and technical ideas also developed along parallel lines in the Soviet
Union and Weimar Germany. Men such as Von Seeckt, Frunze and their younger
successors - Volckheim, Guderian, Tukhachevskii and others - saw the need for mobility
in a future war. The younger generation of military intellectuals saw the value of new
technology, in particular mechanized vehicles and airplanes. One reason for this shared
development and emphasis on mobility was the shared experience of the eastern front in
World War I. Whereas the Western powers experienced trench warfare and developed
defensively minded tactics in the interwar period, Russia and Germany had fought highly
mobile, encirclement-oriented battles during the First World War. During the 1920s, they
drew similar lessons from that shared experience. Those who studied at Kama and
mastered those lessons gained a glimpse into how the next great war would be fought.
Stalin’s execution of most of Soviet students of Kama was one of the most important
factors in the lack of Soviet preparation for the Second World War. It would take two
terrible years of war for the Red Army to relearn the lessons of Kama from the Germans.

\[^{231}\text{Ibid.}\]
BIBLIOGRAPHY

“Oswald Lutz,” Wehrmacht Personenregister, Lexikon Der Wehrmacht. 


“Donesenie nachal'niku osobogo otdua PP OGPU TR vremennogo nachal'nika 1 otdel'nija osobogo otdua Ahmetova.” August 15th, 1930. Tatarstan Oblast Archives. 

http://avalon.law.yale.edu/subject_menus/versailles_menu.asp

“Memo: Private Geldsammlungen,” April 8, 1927, Reichswehr, National Archive of Records Seized. Translated by the current author.

“Josef Harpe.” German Generals. 
http://www.generals.dk/general/Harpe/Josef/Germany.html


Berzins, Janis. “Report #2 on the Tank Courses at Kazan.” Manuscripts and Archives Collection, Yale University. 
---. “Memo on Liquidation of Facility at Kazan.” July 29th, 1933. Manuscripts and Archives Collection, Yale University.

63


