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14. ABSTRACT In November 1939, the USSR invaded Finland in a quest for territorial expansion. The resulting Winter War was a brutal conflict, fought in arctic conditions. This often-overlooked war offers multiple learning points for any military professional. Though history has often focused on the impressive, asymmetric fight put up by the Finnish Army, much can also be learned from a Red Army, often viewed and inflexible and unadaptable. In Finland, the Soviet Army undertook a remarkable effort to change. The Soviet ability to learn and adapt, while actively engaged in combat, was not only impressive but played a critical role in forcing the Finns to concede through force that which they refused to part with through diplomacy. Soviet adaptation occurred at the strategic, operational, and tactical levels, and by analyzing the Red Army's performance across the war's two unofficial phases, the link between adaptation and the achievement of strategic ends becomes clear. Those professionals able and willing to learn from a historical foe, will find that this 105-day war provides an impressive example of organizational change.						
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MASTER OF MILITARY STUDIES

The Winter War (1939-1940): An Analysis of Soviet Adaptation

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

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Executive Summary

Title: The Winter War (1939-1940): An Analysis of Soviet Adaptation

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Thesis: During the Winter War, the Soviet ability to learn and adapt, while actively engaged in combat, was not only impressive but played a critical role in forcing the Finns to concede through force that which they refused to part with through diplomacy. By assessing the causes of Soviet failures in the war's initial phase and analyzing their ability to learn and make changes across all levels of war – strategic, operational, and tactical – the link between adaptation and the achievement of strategic ends becomes clear.

Discussion: The 105-day Winter War (November 1939 – March 1940) saw a Finnish Army execute an impressive and harrowing attempt to defend its homeland against a massive Soviet offensive. As a result, history often focuses on this aspect of the conflict. However, there is also much to be learned from the Soviet experience. In January 1940, after a dismal and embarrassing performance during the war's first month, the Soviets halted their offensive and executed an impressive effort to adapt. From political strategic goals to military strategy, operations to tactics, the Soviets carried out sweeping adaptations before restarting offensive operations in February. Red Army self-analysis and change paid dividends. Ignoring Soviet accomplishments in this area, by focusing only on an inspiring Finnish performance, denies military professionals valuable lessons. The intent here is not to provide an all-inclusive account of the Winter War or deny the brutal, sobering realities of the Soviet experience in Finland. Instead, this paper provides a historical overview of the conflict and reviews the course of the war across two informal phases, while analyzing the impact of Red Army adaptations.

Conclusion: While several compounding factors ultimately forced Finland to sue for peace, one that does not receive enough attention was the impact of Soviet change. In less than one month, the Soviets implemented strategic, operational, and tactical changes that proved critical to what can only be described as a painful and limited success.

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Preface

I first learned of the Winter War in 2010. Fascinated with the topic, I continued to engage with it for several years. The Finns' magnificent stand against a massive Soviet onslaught remains an impressive David versus Goliath story in the annals of military history. Early in the war, a seemingly insignificant, poorly-equipped Finnish Army grasped the tenets of maneuver warfare to negate the enemy's strengths and halt the effectiveness of the Soviet system.

Realizing just how much has been written regarding Finnish success, I wondered what could be learned from the Red Army's experience during the war. As I researched, it became clear that though this war was an extraordinarily painful learning experience for the Soviets, learn they did. While focusing on the performance of a defunct army not often described as flexible or adaptive, during an often-forgotten conflict, this analysis hopes to prove just how important organizational adaptability can be to strategic success.

I must acknowledge those who helped me in this project. Dr. Paul Gelpi's consistent feedback, knowledge, and understanding were invaluable to me. My father, Col. Burton Quist (USMC, Ret.), not only instilled in me an interest in history but also suffered through reading multiple versions of this paper. I am thankful for both. Thanks to Andrea Hamlen for helping make me a better writer over the course of the year. Most importantly, thank you to my wife, Angela, who never complained as I sat upstairs writing, leaving her to deal with the kids. Today, I am positive my son (Isak, 9) and daughter (Laina, 6) know more about the Winter War than any kids their age. Lastly, I will recognize my grandfather's cousin, Erik Björkman, who fought the Soviet machine in the forests of Finland 80 years ago. Hopefully, he forgives me for writing about the enemy.

Introduction

The 1939-1940 Winter War (Russo-Finnish War) was a brutal contest between the Soviet Union and Finland fought in sub-zero temperatures and arctic conditions. The world watched as the small, young country of Finland defended its sovereignty against its larger, communist neighbor.¹ Militarily, Finland was insufficiently prepared and vastly outnumbered.² However, the Finns fought valiantly and effectively against overwhelming odds. As a result, history focuses on the performance of the Finnish Army as military historians capture lessons learned from an army that appeared to have no realistic chance of defending its homeland.

While acknowledging the impressive stand taken by the Finns from November 1939 to March 1940, this paper analyzes the war from a historically less popular view – that of the Red Army. The Soviets paid an unacceptably high price in blood for their eventual territorial gains, with one Red Army general stating, “we won just about enough ground to bury our dead.”³ While several compounding factors ultimately forced Finland to sue for peace, one that does not receive enough credit was the impact of Soviet adaptability during the course of the war. Historian Robert Foley writes, “[military adaptation] has not captured the imagination of historians in the same way as...innovation.”⁴ However, the ability to adapt in war can be critical to success. Ignoring Soviet accomplishments in this area, by focusing only on an inspiring Finnish performance, denies military professionals valuable lessons.

The intent of this paper is not to provide an all-inclusive account of the Winter War. Rather, it will first provide a historical overview of the conflict. It will then review the course of the war across two informal phases, while examining the impact of Red Army adaptations. During the Winter War, the Soviet ability to learn and adapt, while actively engaged in combat, was not only impressive but played a critical role in forcing the Finns to concede through force

that which they refused to part with through diplomacy. By assessing the causes of Soviet failures in the war's initial phase and analyzing their ability to learn and make changes across all levels of war – strategic, operational, and tactical – the link between adaptation and the achievement of strategic ends becomes clear. This assessment challenges common notions about Soviet inflexibility and provides insight to the importance of adaptation in war.

Strategic Background

In the 1930s, the Soviet dictator Joseph Stalin looked to ensure his country's security and sovereignty against a rising German threat. The Nazis consolidated power in 1933 and quickly withdrew Germany from the League of Nations. They remilitarized the Rhineland three years later. These actions increased Stalin's concerns regarding Germany's regional intentions. The 1938 German annexation of Austria exacerbated his hypersensitivity. To secure his borders, deny potential avenues of advance, and increase Soviet power relative to Germany, Stalin set his sights west.⁵ He saw creating a buffer zone in the Baltics and Finland as critical to the security and survival of the USSR.

To build this buffer, Stalin first worked a diplomatic angle. In August 1939, the USSR signed the Molotov-Ribbentrop Pact with Germany. Publicly, this agreement bound both countries to non-aggression, mitigating any immediate Nazi threat. Secretly, however, the pact contained a clause assigning the Baltics and Finland to a sphere of Soviet influence.⁶ One cannot understand the Winter War without understanding these secret protocols.

With the ink on this agreement still wet, Germany and the USSR invaded Poland, with each annexing roughly half of the country. Stalin then pressured the Baltic states into allowing Soviet occupation, permitting Red Army buildups in Estonia, Lithuania, and Latvia. Effectively, all three countries were under Soviet control.⁷ This was formalized less than a year later with the

countries' complete annexation. With the Baltics and eastern Poland securing part of his western border, Stalin had one remaining area of concern – Finland.

Stalin's biggest concern in Finland was the Karelian Isthmus. This region made up a small portion of the two countries' 900-mile border. This thin strip of land sits between Lake Ladoga and the Gulf of Finland. In 1939, the Finnish-Russian border here was just 20 miles from the important Soviet city of Leningrad (modern Saint Petersburg). This was too close for Stalin. Exacerbating Stalin's concerns, fears of a Soviet incursion along the isthmus had compelled the Finns to reinforce the border along what became known as the Mannerheim Line. By the late-1930s, the Mannerheim Line was a series of significant, front-line, defensive fortifications.⁸ Under no illusions that his pact with Hitler was any more than temporary,⁹ Stalin increasingly saw the Karelian Isthmus as a potential route of German advance, providing ready-made fortified positions and immediate access to one of the Soviets' most important cities. He also saw the Gulf of Finland as a seaward avenue of German approach. Stalin's immediate focus became securing what he increasingly saw as a "springboard" for German invasion.¹⁰

In October 1939, Stalin tried the same tactic on Finland that worked so well on the Baltics. He called a Finnish delegation to Moscow. Hoping to secure his Finnish border, he made several requests of his smaller, western neighbor (see Map 1, Appendix A). First, the dictator wanted Finland to allow the Soviet Navy to establish a base at Hanko, on the southern shore of Finland. Second, the Soviets demanded the Finns hand over four islands in the Gulf of Finland. Third, Stalin wanted to modify the Finnish-Soviet border, along the Karelian Isthmus, moving it several miles further west, deeper into what was Finnish territory. This would allow for increased Soviet protection of Leningrad. Fourth, Stalin expected Finland to destroy the Mannerheim Line defenses on the isthmus, so these positions could not be used to support a

German attack.¹¹ These terms would help quell concerns of either a sea-based invasion through the Gulf of Finland or a land-based one across the Karelian Isthmus. In return, Stalin offered his Nordic neighbors 2,100 square miles of comparably insignificant land north of Lake Ladoga.¹² It is critical to understand that while these were Stalin's public demands, the secret agreements in the Molotov-Ribbentrop Pact contained his true aim – the eventual, total annexation of Finland.¹³

At the time, Finland was a young, poor, agrarian country with a worldview colored by its history. The region and people of modern-day Finland lived under Swedish rule for over 500 years. In 1809, Russia seized the territory and maintained it for the next century. Finland declared its independence in 1917, but the following year the country fell into a civil war in which a Soviet-backed Red movement was defeated.¹⁴ By the late 1930s, most Finns were convinced that the Soviets would eventually seek to reabsorb them.¹⁵ The Russian reputation loomed large in the Finnish psyche, and the fall of the Baltic states reinforced that reputation.

During the 1930s, led by their Commander in Chief, Marshal Carl Gustaf Mannerheim, the Finns set about planning their country's defense. Despite Mannerheim's objections, not only did military spending not increase during the decade, but it was reduced.¹⁶ Working within the country's political and economic limitations, the Finnish Army developed its defensive strategy. While focusing its efforts on the Mannerheim Line, regular and reserve forces in the country's northern half were regionally-aligned so that personnel and units were trained and equipped to defend familiar areas close to their homes. Mobilization plans were drawn up to quickly emplace these forces upon indications of Soviet advance. Small elements, forward staged along the border, would delay the Soviets long enough to allow units time to deploy to their assigned areas.¹⁷ In addition to national defense forces, Finland maintained a volunteer Civil Guard system in which local Finns were expected to turn, "...every village and every hamlet into a

strongpoint.”¹⁸ Despite the preparations, Mannerheim remained unconvinced that the Finnish Army could win against the Soviets.¹⁹ However, he hoped that with adequate warning, his smaller force could combine its resolve with its intimate knowledge of terrain and climate to have an asymmetric impact large enough to spark international intervention.²⁰

Finland was not opposed to making any territorial or diplomatic concessions to the USSR, but it was unwilling to give in to Stalin’s specific demands. The economic impact of losing control of both the Bay of Finland as well as the rail and road network in Karelia would be too great.²¹ Also, a Soviet base at Hanko would violate Finland’s declared neutrality in an era when world war seemed increasingly likely.²² Finally, not only was the Soviet reputation critical in Finland’s decision making, but so too was its own. Unconvinced that Stalin’s aims were as limited as they appeared, many in Finland believed standing up to the Soviets could establish a reputation of strength, which might benefit the country in any future negotiations or conflicts.²³ After multiple discussions and counter-offers and with their history, sovereignty, economy, and reputation in mind, the Finns took a position none of the Baltic nations had dared. On 13 November 1939, they refused Stalin’s demands.²⁴

Finland’s stance was inconceivable to the Soviets and reinforced in their leader a growing certainty of a German-Finnish alliance. This seemed the only plausible explanation why such a small country, with such an unimpressive military, would dare refuse what Stalin believed was a reasonable request made from a position overwhelming strength.²⁵ The Finns assumed negotiations would continue and the Soviets would not take military action with an Arctic winter rapidly approaching. They assumed incorrectly.

War Begins (Phase One: November 1939 – January 1940)

When discussing Soviet adaptation during the Winter War, it is helpful to look at the 105-day conflict in two distinct, unofficial phases. Phase One of the Winter War lasted from 30 November 1939 to early January 1940. During these early weeks, the Red Army was outmatched by the impressive resistance of a small, poorly-equipped Finnish Army. The Finns reinforced Napoleon's assertion that moral strength is three times as important as material power.²⁶ What the Finns lacked in men and material, they made up for with knowledge of the terrain and environment, speed, experience, economy of force, and will. In this initial phase, the Finns outperformed the Soviets to the surprise of Stalin and the world.

On 30 November 1939, without formally declaring war, Stalin threw his Red Army's Leningrad Military District forces across the border, invading Finland along the entire front of the Russo-Finnish border (see Map 2, Appendix A). In the south, the 7th Army, as the main effort, attacked across the Karelian Isthmus. Its objective was to penetrate the Mannerheim Line, seize Viipuri (modern Vyborg), and move on to the Finnish capital of Helsinki. The rest of the country saw supporting effort actions by three additional armies. The 8th Army attacked from east to west in a flanking maneuver just north of Lake Lagoda, seeking to envelop Finnish forces on the Karelian Isthmus. North of the 8th Army, across the thinnest portion of Finland, the 9th Army attempted to attack through the breadth of Finland. Reaching the Gulf of Bothnia, it would divide Finland, and her defenders, in two. In the extreme north, the 14th Army attacked toward the port of Petsamo, along the Barents Sea.²⁷ Ignoring the estimates of subordinates, who believed any invasion would take months to succeed, Stalin and his senior leaders insisted that all planning would be based on the assumption that the Finnish Army would collapse within 12 days.²⁸ Poor assumptions and over-confidence resulted in harsh lessons for the Red Army.

Against this Soviet invasion force, stood the Finnish Army under Mannerheim's command (see Map 2, Appendix A). Under his direction, the Army of the Karelian Isthmus (2nd and 3rd Corps) would employ its six divisions along the Mannerheim Line against the Soviet's main effort advance. The 4th Corps held a defensive sector just north of Lake Lagoda. Group Tavela's sector was north of the 4th Corps. The North Finland Group defended north of Group Tavela to the north shore of the Gulf of Bothnia. In the far north stood the Lapland Group, defending the remaining several hundred miles to the Barents Sea. Like the Soviets, the Finns saw the Karelian Isthmus as the area of decisive action and focused their main effort there.²⁹ All other actions were supporting efforts seeking to delay Soviet advances across the boreal forested lands north of Lake Lagoda, buying time for the Finnish main effort to deploy to Karelia.

The Red Army's invasion force drastically outnumbered the Finnish defenders. Military historian and author of *The Soviet Invasion of Finland 1939-40*, Carl Van Dyke, summarizes this advantage as, "3 to 1 in manpower, 80 to 1 in tanks, 5 to 1 in artillery of all types and 5.5 to 1 in aircraft."³⁰ Historians David Glantz and Jonathan House mention, "...a Finnish infantry division had 3,000 fewer troops and less than one-third of the artillery authorized to its Soviet counterpart. [Finland] possessed well under 100 [obsolete] armored vehicles...and 270 largely obsolete air-craft."³¹ The Soviets boasted an initial invasion force of between 26 and 28 reinforced divisions, fed by an extensive national industrial and manpower base capable of providing a seemingly unending supply of men and material.³² To face of this vast, technologically advanced force, the Finns had a total of nine divisions inadequately supplied with mines, limited artillery, and about 100 Bofors 37mm antitank weapons.³³ Finnish forces suffered from a lack of funding, insufficient national industry, and a small population from which to source combat replacements.

The Red Army initially experienced rapid success,³⁴ but its offensive was soon proven to be clumsy, hurried, poorly-orchestrated, and ineffective. Though likely confident after their recent, crushing victory against the Japanese in Manchuria,³⁵ intelligence failures, command and control shortfalls, and ineffective training all compounded to work against Soviet efforts to employ new doctrine in Finland. Additionally, large Soviet efforts in central and northern Finland diluted Red Army advantages in mass and concentration. Stalin ordered over half of his available infantry and 25 percent of available armor into the northern wilderness, a region that lacked significant population centers or strategically important objectives.

During the interwar period, the Red Army had developed a new doctrine of Deep Battle, but it was poorly employed early in the Finnish theater. Created for with the wide steppes of Eastern Europe in mind, and used in the open Polish landscape only weeks earlier, the Red Army neglected to adjust Deep Battle to the comparatively closed terrain and canalized, limited road network available in thickly-forested Finland.³⁶ Deep Battle doctrine was based on the tactical integration of mechanized forces, propelled artillery, mounted infantry, and aviation to penetrate defenses, disorganize an enemy in depth, and destroy him. Deep Operations sought to employ the same integration operationally, allowing the Red Army to exploit penetration, seize significant objectives, and deny a defender the ability to reorganize.³⁷ The limited roads winding through Finland were small, tightly lined with trees, and separated by significant distances. They provided poor avenues of advance along which to employ large mechanized and motorized forces. In this environment, the Soviets struggled to employ Deep Battle or Deep Operations and were unable to properly coordinate the actions of their tanks, infantry, and artillery.³⁸ Exacerbating coordination issues, their massive aviation advantage was employed haphazardly across the theater,³⁹ instead of focusing it in support of their newly developed concepts.

Though significant intelligence preparation was required for effective Deep Battle, the Soviets engaged their units without it. Not only did they lack knowledge of the Finnish order of battle, they failed to understand how the Finnish Army would fight given the terrain, elements, and its personnel and equipment constraints.⁴⁰ Two Soviet generals specifically mentioned the lack of intelligence while reporting to Stalin in the days after the conclusion of the war. One claimed, “We did not know our enemy, we just had a general idea of [him].”⁴¹ The other was more blunt stating, “We studied Finland insufficiently...In our war games, it was very simple, we reached Vyborg [Viipuri] in a jiffy, with a break for lunch.”⁴² Even their main effort attack across the Karelian Isthmus, focused on the decisive action of penetrating the Mannerheim Line, had little intelligence about that defensive system.⁴³ The Soviets moved headlong into an attack with little knowledge of the terrain⁴⁴ and an insufficient understanding of the enemy’s force laydown, order of battle, or strengths and weaknesses.⁴⁵ Poor intelligence efforts negatively affected coordination and mutual support, made artillery and air fires inaccurate on the whole, and mitigated the focus Soviet ground units required to crack the Mannerheim Line.

Most Red Army soldiers also had little political training to inspire them for a fight against their Nordic neighbors, whom they did not know or understand. The average Soviet soldier had little idea why he was fighting.⁴⁶ To make matters worse, the USSR relied heavily on Poles and Ukrainians to make up their fighting force. To these soldiers, many of whom hailed from areas with flat and open terrain, the densely forested, snow-covered, broken Finnish landscape must have seemed like that of another planet.⁴⁷ These Soviet soldiers were at an immediate disadvantage against Finnish defenders fighting for their homeland.

A rigid, centralized Soviet command and control system also presented a significant disadvantage. Clumsy and inflexible, it was unable to quickly adapt to change on the battlefield.

All orders had to be approved up both military and political chains of command.⁴⁸ This slowed action and, combined with poor intelligence, sapped any ability to employ initiative, speed, or tempo. The Finns employed small units to conduct a highly mobile, light infantry fight. This type of combat required exactly what Soviet command and control was incapable of – flexibility, adaptability, and initiative.

Finally, the Red Army was simply unprepared for an arctic fight. Infantrymen were not trained for skiing or forest fighting. Vehicles were not camouflaged for employment in snow. Soldiers were provided khaki uniforms, overcoats, and simple leather boots. Their equipment both failed to protect them against the elements and made them easy targets against an increasingly snow-covered battlefield. Rations provided insufficient caloric intake for a fight in the extreme cold. Tents and warming stoves were not provided.⁴⁹

In sum, the Red Army stumbled into Finland unprepared and untrained, employing their massive, heavy force in a manner that provided the defender every advantage. In contrast, the Finns understood the Soviets. Since its independence, Finland had envisioned the return of their old enemy.⁵⁰ Mannerheim himself served in Russia's tsarist army and knew his enemy well.⁵¹ The smaller country prepared to fight an asymmetric war in which they would leverage their tactical prowess and knowledge of the environment to exploit obvious vulnerabilities in heavy, road-bound Red Army formations. John Langdon-Davies, author of *Invasion in the Snow*, provides an accurate summary of the war's early weeks, "the nature of this conflict [was between] quantity and quality. The clumsily migrating host of animals, ill adapted to the new environment, suffered extinction at the hand of animals which made up for their small numbers by perfect adaptation."⁵² Understanding the importance of the Karelian Isthmus, the Finnish Army employed operational and strategic economy of force efforts throughout the northern

theater. Though overwhelming, the sight of the Red Army streaming across the entire length of the border was likely a welcome surprise to the Finns.⁵³ Soviet actions in the barren areas north of Lake Lagoda allowed the Finns to employ their limited resources effectively and efficiently in the north while throwing every available asset into the fight on the isthmus.

Against the overwhelming Soviet advantage, the Finns relied on light infantry, guerilla tactics in the north. Undetectable Finnish ski troops moved through the forest and found an easy target in Soviet forces strung out along limited Finnish roads. It was in these regions that the Finns perfected what became known as *motti tactics*. The Finnish word *motti* refers to a pile of wood waiting to be chopped, and it perfectly describes how the Finnish Army dealt with Soviet formations in the north. After reconnoitering the road-bound enemy from the forest, small Finnish ski units silently, rapidly attacked a Soviet column at multiple points along its length. The Finns would bring the mounted Soviet advance to a halt, breaking the large enemy force into multiple segments, or *mottis*.⁵⁴ Often relying on their limited artillery assets employed in direct fire mode or a few Bofors anti-tank guns,⁵⁵ Finnish units constructed temporary, ad hoc *winter roads* through the forest along which to move these larger weapons into place.⁵⁶ Employing either heavy assets or engineers with explosives, the Finns fragmented large Soviet formations into several smaller, more manageable parts. The resulting *mottis* were isolated and surrounded. This allowed the Finns to focus on destroying the weakest *mottis* first, while the elements and starvation wore down the larger ones.⁵⁷

From Lake Lagoda to the Barents Sea, the Soviets found themselves outmatched by Finnish defenders who employed impressive and inventive means to deal with Soviet mechanized and motorized forces. Though most Finnish soldiers had never seen a tank in action, let alone scores of them employed in formation, Finnish infantry had a resounding effect on these

platforms so integral to Soviet Deep Battle doctrine. Finnish soldiers invented “Molotov cocktails” to throw into the air vents of Soviet tanks.⁵⁸ They employed homemade satchel charges to disable tank wheels, and immobilized tanks by inserting timber into treads. They covered lakes with cellophane so that they appeared unfrozen to Soviet aerial reconnaissance. This reinforced the Soviet desire to remain road-bound and further vulnerable to Finnish attack.⁵⁹

The fate of the Soviet 9th Army’s 163rd Rifle Division and 44th Motorized Rifle Division provides a clear example of the Red Army’s experience north of Lake Lagoda during the first phase of the Winter War. On 30 November 1939, the 163rd Division surged across the border, easily pushing aside small units of Finnish defenders. On 7 December, it captured the Finnish town of Suomussalmi. The 163rd Division was contained at Suomussalmi by a reduced Finnish brigade until Finnish reinforcements arrived. By the end of December, the Finns had cobbled together the newly formed 9th Division, a force of 11,500 men. Though outnumbered by thousands and at a significant firepower disadvantage, the Finnish 9th Division attacked, trapping the Soviets.⁶⁰ Eventually, the 9th Division destroyed the larger force, sending survivors running into the vast, snow-covered Finnish forest.⁶¹

To reinforce the 163rd Division before its collapse, the 9th Army sent its 44th Motorized Division west along the Raate Road. Though an elite unit comprised of experienced Ukrainian soldiers, the 44th Division was completely unfamiliar with the north woods, winter fighting it would experience. Relying on their one available airplane to provide overhead surveillance, the Finns spotted the 44th Division strung out for over 20 miles along the road.⁶² The Soviet force carried hundreds of pairs of skis, but none of its soldiers had been trained to use them. Given the deep snow, the force was unable to properly disperse soldiers to secure its flanks.

Employed in this fashion, the Soviets were targets. On 11 December 1939, the 44th Division was stopped by two Finnish rifle companies employing hasty roadblocks and a few mortars.⁶³

The 44th Division would now experience *motti tactics* first hand.⁶⁴ Units from the 9th Division skied through the forest, rapidly attacked the Soviets, and egressed. These repeated, fluid actions duped the 44th Division into believing it was facing a much larger Finnish force. Quickly neglecting its original purpose of rescuing the 163rd Division, the 44th instead dug defensive positions. The Finns built *winter roads* through the forest, and moved personnel and equipment into position. Attacked along its length, the 44th Division was chopped into *mottis*. During the fighting, Finnish soldiers received fresh supplies. They constructed warming tents in defilade. Finnish soldiers were rotated off of the line frequently to limit exposure to the elements. In contrast, unprepared Soviets tried to build hasty structures while temperatures plummeted to -40 degrees Fahrenheit. Exposed to both Finnish fire and the elements, the Soviets were soon freezing and starving.⁶⁵ By 7 January 1940, the 44th Division was in collapse, and organized resistance ended. Abandoning the fight along the Raate Road, Soviets fled on foot into the woods. Thousands fell victim to the cold and Finnish ski troops.

The fate of the 163rd and 44th Divisions were emblematic of the Soviet experience in the north. The Finns acquired over 40 tanks, 70 artillery pieces, nearly 300 vehicles, several thousand rifles and machineguns, over 1,000 horses, and highly sought-after communications equipment. The Soviets lost at least 22,500 soldiers to enemy action and the elements. The Finns lost 2,700 men around Suomussalmi.⁶⁶ In the words of military historian William Trotter, “Suomussalmi was the cleanest, most decisive, and most spectacular Finnish victory in the northern half of the country – a paradigm of the qualities that made the Finnish ski soldier a legend...other battles in the north and central parts of the country were...similar...”⁶⁷

The fight on the Karelian Isthmus was different than that occurring in the northern half of the country. Compared to the vast expanse of wilderness in the north, the narrow isthmus offered more roads on which to employ Soviet heavy assets. However, given the limited area between two bodies of water, there was no opportunity for significant spatial maneuver. Here, both attacker and defender employed a conventional fight anchored around the Mannerheim Line, its fortifications tied in to the Gulf of Finland in the west and Lake Ladoga in the east.⁶⁸ Across the isthmus, the Soviets poured the 7th Army with 120,000 soldiers, 1,500 howitzers, and 1,400 tanks, all supported by 1,000 airplanes. In their way stood 26,000 Finns with 70 artillery pieces and 30 anti-tank guns.⁶⁹

On the Karelian Isthmus, well-constructed and mutually supporting defensive positions devastated Soviet attacks. The Mannerheim Line was not, as Soviet propaganda expressed, comparable in strength to the Maginot or Siegfried Lines.⁷⁰ Nonetheless, it was a stout, well-prepared line of fortifications. To reinforce it, Finnish forces erected obstacles along the multiple avenues of approach, cleared fields of fire, evacuated civilians, and employed booby traps of all sorts. Soviet tanks were one of the biggest threats to the Finns, and they initially had a devastating physical and psychological effect on the defenders.⁷¹ Soviet tanks moving off-road were ambushed in forest clearings or submerged to the bottom of frozen lakes, targeted by explosives employed under the ice layer.⁷² The Finns allowed Soviet tanks to approach, focusing their fire on the supporting infantry. This separated tanks from their dismounted protectors, making destruction of the mechanized assets easier. The Finns employed their few heavy assets, quickly moved them to follow on positions, and counterattacked effectively.

Red Army units advanced across Karelia in the same manner they did in the north, and they experienced a similar outcome. Intelligence was so poor that Soviet artillery fired blindly

into the trees. Large formations slowed to a crawl along roads. Sappers proved ineffective at removing tank obstacles, while Soviet infantry attacked in the only fashion the terrain permitted – frontal assaults across open terrain. Poorly coordinated with artillery and tanks, waves of Red Army troops were slowed, precisely targeted by artillery, and cut down by machinegun fire.⁷³ William Trotter writes, “The Russian attacks formed in the open, approached in the open, and were pressed home in the open, against an entrenched defender well supplied with machine guns...at this stage of the war, the Russians had no...camouflage for their men and no whitewash for their tanks. The tanks moved in ungainly clumps, and the infantry attacked in dense, human wave formations...it seemed beyond belief that any army...would continue to mount attack after attack across such billiard-table terrain.”⁷⁴ Despite weeks of gruesome, stubborn, repeated assaults, Soviet units had advanced a mere few hundred yards.⁷⁵ By late-December 1939, the poorly coordinated attack along the isthmus had failed.⁷⁶ A few reduced Finnish regiments defeated several 7th Army rifle divisions at the cost of over 10,000 casualties.⁷⁷ The Finns concluded the Red Army was unable to execute either Deep Battle or basic combined arms.⁷⁸

By January 1940, Soviet offensives were stalled across Finland. The 7th Army was stopped on the Karelian Isthmus. The 8th Army’s attempted envelopment was bogged down, road-bound, and halted.⁷⁹ The 9th Army’s effort to bisect Finland was stymied by catastrophes like those around Suomussalmi. The only Soviet success during Phase One came in the extreme north, where the 14th Army captured the strategically important port of Petsamo. Finnish forces there were scarce and did not attempt to deny the Soviets the port or the important nearby nickel ore mines. However, the Finnish Lapland Group contained the Soviets in the Petsamo region, denying their attempts to continue south along the Arctic Highway.⁸⁰ In Phase One, across the

northern two-thirds of Finland, Soviet units repeatedly found themselves out-maneuvered and encircled.⁸¹

By January 1940, the need for change was apparent. Red Army forces were beaten and demoralized. Discipline in the ranks faltered. Stalin and his generals recognized change was required to succeed against their neighbor and repair the Red Army's faltering reputation. Hitler had to be delighted watching the Soviets' inability to beat what was seemingly such an unimpressive foe. In early January, the Soviet High Command (Stavka) ordered a general halt to offensive operations.⁸² Stalin called his top military leaders to Moscow and demanded change. The Red Army would use the month of January to learn, adapt, and prepare for a renewed offensive.⁸³ This marks the end of the war's first phase.

The Red Army Adapts (January – February 1940)

The Winter War offers a rare example of an army in contact pausing offensive action to undertake a formal program to change, prior to restarting efforts to break the enemy's will. Soviet adaptation occurred at the strategic, operational, and tactical levels of war. The latter included specific changes across several warfighting functions, which allowed for operational and strategic goals to be met. Adaptation efforts are never perfect, and they certainly were not in this instance. However, the impact of Soviet adaptation would prove significant to the war's outcome and provides lessons learned for any military organization.

Strategic Adaptations

It should first be noted that, based on their experiences in the first month of the Winter War, the Soviets adapted the political and diplomatic strategic ends of the war effort. Stalin's initial public demands of Finland were relatively small territorial ones. While these were the initial spark for war, they were likely only an appetizer for Stalin, whose unstated goal was the

annexation of Finland *in toto*.⁸⁴ Given this, commanders in Phase One called for the annihilation of Finland's army.⁸⁵ Based on the results of the war's first phase, Stalin adapted his ends. The Finnish resistance seemingly forced Stalin, and the Stavka, to accept an independent Finland. Rather than destroying its army and absorbing the country, the Red Army would now seek only to force the Finns to the peace table, satisfied with Finnish capitulation and limited territorial gains. Summarizing these new ends, Van Dyke states, "...strategic goals had been limited...to territorial annexations on the Karelian Isthmus and...north coast of Lake Lagoda."⁸⁶

To meet these political strategic ends, Stalin made sweeping changes to the Leningrad Military District. The force was reorganized, transformed, reinforced, and renamed. Now called the Northwestern Front, its leadership changed as well.⁸⁷ Meretskov was demoted from the commander of the overall war effort and placed in command of the 7th Army. In his place, Stalin appointed Marshal Simon Timoshenko to lead the Northwestern Front.⁸⁸ Timoshenko proved himself adept at battlefield leadership of large forces during combat in Poland in September 1939. He now volunteered to lead the Soviets to victory in Finland.⁸⁹ Timoshenko's post-war words clearly show his frustrations with the November-January war effort, "If we had only deployed our forces against the Finns in the way even a child could have figured out...things would have turned out differently."⁹⁰ Timoshenko would now manage the most critical Soviet effort – that against the Mannerheim Line.

Soviet adaptation was also apparent in its military strategy. Given the embarrassing performance of the Red Army against "such a weak opponent," Stalin ordered a review to be conducted by the Operations Administration of the General Staff.⁹¹ He then convened a meeting of members of the Defense Commissariat to hear the report, analyze the Phase One failures of the Leningrad Military District, and recommend adjustments. Acting as a formal review

mechanism, this group of military advisors concluded that Meretskov's command not only misjudged Finnish strengths, but its units were poorly trained to execute combined arms penetrations. It recommended a revised strategy focusing on employing overwhelming mass along the Karelian Isthmus in order to provide concentrated, focused combat power against the Mannerheim Line.⁹² Soviet forces stopped in the north would simply try to survive. Stalin and his generals realized the initial Soviet plan of attacking across the entire length of Finland served only to dilute the focus required to break the Mannerheim Line – obviously the Finnish main effort.⁹³ The Stavka provided Timoshenko the mass he would require to collapse the Finnish defenses, reinforcing the war effort and increasing Soviet manpower in the region to 1.3 million. The vast majority of these reinforcements were sent to the isthmus. Timoshenko would enjoy an advantage of 30 divisions to eight along that strip of land.⁹⁴

Operational Adaptations

Instead of committing only the 7th Army along the isthmus, two additional armies were allotted to the efforts against the Mannerheim Line, and Timoshenko employed them within a new operational approach (see Map 3, Appendix A). At his disposal in the Northwestern Front, Timoshenko now had the 7th Army (Marshal Meretskov), the 13th Army (Marshal Grendahl), and an additional army in reserve (Marshal Pavlov). Specific to this operational concept, and based on recent intelligence efforts and Phase One experience, the Northwestern Front would focus its penetration attempts around Summa and Lähde. The 7th Army would serve as the main effort along the isthmus and attack in the west. Oriented toward Viipuri, it would seek to penetrate the Mannerheim Line in the Summa and Lähde sector, focusing the majority of its combat power along a 10-mile section of defenses.⁹⁵ Once the 7th Army broke through, the objective would become Viipuri.⁹⁶ As a supporting effort, the 13th Army was to attack north along the eastern

side of the isthmus, aiming toward Käkisalmi. Its purpose was to divert Finnish resources and manpower away from the main effort's actions. Timoshenko would hold one army in reserve, prepared to move it across the frozen Bay of Viipuri (Bay of Vyborg) to encircle the Finns. Once conditions permitted, either Meretskov's or Pavlov's forces would seize Viipuri.⁹⁷ This would threaten Helsinki and force capitulation.

To support this operational approach and improve the conditions faced by its soldiers, the Soviets also improved their logistical support. Railroads were tasked to increase their support to the war effort. Additional roads to the isthmus were constructed. Critical classes of supply, enough to support 500,000 men, were flooded to support the 7th and 13th Armies.⁹⁸ In the Northwestern Front, a system of logistics-push was adopted to keep critical classes of supply well forward. Instead of relying on division-level exchange and distribution points, mobile detachments were created to echelon logistical needs to units in contact.⁹⁹ The government also ordered national industry to increase food production and develop stable, dried food meals. As the war continued, this reduced the need to cart large quantities of fresh food into the fight.¹⁰⁰

The Soviets also undertook efforts to improve the will and morale that was waning in their beaten, frozen army. Political workers, tasked with building morale inside of frontline units, began focusing less on professing the importance of socialism, Marxism, and blind obedience to Stalin. They instead stressed nationalism and patriotism. Soldiers were inspired by a call to avenge the embarrassing performance of the first phase of the war and redeem the glory of their homeland.¹⁰¹ The Red Army recognized performance as well, awarding 3,500 soldiers for heroic action during Phase One.¹⁰² Soviet newspapers ran regular articles praising individual soldiers and blaming the Finns for instigating the war.¹⁰³ Public recognition was reinforced by a 100-gram daily ration of vodka provided to soldiers preparing for Phase Two. Moscow eased

censorship on mail and called on citizens to send letters and gifts to the front.¹⁰⁴ Positive reinforcement was not the only sort relied on in Stalin's army. Executions were also ordered. Leaders in the 163rd and 44th Divisions were executed after the disaster at Suomussalmi. Patrolling efforts were organized to kill deserters in the rear area.¹⁰⁵ The uniquely Soviet efforts to improve morale through a balance of patriotism, reward, and terror seemed to have a positive effect on will in the Northwestern Front. As one Soviet commander described it, by February 1940, "Each [soldier] was burning with the desire to fulfill the combat task...at any cost."¹⁰⁶

When planning to employ his armies, Timoshenko took into account both the realities of the isthmus fighting and Soviet strategic advantages. With maneuverability limited on the isthmus, frontal attacks were the only real option. These played into Soviet advantages in men and material. Timoshenko realized this and understood Stalin's lack of compunction to use both in a manner and rate most would consider unacceptable. To leverage this advantage, Timoshenko planned to use repeated, well supported frontal attacks to force the Finns to pay an unbearable price. It was understood that this would come with significant Red Army losses as well, but the Soviet Union had a reservoir of personnel and equipment from which to draw – Finland did not. To Timoshenko, this was a simple math problem. There were more Russians in the world than Finns, and the latter could not afford to bleed at the same rate as the former.¹⁰⁷

Tactical Adaptations

Next, the Northwestern Front set out to undertake what Carl Van Dyke refers to as, "[Its] most important responsibility...to study the lessons of recent battle experience, adjust tactical doctrine on the basis of these lessons, and then supervise the training of troops in this new doctrine."¹⁰⁸ It is in these adaptations, occurring across nearly every warfighting function, that

Soviet change is most apparent. These tactical changes would allow for operational and strategic success.

The Soviets realized the intelligence failures in their initial offensive and set out to fix them. This was an important adaptation, as it allowed for all other changes to succeed.¹⁰⁹ Starting in January, reconnaissance planes were constantly employed out of new bases in Estonia. This provided ground units with detailed battlefield photographs and a vastly improved understanding of the enemy system.¹¹⁰ Reconnaissance balloons also collected consistently.¹¹¹ Northwestern Front units employed rear echelon troops in patrolling and collection efforts, saving the strength of frontline personnel for the future offensive. As a result of the January intelligence efforts, the Front pinpointed up to 75 percent of Finnish bunkers on the isthmus.¹¹² This allowed indirect fire and air assets to destroy many Mannerheim Line positions during the January lull, before the Soviet offensive restarted.¹¹³ Timoshenko himself visited the front along the Karelian Isthmus to see the terrain and the enemy positions firsthand. Comparing his observations with the Phase One battlefield reports of his subordinates helped him establish his operational aim point of Viipuri, which he now saw as essential to strategic success.¹¹⁴

Soviet adaptation was also apparent regarding fires. While analyzing its failures and making several imperative adjustments, the Soviets certainly did not let up on the Finnish defenders in January. Rather, aerial and indirect fire attacks increased dramatically in frequency. They were particularly focused on wearing down the physical and mental state of the isthmus defenders along the Mannerheim Line.¹¹⁵ Artillery was massed in support of the new offensive, as over 2,800 cannons were moved to support of the Northwestern Front. These included assets as heavy as 280mm railroad-mounted guns. The Soviets also learned the effectiveness of ruse fire missions to deceive defending Finns.¹¹⁶

Timoshenko ordered specific adjustments to remedy the poor infantry-artillery coordination plaguing Soviet attempts at Deep Battle. Forward observers would accompany every attacking infantry unit and be employed in balloons above the battlefield to improve spotting and corrections.¹¹⁷ These changes would allow for well controlled, accurate, and flexible massed fires to be brought to bear quickly. Timoshenko also tasked a staff section with improving communications between infantry units and supporting artillery ones. To fix the Red Army's poor employment of mortars, both mortar companies and batteries were established. This would increase the weapons' effectiveness and flexibility, which was critical in keeping defending Finns in their fighting positions and limiting their maneuverability.¹¹⁸ Timoshenko's staff provided specific guidance to artillery commands, instructing them that the war's early efforts demonstrated Finnish fortifications typically required at least four direct impacts, by rounds of 200mm or greater, to have the desired effect on the entrenched defenders.¹¹⁹ These adjustments would allow future attacks along the Karelian Isthmus to be effectively supported by an average of 80 artillery pieces for every one mile of frontage.¹²⁰

While Stalin forced command and control changes at the highest levels of the Northwestern Front, change was seen at multiple levels as efforts to decentralize took hold. Soviet Deep Battle doctrine had stressed highly-centralized control during a combined arms fight. By January 1940, however, Timoshenko realized the ineffectiveness of this rigid system and set about to decentralize control while ensuring unity of command and coordinated action.¹²¹ To improve command and control, he first clarified the responsibilities and expectations of each level of command. Identifying the roles of army, corps, division, regimental, and battalion commands would allow for clarity, ownership, and focus during the planning and execution of combined arms assaults.¹²²

Timoshenko's staff believed many of the Red Army's failures from November to January were the result of both ineffective command and control and a lack of initiative. Initiative at the battalion level was a particular concern. To remedy this, Timoshenko ordered battalion commanders to hold "orientation meetings" with subordinates in order to analyze the terrain, coordinate and deconflict supporting fires, and establish signal plans. Each would be critical to tank-infantry-artillery coordination. To ensure an increased understanding, subordinate commanders were to be included in all reconnaissance and planning efforts. Timoshenko ordered battery commanders to co-locate with the infantry company commanders they supported.¹²³ Further, the Stavka ordered attempts to decentralize control based on the recent successes of German actions in continental Europe. A new system of "troop control" was implemented,¹²⁴ which demanded a clear understanding of each level of command as well as improved and coordinated planning. Also stressed was the importance of maintaining communication vertically and laterally. This was viewed as critical in allowing for increased lower-level initiative as well as tactical and operational flexibility.¹²⁵ By February, the Soviet system of command and control was overhauled in this fashion.

The Soviet Defense Commissariat required that, during the Stavka-ordered stand down, all forces would be trained in defeating fortified positions, penetration tactics, and the reduction of bunkers. To this end, Timoshenko tasked his staff to formalize improvements in both tactics and doctrine. Within two weeks, the section published *On Organizing and Executing Breakthrough of Fortified Regions*. This new doctrine was issued to the 7th and 13th Armies on 20 January 1940.¹²⁶ It stressed coordinated action, mutual support, combined arms, and flexibility as the keys to assaulting well-prepared defensive positions.¹²⁷

Regarding the assault of fortifications, the Northwestern Front ordered adaptations based on well-coordinated combined arms efforts, similar to German storm troop tactics. Engineers would dig entrenchments in the direction of Finnish defensive lines, and units would form at these “jump-off points.” Artillery focus would shift from providing shaping and preparatory fires to massed, concentrated creeping barrages in front of the assault elements. Behind these barrages would come combined arms units organized and prepared to exploit the effects of indirect fires, which through improved reconnaissance, observation, and mass, were now significantly more accurate.¹²⁸ These integrated, combined arms units were referred to as storm groups.¹²⁹ According to David Glantz and Jonathan House, such groups might include, “a rifle platoon, a machine-gun platoon, three tanks, snipers...[and] engineers.”¹³⁰ Behind these task-organized units would follow mortars and light artillery to provide close, highly-responsive supporting fires. Storm groups were to focus on removing obstacles and reducing those Finnish defensive positions not destroyed by artillery, air, or tank actions alone.¹³¹

Increased coordination among combat arms was imperative for successful storm group action. Engineers would clear obstacles in support of tanks. Infantry would protect tanks. Tanks would permit both infantry and engineers to close on Finnish defenses.¹³² Like the Finns pulled heavy equipment on sleds behind reindeer and horses, Soviet tank crews were taught to do the same.¹³³ In line with the new theory of troop control, storm groups were to maintain communications through radio or telephone. Coordinating with higher and adjacent units would allow for local successes to be exploited. This communications focus would also ensure fire control could be shifted among any artillery unit within range.

With new doctrine and tactics came a new focus on equipment. Infantrymen were issued shields mounted on small skis to provide some level of protection when approaching defensive

positions.¹³⁴ The Soviets also moved new tanks to the isthmus. Timoshenko's staff realized its forces did not have armored assets stout enough to withstand Finnish anti-tank fire.¹³⁵ Many were also not capable of providing the firepower required to reduce Finnish bunkers. Into this gap, the Red Army moved its newly designed KV heavy tanks and increased its numbers of T-34 tanks in theater. The Soviets also brought in significant numbers of T-26 tanks which, though lighter than the KV or T-34, were able to withstand the impacts of most Finnish light, anti-tank assets.¹³⁶ These platforms would play a critical role in support of storm groups.¹³⁷ Employed in tandem, they would assist in destroying Finnish defenses, penetrating the Mannerheim Line, and pursuing both Deep Battle and Deep Operations. The Red Army also undertook efforts at camouflage, painting tanks white and issuing infantry snow capes.¹³⁸

In contrast to the hurried and poorly planned attacks of Phase One, the Soviets undertook a formal training and rehearsal program focusing on tactical and operational patience and preparation. The significance of the squad leader in break through operations was a focus.¹³⁹ Securing communications was stressed as a means to allow for coordination. The importance of infantry and armor dispersion was taught, as was cooperation between artillery, armor, infantry, and engineers. Replicas of Finnish fortifications around Summa were built just behind the Soviet lines, and units such as the 123rd Division, rehearsed their assaults several times.¹⁴⁰ Additional training focused on the environment the Soviet infantryman faced – arctic cold and deep snow.¹⁴¹ Soldiers were taught to ski, and ski units were established.¹⁴² The Red Army would eventually create 40 battalions trained for skiing, including around 45,000 soldiers.¹⁴³ While these new skiers were likely incomparable to the experienced Finns,¹⁴⁴ this new skill would increase Soviet tactical and operational employment options during Phase Two.¹⁴⁵ Soviet

training and rehearsals were critical in ensuring doctrinal and tactical change was instilled at the lowest levels. These efforts continued until the day the offensive resumed.

By the first week of February, Red Army adaptation efforts were complete. Strategic, operational, and tactical changes were implemented. Doctrine was altered. Adaptations to increase the effectiveness of Soviet combined arms were formalized and rehearsed. Allen Chew, author of *The White Death*, mentions, "...the [Soviet], learning from his costly blunders, was improving his tactics and reorganizing his command for renewed assaults."¹⁴⁶ The Northwestern Front would now test these adaptations as it restarted its offensive operations.

Soviets Resume the Offensive (Phase Two: February – March 1940)

By February 1940, Soviet adaptation was one of many factors working against the Finns. Finland was facing a shortage of ammunition and weapons, particularly those capable of affecting Soviet tanks, now arriving to the isthmus at an increasing rate.¹⁴⁷ The Finnish manpower disadvantage worsened daily. World powers debated how to best assist what US President Franklin Roosevelt described as, "a nation so infinitesimally small that it could do no conceivable, possible harm to the Soviet Union."¹⁴⁸ Finland itself was divided on even accepting military aid, as many Finns worried doing so would pull the country into a larger world war.¹⁴⁹ Though Finland was grateful for what neighbors did give, Norway and Sweden were not interested in sacrificing their neutrality by providing significant levels of direct support or allowing Allied forces to freely cross their territory.¹⁵⁰ Finland received much needed weaponry, air assets, and volunteer fighters from the international community, but these were both too little and too late.¹⁵¹ These factors deserve recognition, but they have been well documented over the course of history. The focus here is the impact of Soviet adaptation, as seen during the

Northwestern Front's actions along the Karelian Isthmus. It was here that adaptation would have its impact, and it was here that the Soviets would ultimately obtain their revised strategic ends.

Against the efforts of the Northwestern Front's three armies stood the depleted and tired Finnish forces under the command of Lieutenant General Österman's Isthmus Army (see Map 3, Appendix A). In Österman's command were 2nd Corps (General Öhquist), 3rd Corps (General Heinrichs), and three divisions in reserve. General Öhquist's force held the western portion of the Mannerheim Line south of Viipuri, anchored to the Bay of Finland. It faced the Soviet 7th Army's attempts to break through the Mannerheim Line in the vicinity of Summa and Lähde. General Heinrich's force manned the eastern portion of the Mannerheim Line. Tying in to 2nd Corps's eastern flank, it stretched to Taipale and was anchored by Lake Lagoda in the east. The 3rd Corps would defend against the 13th Army's efforts around Taipale.¹⁵²

Phase Two was planned to start on 11 February 1940 with the renewed Soviet offensive along the Karelian Isthmus. To support this effort, and to test Soviet learning and adaptation efforts, Timoshenko ordered five supporting attacks and demonstrations along the Karelian Isthmus, to begin on 1 February. The purpose of these efforts was three-fold. They would probe for gaps to exploit in the Finnish lines around Summa and Lähde, while continuing to attrite Finnish defenders.¹⁵³ They would also provide Soviet units, now employing storm groups supported by tank and infantry units, the opportunity to become familiar with a new troop control system focused on decentralized control, initiative, and discipline.¹⁵⁴ As this system was counter to the highly centralized control practiced early in the war, these efforts were an essential test prior to any new offensive. They display Soviet learning and adaptation in command and control, intelligence, fires, and general coordination between combat arms.

On 1 February, the Northwestern Front began 11 days of preliminary attacks. These were well supported by aerial bombing and deep artillery fires focused on Finnish rear area forces, lines of communication, and supply areas.¹⁵⁵ These strikes were in addition to the unceasing targeting efforts throughout January.¹⁵⁶ Based on the new Soviet intelligence focus, preparatory fires were significantly more accurate than their earlier efforts. They were also more effective and overwhelming given the increase in indirect fire assets on the isthmus. Air attacks were increasingly effective and focused and employed at least 500 Soviet aircraft. Mannerheim himself commented on the new cooperation the Soviets showed in February, which was enhanced by increased aerial activity and improved artillery accuracy. Both were a direct result of Soviet intelligence efforts and improved fire direction using balloons and tanks.¹⁵⁷

Soviet storm groups were certainly still learning during the initial attacks of 1 to 11 February, but improvement was apparent.¹⁵⁸ These probing attacks wore the Finns down physically and mentally and, focused through increased intelligence efforts, were able to destroy several Finnish strongpoints. They also provided valuable information about Finnish defenses, identifying gaps and locating several Finnish fortifications lacking mutual support. Soviet infantry found many bunkers armed only with machineguns and without anti-tank weapons. This information was relayed, and attacking Soviet storm group adjusted their tactics. With their newly arrived KV, T-34, and T-28 tanks, the Soviets found inventive ways to neutralize Finnish defensive positions. This included simply parking a tank at the opening of a bunker to block its machinegun fire, allowing infantry or storm groups to close in.¹⁵⁹

These early February attacks helped prove that Soviet storm groups, operating under troop control, were a reliable means of reducing fortifications.¹⁶⁰ The effectiveness of these adaptations is clearly seen in the actions of two Soviet companies conducting attacks against

Finnish forces around Summa and Lähde on 1 February 1940. In the first instance, per the requirements of troop control, the regimental and battalion commanders held orientation meetings with the company commander and allowed him to play a role in planning. Artillery preparation set conditions for lower-echelon actions. The company commander led a storm group made up of an artillery platoon, several T-28 tanks, infantrymen, and sappers. Its objective was a Finnish concrete fort named DOT No. 45. The company commander was provided telephone communication with an adjacent battalion, allowing for responsive, additional fire support.¹⁶¹ With newly organized storm groups employing the doctrine released just two weeks prior, the company moved to its jump-off position and began its assault under accurate artillery suppression. Sappers cleared obstacles in support of tank and infantry actions. Storm groups were towed in sleds behind tanks, fighting their way to the DOT. After a satchel charge proved ineffective in reducing the position, Soviet infantry, engineers, and tanks worked in concert to repel a stout Finnish counterattack. Soviet actions were well-supported by regimental artillery, only possible due to the new Soviet focus on troop control and subordinate unit initiative. The demand for continuous communications also proved critical. After defeating the counterattack, the Soviet company called for additional explosives. After two more attempts, DOT No. 45 was destroyed by engineers employing hand-delivered explosives.¹⁶² The successful actions against DOT No. 45 were relayed to an adjacent company, which employed near carbon copy efforts to destroy an adjacent fortified position.¹⁶³ Improved Soviet tank-infantry coordination was clearly apparent, as was tanks' support for one another. As a result, ad hoc Finnish anti-tank measures, so successfully employed early in the war, saw reduced effectiveness.¹⁶⁴ Timoshenko, and those he tasked with penning *On Organizing and Executing*

Breakthrough of Fortified Regions, began to see the effectiveness of storm groups, troop control, and new doctrine.

Starting on 11 February 1940, the renewed general offensive along the Karelian Isthmus continued to prove that Soviet adaptations, though far from perfect, were successful. Several hours before the 7th Army began its offensive against the Mannerheim Line, it began its artillery preparations. Eager to see the effectiveness of change, Timoshenko toured several Soviet artillery positions. He was happy with what he observed, as Soviet gunners showed a new level of accuracy and speed. The initiation of the offensive was not only well supported, but was well coordinated as commanders at all levels communicated and employed agreed upon signals.¹⁶⁵ This was already an improvement over the first month of the war. While the 7th Army's 100th Division's penetration attempts were stymied by well-coordinated and reinforced Finnish efforts, the Soviets' new focus on lateral communication allowed information to flow quickly to the adjacent 123rd Rifle Division.

Using the information derived from its sister unit, General Aliabushev's 123rd Division adjusted appropriately. Carl Van Dyke explains the adaptation and flexibility shown by the 123rd Division, which was in stark contrast to Soviet Phase One efforts. "Instead of the normal artillery preparation, Aliabushev ordered his artillery...to conduct 10-15 minute intensive fire-raids against specific targets followed by false transfer of fire to targets in the enemy rear in order to confuse the Finns and catch them exposed in their trenches by the next raid."¹⁶⁶ Following these precision fires, the 123rd began sweeping, saturating fires in support of its regimental assaults. Communication and observation had improved such that accurate, concentrated artillery was employed as close as 75m from units in the attack.¹⁶⁷ Sappers cleared paths for tanks.¹⁶⁸ Heavy tanks spearheaded the assault. Behind them came light tanks and

storm groups. The storm groups blocked fortification embrasures with rocks before sappers reduced them with explosives. In less than 30 minutes, the first fortifications were destroyed. Elsewhere, the 123rd faced stiffer resistance. However, coordinating additional artillery support allowed one Regiment to gain ground and force a local retreat at the cost of 700 defending Finns. Another regiment, though initially slowed, quickly called up a reserve storm group to assist in destroying two robust bunker systems. In dramatic contrast to the 7th Army's efforts in November and December, where a scant few hundred meters were gained against Mannerheim Line defenses, on 11 February alone, the 123rd Division progressed 1,200m, destroying 32 fortifications and bunkers.¹⁶⁹ To the Finns' surprise, Soviet attackers wore white camouflage, employed armored shields, and even skied into the assault.¹⁷⁰

Based on the division's success and showcasing a new flexibility, Timoshenko shifted his main effort to the 123rd, eventually creating the first crack in the Mannerheim Line. By the end of 12 February, the division had advanced another 600m and destroyed seven more defensive structures. The 123rd Division reinforced local success by its 27th Regiment, quickly shifting artillery and tank support to that unit. The 7th Army commander, Meretskov, reinforced the 123rd Division with his tank reserve. Applying its rehearsed actions, which were further refined on 11 and 12 February, the 123rd collapsed the remaining Finnish defenses in its way.¹⁷¹ On 13 February, the division opened a four-kilometer gap in the Finnish frontline near Lähde. Timoshenko ordered 7th Army tank and infantry elements through this gap to allow for follow on operational pursuit and encirclement of the Finns. By the end of 13 February, the 7th Army also created a breakthrough in the Finnish alternate defensive positions, while coordinated tank, artillery, and infantry efforts defeated another Finnish counterattack.¹⁷² The latter even employed what in Phase One had been solely a Finnish capability – the effective use of ski

troops. Soviet skiers flanked the counterattack, diverted Finnish forces, and allowed Soviet rifle battalions to blunt the attack.¹⁷³

It would be an over-statement to claim adaptation efforts succeeded in replacing all Red Army problems with vast success. Perfection is not the claim. Several efforts by both the 7th and the 13th Armies were thwarted by stiff Finnish resistance. One Soviet flanking effort, across the frozen Gulf of Finland, was rapidly defeated as Finnish coastal defenses targeted the ice supporting the Soviet attackers. Battery fire opened the frozen bay, sending scores of Red Army soldiers and several tanks to the bottom.¹⁷⁴ A flanking attempt across Lake Lagoda fared no better. It too was stopped by Finnish coastal defense barrages and machinegun fire.¹⁷⁵ Command and control issues plagued the 13th Army's actions in the east. In the west, the operational encirclement envisioned by Timoshenko never occurred, as the 7th Army's 100th Division was slowed by light Finnish resistance.¹⁷⁶ Experience with Finnish deception caused hesitation, and the Red Army was slow to exploit breakthroughs.¹⁷⁷ Many critique the Soviets for their human-wave tactics, which allowed hundreds of Red Army soldiers to be killed by entrenched Finns.¹⁷⁸ It should be understood, however, that Timoshenko recognized the price that would come with penetrating the Mannerheim Line. Adaptation efforts allowed the Soviets to effectively employ their mass advantage and keep losses to a level that, while grotesque and inhumane, allowed for tactical and operational progress. Timoshenko's plan to force the Finns to pay a price they were unable to sustain was showing signs of working.

The effect of Soviet change efforts can be seen in the Finnish response. By the second week of February 1940, Finnish units around Summa and Lähde were withdrawing to an Intermediate Line of defenses further northwest (see Map 4, Appendix A).¹⁷⁹ This line was significantly closer to Viipuri. The newly-focused air and artillery efforts were felt across the

line. In the east, Finnish defenders around Taipale were on the receiving end of over 100 bombing sorties a day.¹⁸⁰ In the west, around Summa and Lähde, attacking Red Army units found several Finnish bunkers still standing, but full of dead Finns. These defenders were killed by the concussive effects of concentrated artillery fire.¹⁸¹ Logbook entries of General Öhquist, show the impact of Soviet adaptation. Öhquist writes, "...fortifications at Summa and Lähde ...are being demolished by enemy bombardment each day and have to be repaired each night anew...Heavy artillery bombardment and...probing attacks on the 3rd Division's sector throughout the night. Russian infantry that now assaults in small groups are well trained and valiant...Similar attacks at Taipale all over yesterday."¹⁸² The Finns were certainly seeing an improved Soviet attacker. One that was far more capable of coordinating not only combined arms, but mutually supporting actions as well.¹⁸³

By 14 February 1940, the situation for the Finns was dire. The breach in the Mannerheim Line at Summa and Lähde opened a path to Viipuri in the west. Mannerheim was forced to order a general withdrawal to the Intermediate Line, while shifting every available asset to the isthmus. This included units from every region north of Lake Lagoda as well as Civil Guard units manned by schoolchildren from Viipuri.¹⁸⁴

The successes of the Soviet 123rd Division continued on 15 February, as Aliabushev exploited the breakthrough near Summa and Lähde to hand the Northwestern Front its first successful case of Deep Operations of the war. The 123rd Division looked to seize the town of Lähde itself. Two mobile elements under the command of Colonel Barabov and Major Vershinin were ordered toward Lähde, in front of the 123rd Division. The 7th Army commander committed Vershinin and Barabov without coordinating with Aliabushev. However, after their respective staffs conducted reconnaissance and terrain analysis, and after Aliabushev visited

Vershinin and Barabov personally, the three decided to coordinate their efforts. Aliabushev's infantry attacked, supported by Vershinin's mobile assets. Barabov's tanks burned out Finnish bunkers with flamethrowers. The combined force seized Lähde by the end of the day. The 123rd Division's infantry secured the town, while the mobile units of Vershinin and Barabov continued on independently, pushing deeper into Finland.¹⁸⁵ Timoshenko's headquarters closely studied the actions of Aliabushev, Baranov, and Vershinin. Van Dyke writes, "This battle was the first example of Deep Operations...and the theorists were amazed to find that three commanders, un beholden to each other hierarchically, could co-operate with each other at the planning table and in the battlefield...if troop control was nominally assumed by one of the commanders, combined arms combat did not have to be so centrally controlled."¹⁸⁶ Though not speaking about Lähde specifically, the words of Carl Mannerheim acknowledge a general improvement of Soviet forces, "...the Russians...began to learn from experience...they proved themselves capable of maneuvering a far greater number of units [on]...the Karelian Isthmus than we had thought possible."¹⁸⁷

On 16 February 1940, the 7th Army opened another breach west of Summa and Lähde and pursued Finnish forces moving to the Intermediate Line, while the 13th Army made slow, painful headway in the east. The 13th Army continued its indirect fire and aerial bombing efforts around Taipale, Kirvesmäki, and Koukkuniemi.¹⁸⁸ As the 7th Army had in the west, the 13th Army employed ski units as a new means of mobility and maneuver. In support of adjacent unit breakthrough attempts around Taipale, the Soviet 97th Ski Battalion, joined by light tanks and scouts, attempted to ski over the frozen Lake Lagoda to capture a Finnish battery on the defenders left flank.¹⁸⁹ Though defeated,¹⁹⁰ this effort shows Soviet improvement and adaptation. While Red Army ski units existed in Phase One,¹⁹¹ prior to training efforts in

January, the Soviets had proven unable to ski effectively in significant numbers. They certainly did not employ ski battalions successfully, in concert with other battlefield actions.

On 18 February, after pausing to regroup from sustaining high casualties, the 13th Army finally penetrated the Mannerheim Line around Kirvesmäki, west of Taipale.¹⁹² On 19 February, it broke through at Terenttilä.¹⁹³ From 17 to 19 February, the Finns along the Karelian Isthmus completed their withdraw to the Intermediate Line.¹⁹⁴ With the Soviets in pursuit, the Finns were no sooner in their new positions than they were attacked in force. The Intermediate Line was quickly overrun in the west by the 7th Army. Ten days later, it was broken by the 13th Army in the east.¹⁹⁵ In the end of February, Mannerheim directed the 1st and 2nd Corps to withdrawal to a final defensive line, known as the Rear Line, just south of Viipuri (see Map 5, Appendix A). Here, the Finns would focus their final attempts to defend the city,¹⁹⁶ as seizing it would clearly be the next Soviet objective.

Though successful, Timoshenko was critical of the 7th and 13th Armies. He was eager to capture Viipuri and believed neither army was moving fast enough. In late February, before moving on Viipuri, Timoshenko criticized the troop control efforts of both armies. He believed poor coordination and insufficient reporting was slowing progress and inhibiting initiative.¹⁹⁷ Both armies responded with efforts to increase coordination throughout the hierarchy, refocusing on inclusive battle planning. The 7th and 13th Armies also immediately began their first night operations of the war. The success of both allowed for continued operational pursuit by Meretskov's force. On 27 February, the Stavka gave the order to encircle Viipuri.¹⁹⁸ Seizing Viipuri and threatening Helsinki, would either force capitulation or allow for the destruction of the Finnish Army and seizure of the capital.

To move on Viipuri, Timoshenko would coordinate ground and naval actions to begin on 28 February 1940. The Northwestern Front would employ the Baltic Fleet to conduct diversionary fire missions approximately 60 miles west of Viipuri. Proving capable of operational-level coordination, the Soviets would also conduct landings further west along Finland's southern coast. This would spread the already depleted Finnish forces and occupy Mannerheim's reserves.¹⁹⁹ Simultaneously, the 28th Rifle Corps would attack across the frozen Bay of Viipuri and cut the road network to Helsinki. To do this, the Soviets would again adapt, employing a Finnish tactic to increase maneuverability and extend logistical reach. The 28th Corps would construct *winter roads* across the frozen bay. Concurrently, the 50th Rifle Corps would exploit breakthroughs to flank Viipuri from the east. The 10th and 34th Rifle Corps would move directly south to north, attacking the Finnish Rear Line defenses south of Viipuri.²⁰⁰

By 6 March 1940, Viipuri was effectively surrounded. West of the city, the 28th Corps landed on the northern shore of Viipuri Bay and blocked the road connecting Viipuri to Helsinki.²⁰¹ This came only after suffering high casualties. Many occurred when the Finnish coastal batteries once again fired on the ice supporting the Soviet movement across the bay. Multiple tanks and companies of infantry collapsed into the icy water.²⁰² In their efforts, the Soviets again saw the value of ski-troops and demonstrated an ability to conduct these operations effectively. A Soviet infantry unit skied over a peninsula west of Viipuri, surprised Finnish defenders and pushed them back.²⁰³ The Finns quickly flooded areas around Viipuri in an attempt to slow the 7th Army's advance. To cross these areas, Soviet engineers laid bridges while storm groups destroyed additional fortifications. With the 13th Army also gaining ground, the city of Viipuri was surrounded.²⁰⁴

Though Timoshenko prepared to seize Viipuri on 7 March 1940, the assault never occurred. The Soviets planned to coordinate the actions of several storm groups, attacking the city in the same manner that had proven successful in reducing Finnish field fortifications.²⁰⁵ While exhausted, the Red Army was able to continue reinforcing frontline divisions. The Finnish Army, on the other hand, was running out of men and material. It had found its breaking point. General Heinrichs, who had replaced General Österman as the commander of the Finnish Army of the Isthmus, summarized the state of the Finnish defenders in the following situation report filed on 9 March 1940:

It is my duty to report that the present state of the Army is such that continued military operations can lead to nothing but further debilitation and fresh losses of territory...Lieutenant General Oesch, the commander of the Coastal Group, has emphasised to me the scant numbers and moral exhaustion of his forces, and does not seem to believe he can succeed with them. Lieutenant-General Öhquist, commander of the II Army Corps, has expressed the opinion that if no surprises take place, his present front may last a week, but no longer, due to expenditure of his personnel, particularly officers. Major-General Tavela, of III Army Corps, expresses his view by saying that everything is hanging by a thread.²⁰⁶

Mannerheim recommended Finnish diplomats sue for peace before the army collapsed completely, allowing for further Soviet gains. A Finnish delegation in Moscow took Mannerheim's recommendation and gave in to Stalin's demands. The Moscow Peace Treaty went into effect on 13 March 1940.²⁰⁷ Finland was forced to part with 10 percent of its territory and resettle 500,000 citizens.²⁰⁸ The ceded lands included all of Stalin's original demands and more (see Map 2, Appendix A).

Conclusion

Adaptation played a significant role in forcing the Finns to concede, ending the Winter War. Carl Van Dyke summarizes the importance of Soviet adaptation efforts stating, "Most foreign military commentators...dismiss the Red Army's ability to conduct modern warfare.

Others, who had the patience to follow the development of Red Army operations on the Karelian Isthmus carefully, later acknowledged the Red Army's surprising degree of organizational adaptability."²⁰⁹ Tactical, operational, and strategic military change allowed for Stalin's revised strategic ends to be met.

Change not only helped the Soviets solve the immediate Finnish problem, but proved critical a year later when the Germans validated Stalin's initial concerns and invaded. In the words of David Glantz and Jonathan House, "Finnish warnings [to Germany] that the Red Army had markedly improved by February went unheeded."²¹⁰ When the German Army found itself fighting the Soviets during a Russian winter, they were on the receiving end of now-formalized Soviet adaptation efforts. Experience from the Winter War proved invaluable. Improved Soviet equipment and logistics changes extended the Red Army's operational reach. Many doctrinal and tactical adjustments proved effective as well. This included the use of thousands of ski troops to wreak havoc on a German Army struggling to move mechanized and motorized assets across the frozen Russian steppes.²¹¹ Red Army efforts, coupled with Germany's neglect of history, were critical to that campaign's outcome.²¹²

Historically, the Red Army is not known for flexibility or adaptability. So, what allowed it to change so quickly in January 1940? The answer is likely three-fold. First, and most importantly, the Soviets were in a position in which they simply could not fail. With a German threat in mind (as well as an Allied one), Stalin understood that if the Red Army continued to struggle against a small and seemingly insignificant opponent, irreversible damage would be done to both Soviet forces and Soviet reputation. Germany would quickly exploit this vulnerability. By January, Stalin was out of options. He either had to allow for increased critical thought among his military leaders, while sponsoring their organizational change efforts, or the

USSR would be perceived as a goliath incapable of achieving great power status. Second, Stalin used a formal and directed review process, executed by his General Staff and Defense Commissariat, to identify issues and recommend change. Finally, he found an agent in Timoshenko who was able to meet strategic ends, within strategic guidance, by overseeing operational and tactical change.

The Winter War is an often-forgotten conflict. Falling somewhere between a regional war and a much larger, impending global one, it is overshadowed by other World War Two campaigns. Military professionals should study this conflict not simply from the historically popular view focusing on a small nation defending itself against a larger, more technologically-advanced neighbor. The war also provides an example of organizational learning and change in combat. In the words of historian Geoffrey Cox, “The Red Army made mistakes in Finland, but it had something which not all armies have – a willingness to learn from its errors.”²¹³ Though several factors worked against the Finns, one of those often overlooked is the adaptation effort undertaken by the Red Army. In less than one month, the Soviets implemented strategic, operational, and tactical changes that proved critical to what can only be described as a painful and limited success.

Appendix A: Maps

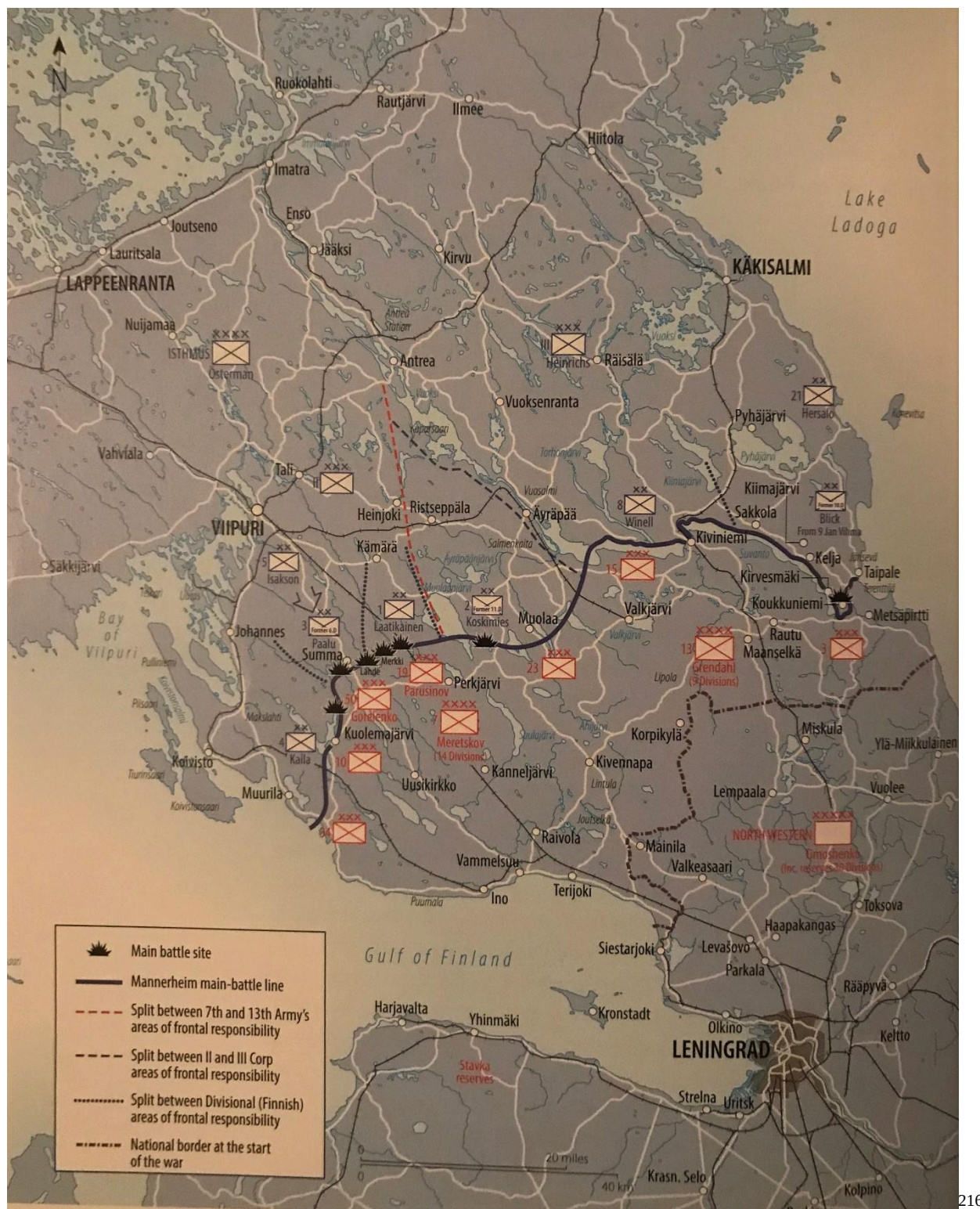


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Map 1: The territory ceded by the USSR at the end of the Winter War. (The land between Lake Ladoga and the Gulf of Finland is the Karelian Isthmus.)



Map 2: The initial Soviet invasion, starting 30 November 1939 (Phase One).



Map 3: The revised Soviet offensive, starting 11 February 1940 and focused on the Karelian Isthmus (Phase Two).



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Map 4: Finnish withdrawal to the Intermediate (Interim) Line.



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Map 5: Finnish withdrawal to the Rear Line and Soviet actions toward Viipuri.

Notes

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- ¹⁰³ James Anzulovic, "The Russian Record of the Winter War," 151-153; Roger Reese, "Lessons of the Winter War," 844.
- ¹⁰⁴ Carl Van Dyke, *The Soviet Invasion of Finland*, 127.
- ¹⁰⁵ Roger Reese, "Lessons of the Winter War," 847.
- ¹⁰⁶ Alexander Chubaryan and Harold Shukman, *Stalin and the Soviet-Finnish War*, 13.
- ¹⁰⁷ Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 232. Timoshenko is quoted as stating, "In frontal attack no enemy...can hope to compare with us. By making a succession of direct attacks we shall compel him to lose blood...something he has less of than we have. Of course, we shall have enormous losses too, but...one has to count not one's own losses but those of the enemy..."
- ¹⁰⁸ Carl Van Dyke, *The Soviet Invasion of Finland*, 105.
- ¹⁰⁹ Carl Van Dyke, *The Soviet Invasion of Finland*, 109.
- ¹¹⁰ Alexander Chubaryan and Harold Shukman, *Stalin and the Soviet-Finnish War*, 5-6.
- ¹¹¹ Carl Mannerheim, *The Memoires of Marshal Mannerheim*, 351; Gordon Sander, *The Hundred Day Winter War*, 254.
- ¹¹² Allen Chew, *The White Death*, 142; Bair Irincheev, *The Mannerheim Line 1920-1939*, 32. (Irincheev does not state specific percentages of Finnish fortifications destroyed, but states, "One by one the Finnish bunkers were picked out and destroyed...")
- ¹¹³ Allen Chew, *The White Death*, 142.
- ¹¹⁴ Ohto Manninen, "The Soviet Plans for the North Western Theater of Operations," 40-41.
- ¹¹⁵ Allen Chew, *The White Death*, 139-140; Carl Mannerheim, *The Memoires of Marshal Mannerheim*, 353; Alan Paley, *The Russo-Finnish War*, 21.
- ¹¹⁶ Alexander Chubaryan and Harold Shukman, *Stalin and the Soviet-Finnish War*, 9; William Trotter, *Frozen Hell*, 209.
- ¹¹⁷ Bair Irincheev, *The Mannerheim Line 1920-1939*, 32; William Trotter, *Frozen Hell*, 209; Gordon Sander, *The Hundred Day Winter War*, 254.
- ¹¹⁸ Carl Van Dyke, *The Soviet Invasion of Finland*, 112-113.
- ¹¹⁹ Carl Van Dyke, *The Soviet Invasion of Finland*, 112.
- ¹²⁰ William Trotter, *Frozen Hell*, 209.
- ¹²¹ Carl Van Dyke, *The Soviet Invasion of Finland*, 113.
- ¹²² Carl Van Dyke, *The Soviet Invasion of Finland*, 113.
- ¹²³ Carl Van Dyke, *The Soviet Invasion of Finland*, 113-114; Alexander Chubaryan and Harold Shukman, *Stalin and the Soviet-Finnish War*, 9.
- ¹²⁴ Carl Van Dyke, *The Soviet Invasion of Finland*, 138.
- ¹²⁵ Carl Van Dyke, *The Soviet Invasion of Finland*, 117.
- ¹²⁶ Carl Van Dyke, *The Soviet Invasion of Finland*, 105-106.
- ¹²⁷ Carl Van Dyke, *The Soviet Invasion of Finland*, 106.
- ¹²⁸ Carl Van Dyke, *The Soviet Invasion of Finland*, 114-115; David Glantz and Jonathan House, *When Titans Clashed*, 21.
- ¹²⁹ Carl Van Dyke, *The Soviet Invasion of Finland*, 114-117; Gordon Sander, *The Hundred Day Winter War*, 251.
- ¹³⁰ David Glantz and Jonathan House, *When Titans Clashed*, 21.

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- ¹³¹ Carl Van Dyke, *The Soviet Invasion of Finland*, 116; David Glantz and Jonathan House, *When Titans Clashed*, 21.
- ¹³² Alexander Chubaryan and Harold Shukman, *Stalin and the Soviet-Finnish War*, 4 and 15.
- ¹³³ James Anzulovic, "The Russian Record of the Winter War," 163; Carl Mannerheim, *The Memoires of Marshal Mannerheim*, 353; Allen Chew, *The White Death*, 146; Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 177.
- ¹³⁴ Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 256; Allen Chew, *The White Death*, 146.
- ¹³⁵ Alexander Chubaryan and Harold Shukman, *Stalin and the Soviet-Finnish War*, 25; Carl Van Dyke, *The Soviet Invasion of Finland*, 117.
- ¹³⁶ James Anzulovic, "The Russian Record of the Winter War," 161.
- ¹³⁷ Carl Van Dyke, *The Soviet Invasion of Finland*, 117; David Glantz and Jonathan House, *When Titans Clashed*, 21.
- ¹³⁸ Richard Armstrong and Joseph Welsh, *Winter Warfare*, 5; Carl Van Dyke, *The Soviet Invasion of Finland*, 111; LtCol Jouni Keravuori, "The Russo-Finnish War 1939-1940," III-22.
- ¹³⁹ Alexander Chubaryan and Harold Shukman, *Stalin and the Soviet-Finnish War*, 14.
- ¹⁴⁰ Allen Chew, *The White Death*, 141.
- ¹⁴¹ David Glantz and Jonathan House, *When Titans Clashed*, 21.
- ¹⁴² Alexander Chubaryan and Harold Shukman, *Stalin and the Soviet-Finnish War* 238.
- ¹⁴³ Ohto Manninen, "The Soviet Plans for the North Western Theater of Operations," 38.
- ¹⁴⁴ Carl Mannerheim, *The Memoires of Marshal Mannerheim*, 368.
- ¹⁴⁵ Richard Armstrong and Joseph Welsh, *Winter Warfare*, 12.
- ¹⁴⁶ Allen Chew, *The White Death*, 126.
- ¹⁴⁷ William Trotter, *Frozen Hell*, 214-215; John Langdon-Davies, *Invasion in the Snow*, 96.
- ¹⁴⁸ *Fire and Ice*, 9:40.
- ¹⁴⁹ Eloise Engle and Lauri Paananen, *Winter War*, 132; Gordon Sander, *The Hundred Day Winter War*, 248.
- ¹⁵⁰ Eloise Engle and Lauri Paananen, *Winter War*, 120; James Anzulovic, "The Russian Record of the Winter War," 166; Alan Paley, *The Russo-Finnish War*, 20.
- ¹⁵¹ Eloise Engle and Lauri Paananen, *Winter War*, 120-132; Carl Mannerheim, *The Memoires of Marshal Mannerheim*, 377; Gordon Sander, *The Hundred Day Winter War*, 246-247.
- ¹⁵² Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 232-233; William Trotter, *Frozen Hell*, 213-214.
- ¹⁵³ Eloise Engle and Lauri Paananen, *Winter War*, 121-122; James Anzulovic, "The Russian Record of the Winter War, 1939-1940," 162; William Trotter, *Frozen Hell*, 214 and 216.
- ¹⁵⁴ Carl Van Dyke, *The Soviet Invasion of Finland*, 138-139.
- ¹⁵⁵ Carl Van Dyke, *The Soviet Invasion of Finland*, 139; Eloise Engle and Lauri Paananen *Winter War*, 122; William Trotter, *Frozen Hell*, 214; Ohto Manninen, "The Soviet Plans for the North Western Theater of Operations," 38.
- ¹⁵⁶ Carl Mannerheim, *The Memoires of Marshal Mannerheim*, 351.
- ¹⁵⁷ Carl Mannerheim, *The Memoires of Marshal Mannerheim*, 353 and 368; Gordon Sander, *The Hundred Day Winter War*, 254 and 269.
- ¹⁵⁸ Carl Mannerheim, *The Memoires of Marshal Mannerheim*, 353.
- ¹⁵⁹ William Trotter, *Frozen Hell*, 217; Gordon Sander, *The Hundred Day Winter War*, 273.
- ¹⁶⁰ Alexander Chubaryan and Harold Shukman, *Stalin and the Soviet-Finnish War*, 4 and 15.
- ¹⁶¹ Carl Van Dyke, *The Soviet Invasion of Finland*, 139-142; Gordon Sander, *The Hundred Day Winter War*, 251.
- ¹⁶² Carl Van Dyke, *The Soviet Invasion of Finland*, 139-142; Gordon Sander, *The Hundred Day Winter War*, 250-253.
- ¹⁶³ Carl Van Dyke, *The Soviet Invasion of Finland*, 144; Gordon Sander, *The Hundred Day Winter War*, 254.
- ¹⁶⁴ LtCol Jouni Keravuori, "The Russo-Finnish War 1939-1940," III-21.
- ¹⁶⁵ Carl Van Dyke, *The Soviet Invasion of Finland*, 150.
- ¹⁶⁶ Carl Van Dyke, *The Soviet Invasion of Finland*, 151.
- ¹⁶⁷ Gordon Sander, *The Hundred Day Winter War*, 272.
- ¹⁶⁸ Gordon Sander, *The Hundred Day Winter War*, 269-270.

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- ¹⁶⁹ Carl Van Dyke, *The Soviet Invasion of Finland*, 152.
- ¹⁷⁰ Gordon Sander, *The Hundred Day Winter War*, 269.
- ¹⁷¹ Carl Van Dyke, *The Soviet Invasion of Finland*, 155.
- ¹⁷² Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 240; Carl Van Dyke, *The Soviet Invasion of Finland*, 155-157; LtCol Jouni Keravuori, "The Russo-Finnish War 1939-1940," III-31-32; David Glantz and Jonathan House, *When Titans Clashed*, 22.
- ¹⁷³ Allen Chew, *The White Death*, 157.
- ¹⁷⁴ William Trotter, *Frozen Hell*, 219; Allen Chew, *The White Death*, 154 and 159-160.
- ¹⁷⁵ William Trotter, *Frozen Hell*, 220; Eloise Engle and Lauri Paananen, *Winter War*, 125; James Anzulovic, "The Russian Record of the Winter War," 165.
- ¹⁷⁶ Carl Van Dyke, *The Soviet Invasion of Finland*, 160.
- ¹⁷⁷ Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 243; LtCol Jouni Keravuori, "The Russo-Finnish War 1939-1940," III-35; Allen Chew, *The White Death*, 159; Carl Mannerheim, *The Memoires of Marshal Mannerheim*, 356.
- ¹⁷⁸ William Trotter, *Frozen Hell*, 217; Eloise Engle and Lauri Paananen, *Winter War*, 123-125; LtCol Jouni Keravuori, "The Russo-Finnish War 1939-1940," III-26-III-28.
- ¹⁷⁹ LtCol Jouni Keravuori, "The Russo-Finnish War 1939-1940," III-35; David Glantz and Jonathan House, *When Titans Clashed*, 22.
- ¹⁸⁰ William Trotter, *Frozen Hell*, 220.
- ¹⁸¹ William Trotter, *Frozen Hell*, 217.
- ¹⁸² General Öhquist as quoted in Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 238.
- ¹⁸³ Carl Mannerheim, *The Memoires of Marshal Mannerheim*, 350; Eloise Engle and Lauri Paananen, *Winter War*, 122-123.
- ¹⁸⁴ Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 244; Eloise Engle and Lauri Paananen, *Winter War*, 125.
- ¹⁸⁵ Carl Van Dyke, *The Soviet Invasion of Finland*, 158.
- ¹⁸⁶ Carl Van Dyke, *The Soviet Invasion of Finland*, 159.
- ¹⁸⁷ Carl Mannerheim, *The Memoires of Marshal Mannerheim*, 367.
- ¹⁸⁸ Carl Van Dyke, *The Soviet Invasion of Finland*, 162-163; Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 251.
- ¹⁸⁹ Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 249; ¹⁸⁹ Bair Irincheev, *The War of the White Death: Finland Against the Soviet Union 1939-40* (Barnsley, UK: Pen & Sword Pub., 2011), 164-167.
- ¹⁹⁰ Bair Irincheev, *The War of the White Death*, 165.
- ¹⁹¹ Alexander Chubaryan and Harold Shukman, *Stalin and the Soviet-Finnish War*, photo #4 between pages 102 and 103.
- ¹⁹² Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 251; Alexander Chubaryan and Harold Shukman, *Stalin and the Soviet-Finnish War*, 220.
- ¹⁹³ Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 251; Alexander Chubaryan and Harold Shukman, *Stalin and the Soviet-Finnish War*, 220.
- ¹⁹⁴ Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 245; Carl Van Dyke, *The Soviet Invasion of Finland*, 163.
- ¹⁹⁵ Alexander Chubaryan and Harold Shukman, *Stalin and the Soviet-Finnish War*, 220; Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 256; William Trotter *Frozen Hell*, 244.
- ¹⁹⁶ Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 253.
- ¹⁹⁷ Carl Van Dyke, *The Soviet Invasion of Finland*, 165.
- ¹⁹⁸ Carl Van Dyke, *The Soviet Invasion of Finland*, 165-167; Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 266.
- ¹⁹⁹ Carl Mannerheim, *The Memoires of Marshal Mannerheim*, 362.
- ²⁰⁰ Carl Van Dyke, *The Soviet Invasion of Finland*, 167-170; Vesa Nenyne, Peter Munter and Toni Wirtanen, *Finland at War*, 267; Carl Mannerheim, *The Memoires of Marshal Mannerheim*, 361-362.

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- ²⁰¹ Vesa Nenyé, Peter Munter and Toni Wirtanen, *Finland at War*, 270-272; James Anzulovic, “The Russian Record of the Winter War,” 164; Carl Mannerheim, *The Memoires of Marshal Mannerheim*, 362.
- ²⁰² *Fire and Ice*, 43:00-44:00
- ²⁰³ Vesa Nenyé, Peter Munter and Toni Wirtanen, *Finland at War*, 270.
- ²⁰⁴ Carl Van Dyke, *The Soviet Invasion of Finland*, 169-174; William Trotter, *Frozen Hell*, 258-260; Vesa Nenyé, Peter Munter and Toni Wirtanen, *Finland at War*, 270-272.
- ²⁰⁵ Carl Van Dyke, *The Soviet Invasion of Finland*, 169.
- ²⁰⁶ Vesa Nenyé, Peter Munter and Toni Wirtanen, *Finland at War*, 273.
- ²⁰⁷ Vesa Nenyé, Peter Munter and Toni Wirtanen, *Finland at War*, 280; William Trotter *Frozen Hell*, 260.
- ²⁰⁸ Vesa Nenyé, Peter Munter and Toni Wirtanen, *Finland at War*, 283; ; Carl Mannerheim, *The Memoires of Marshal Mannerheim*, 388.
- ²⁰⁹ Carl Van Dyke, *The Soviet Invasion of Finland*, 149.
- ²¹⁰ David Glantz and Jonathan House, *When Titans Clashed*, 22.
- ²¹¹ Bruce C. Paton, (ED). “Cold, Casualties, and Conquests: The Effects of Cold on Warfare” *Medical Aspects of Harsh Environments* vol. 1 (Office of the Surgeon General, Department of the Army, United States of America, 2001), 328; Allen Chew, “Fighting the Russians in Winter,” 31-37; Richard Armstrong and Joseph Welsh, *Winter Warfare*. The first half of this book is dedicated to the adaptations made in the Red Army after its Winter War experience.
- ²¹² Allen Chew, “Fighting the Russians in Winter,” 37.
- ²¹³ Geoffrey Cox as quoted by Gordon Sander, *The Hundred Day Winter War*, 255.
- ²¹⁴ Vesa Nenyé, Peter Munter and Toni Wirtanen, *Finland at War*, 286.
- ²¹⁵ Vesa Nenyé, Peter Munter and Toni Wirtanen, *Finland at War*, 55.
- ²¹⁶ Vesa Nenyé, Peter Munter and Toni Wirtanen, *Finland at War* 234.
- ²¹⁷ Vesa Nenyé, Peter Munter and Toni Wirtanen, *Finland at War*, 247.
- ²¹⁸ Vesa Nenyé, Peter Munter and Toni Wirtanen, *Finland at War*, 267.

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