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Cover photo: The first Swiss Federal Railways express city train arrives in Romanshorn, Switzerland, during the spring of 1940. During World War II, rail was the most effective mode of transportation for bulk supplies, equipment, and personnel.

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Program Description

The Command and General Staff College (CGSC) Art of War Scholar's program offers a small number of competitively select officers a chance to participate in intensive, graduate level seminars and in-depth personal research that focuses primarily on understanding strategy and operational art through modern military history. The purpose of the program is to produce officers with critical thinking skills and an advanced understanding of the art of warfighting. These abilities are honed by reading, researching, thinking, debating, and writing about complex issues across the full spectrum of modern warfare, from the lessons of the Russo-Japanese war through recent Global War on Terror operations in Afghanistan and Iraq, while looking ahead to the twenty-first century evolution of the art of war.

Abstract

Swiss World War II military history has been neglected in English-language historiography because Switzerland successfully remained neutral and other controversial topics regarding the Swiss experience during the war have dominated the historical conversation. After the destabilizing rise of Nazism in Germany in 1933, Switzerland's survival was seriously threatened by the events unfolding in Europe and required significant military preparation. This manuscript fills that historiographic gap with discussion on Swiss military logistics preparation from 1933 to 1941. Due to Swiss preparation in the form of mobilization, rearmament, and logistics force design Switzerland's logistical preparation was complete by 1941 which contributed to its ability to remain neutral during World War II. This success was due to the close alignment of Swiss preparation with their various military strategies, operational environment, and unique military traditions. Small nations that are near larger and increasingly aggressive neighbors during today's era of great power competition should study the Swiss experience during World War II to inform their own security preparation.

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Introduction

> We have the resolute intention of protecting our independence against any attack on this [land], our dearest possession, and of upholding our neutrality against anyone who fails to respect it.
> —Swiss President Ludwig Forrer, quoted in Stephen P. Halbrook, *Target Switzerland: Swiss Armed Neutrality in World War II*

There is a view among many historians and in the public that Switzerland avoided war during World War II primarily because of its collaboration and cooperation with its Axis neighbors, especially Germany. This view is likely a result of unfamiliarity with Swiss history and the notoriety of recent controversies regarding the status of Holocaust victims bank accounts, fugitive Nazi funds, and the Swiss National Bank's gold trade with the German Reichsbank.[1] Many factors contributed to Switzerland's ability to maintain its sovereignty, including its diplomatic efforts, economic cooperation with many of the participants in the war, and the general strategic circumstances of the warring parties during the conflict. However, Switzerland's defense preparation contributed immensely to the equation and played an important role in dissuading its much larger and more aggressive neighbors from violating Swiss sovereignty. During World War II, Swiss anti-Nazi sentiment was among the highest in Europe, and the Swiss were determined to resist Nazi aggression and maintain their neutrality and sovereignty during the war.[2]

Switzerland has always taken its war preparation extremely seriously. Switzerland's vigilance and preparation for conflict traces its roots to its proud military traditions, its fiercely independent political system, and its highly defensible geography. American Colonel George Bell wrote the following in 1911:

> Any nation, however powerful, will pause before invading Switzerland, for, combined with preparedness, there is a Spartan patriotism and valor, inherited from ancestors who had no fear of death, and a love of country unsurpassed by any known people, and this army, or nation in arms, before being killed or annihilated by sheer force of numbers, will inflict terrible losses, as while the Swiss believes in peace, and desires it above all else, his good sense tells him this is best assured by preparedness at all times.[3]

The fact that many Swiss citizens still serve in their militia and maintain their government-issued rifles in their homes throughout their service is further evidence that Switzerland remains prepared to protect its sovereignty and remains committed to its national defense today.[4]

Despite being surrounded by contesting forces and its status as a neutral nation, Switzerland continuously demonstrated its determination, resolve, and preparation to defend itself. As the *Wehrmacht* overran western Europe in 1940, the Axis powers surrounded the small nation and formed what historians Stephen Halbrook and Urs Schwarz called the "white spot" on European maps depicting the conquests of the Third Reich.[5] As a result of their preparation, Switzerland was the only democratic state on continental Europe to retain its sovereignty.

While Switzerland was spared the horrors of Axis invasion and conquest, Swiss territorial integrity and security was not a foregone conclusion. Swiss foresight and logistics preparation in areas of mobilization, force design, and rearmament and the alignment of these initiatives with the Swiss military strategy contributed to Switzerland's ability to enforce its sovereignty. Based on the actions, reforms, plans, policies, and initiatives implemented in the pre-war and early war period, the Swiss were logistically prepared for conflict as early as 1941 and their military readiness continued to expand on this solid foundation until the war's conclusion.

There is no English language historiographic literature that exclusively focuses on tracing and analyzing Switzerland's wartime logistical and sustainment preparation during World War II. This manuscript builds on the exceptional work of authors such as Halbrook, Hans Senn, and Willi Gautschi by providing an in-depth analysis of Switzerland's wartime sustainment preparation from a military logistician's perspective. This manuscript is primarily a qualitative analysis, focusing on policies, decisions, events, and people with quantitative analysis provided when possible.

There are significant lessons to be learned from Switzerland's actions during World War II that are particularly relevant today. In the current era of "Great Power Competition" of the 2020s there are many small nations that, like Switzerland, find themselves encircled or near powerful, aggressive, and increasingly assertive neighbors. Mongolia, Taiwan, Eastern European nations, countries in the Caucus, and the Baltic states are some modern examples. Switzerland's actions during World War II offer a historical lens and framework through which political and military leaders may view their present situations and prepare for potential conflict.

Historiographical Review

There has been significant German-language research and writing on Switzerland during World War II but only a handful of books and articles have been translated or written in English. Given that the expected audience of this manuscript is primarily English-speaking historians, policy-makers, security analysts, and military personnel, the historiographical review is focused primarily on English-language literature but does not neglect key German-language literature.

Much of the secondary source and historiographic literature regarding Switzerland in World War II is focused on political, diplomatic, foreign policy, geopolitical, intelligence, financial, and economic topics. Switzerland's neutrality enabled it to be both a broker to and conduit between the Axis and Allies. This special relationship with both parties resulted in historically unique circumstances and the topics related to these circumstances have received special attention from historians. Rudolf Juan, in his assessment of Swiss World War II historiography, suggested that the topic of Swiss defense was "of secondary, not to say tertiary, importance," especially when compared to the compelling and controversial topics such as Swiss financial and gold arrangements with Germany, refugee policy, espionage, and its diplomatic role in the conflict.[6] Due to the cooperation between Switzerland and the European Axis-aligned states, criticism of Switzerland's neutrality, or rebukes thereof, dominate much of the English-language literature.[7] The general lack of Swiss defense and military literature, especially in English, is understandable given that Switzerland did not actually conduct major combat operations and successfully remained out of the conflict.

German-language literature does a better job of examining Swiss logistics matters and developments during the war. Rudolf Haudenschild's recently published two-volume book, *Logistik der Schweizer Armee* [Logistics of the Swiss Army], provides expansive coverage on all topics of Swiss logistics, including two sections covering World War II.[8] It is an extremely important collection that has aggregated substantial primary source information regarding Swiss logistics. The chief limitation of Haudenschild's book is that it is a survey that covers approximately 170 years of Swiss logistics history and presents limited analysis. Former Chief of Staff of the Swiss Army from 1977 to 1980, participant in World War II, and prolific Swiss military historian, Hans Senn's works are also critical to understanding Swiss military history in World War II. Given his high-ranking position in the Swiss Army, his participation in the conflict, and because he was

such a prolific writer on Swiss military topics, Senn is one of the most important figures in Swiss military history and provides substantial insight and analysis into Swiss preparations during World War II.

In the late 1990s and early 2000s, English-language Swiss World War II history experienced a Cambrian Explosion where a variety of new sources were published in English and many older German sources were translated. Prompted by a controversial class-action lawsuit over Jewish assets in Holocaust-era bank accounts, the study of Switzerland's history came back into vogue.[9] While the resurging popularity and criticism was primarily focused on Switzerland's relationship with Nazi Germany, the residual impacts from the war, and matters of conciliation, it had a secondary effect of bringing more attention to other historical topics regarding Switzerland's World War II activities.

Military history benefited from this resurgence of popularity in Swiss historical study. Gautschi's *General Henri Guisan,* a biography of the Swiss Commander and Chief for the entirety of the war, first entered print in both English and German during this timeframe. As General Henri Guisan's leadership spanned the entire conflict, it is one of the most comprehensive books available when studying Swiss military strategy, capabilities, policy, and preparation. General Guisan's role in the conflict cannot be understated. He is a mythic figure widely considered to have been responsible for keeping Switzerland out of the war and sparing it from the devastation and suffering experienced by the rest of Europe.[10]

Halbrook's books, *Target Switzerland* and *The Swiss and the Nazis* are some of the most popular and important contributions to the English language historian's understanding of Swiss military history during World War II.[11] *Target Switzerland's* significance is highlighted when it received the 2000 Max Geilinger Foundation award for works contributing to Swiss and Anglo-American culture and the 2002 Foundation for Western Thought award. Halbrook's series serves two roles: a starting point for this author's research and the foundation on which this manuscript builds on. Halbrook's series, while extremely comprehensive, is focused on preparation as a whole and touches on all aspects including diplomatic, social, civil, political, and military preparations. Halbrook briefly introduces many of the topics in this manuscript, especially those pertaining to military logistics and readiness, but the focus of this research is on deeper examination of logistics matters.

Equally important in this analysis is the perspective of the chief adversary, belligerent, and threat to Switzerland: Nazi Germany. Klaus Urn-

er's book, *Let's Swallow Switzerland* and many components of Halbrook's second book, *The Swiss and the Nazis,* fill this void by discussing German perspectives and German war plans against Switzerland and informs the manuscript on the effectiveness of Switzerland's logistics preparation from the adversary's perspective.[12] This manuscript will frequently refer to Urner and Halbrook's text and others like it, to evaluate how the Axis viewed the progress of Switzerland's logistical preparation throughout the war. These texts inform Germany's reasoning to escalate or de-escalate hostility through coercion, pressure, and threat of military action against Switzerland because of, or despite, Swiss preparation. Urner is in a unique position to provide the German perspective for two reasons: (1) Urner is widely considered an authoritative historian on Swiss-German relations and interactions in World War II having written several books on the topic and having wide access to various sources as an archivist and (2) he compared existing war plans, such as the widely known Operation Tannenbaum plans, with newly discovered German General Staff war plans against Switzerland that may have threatened Switzerland earlier than previous historiography would suggest.[13] Thus, Urner's analysis plays a critical role highlighting when the risks were greatest for Switzerland which can be compared against Swiss military preparation.

In addition to Gautschi, Halbrook, and Urner, the writings by Hans Senn and Swiss military historian Jürg Stüssi-Lauterburg have also been published in English and inform this manuscript analysis. Stüssi-Lauterburg and Senn's contributions, appearing in the anthologies *Switzerland Under Siege 1939-1945: A Neutral Nation's Struggle for Survival* and *Retrospectives on Switzerland in World War Two,* are some of the few English works that form arguments as to Switzerland's level of readiness and its impact on Axis decision-making.[14]

A key element of Swiss preparation efforts was a focus on forts and fortifications. The impact of fortresses on Swiss defensive strategy, national psyche, and military history cannot be understated, therefore the literature on Swiss fortifications represented by texts such as J. E. Kaufmann and H. W. Kaufmann's *The Forts and Fortifications of Europe, 1815-1945: the Neutral States* and J. E. Kaufmann' and R. M. Jurga's *Fortress Europe: European Fortifications of World War II* are also foundational.[15] The literature on fortresses is especially important because these facilities were not only tactical strongpoints that provided advantages to the defender and greatly influenced Swiss strategy, but they also played a critical role in sustainment activities by acting as garrisons, depots, supply points, infirmaries, and other key logistical facilities and nodes. In many respects

Switzerland resorted to a "rigid defensive posture," one that was reliant on fortresses, because of its logistical shortcomings in its industrial base and lack of mechanized forces.[16] Switzerland could never produce, field, and sustain armored vehicles, warplanes, and other means of mechanized warfare in sufficient quantities to execute a strategy based on maneuver.[17] Instead, the Swiss resorted to constructing forts, an inherently logistical undertaking, but also an activity that the Swiss could achieve at the appropriate scale to have an impact. Switzerland had far greater historical experience and expertise in constructing fortifications than it had in mechanizing and modernizing its army. The integration of forts into a defensive strategy exemplified Swiss intellectual adaptability and objectivity. The Swiss understood their military's shortcomings, acknowledged the natural advantages offered by their geography, and did not ignore the capabilities of their enemies.

General histories of World War II such as the titanic works of William L. Shirer, Allen Reed Millet, Williamson Murray, and Gerhard L. Wienberg, offer little regarding Switzerland's armed forces, let alone topics such as Swiss military logistics and preparation.[18] In these works, Switzerland, like many other neutral nations in World

War II, receives only cursory mention or analysis. However, these sources remain useful in placing Switzerland in the broader context of the conflict and clarifying the Axis' motivations and residual military capacity to threaten Switzerland as the war progressed. Peter H. Wilson's recent addition to the broader historiography, *Iron and Blood: A Military History of the German Speaking Peoples since 1500,* published in February 2023, offers a valuable new and expansive perspective on the military history of the German-speaking peoples.[19] This text gives significant attention to Switzerland during the period covered in this manuscript while also offering important context to Switzerland's broader military history.

The most important sources for adding to the general body of knowledge and providing deeper analysis on Swiss logistical preparation are the primary and archival sources. The Swiss Federal Archives in Bern was instrumental in uncovering the evolution and impacts of Swiss logistics on the outcome of the war. The *"Operationsbefehls"* ["Operations Command"] which were equivalent to operations orders for modern militaries, are foundational archival sources for this manuscript. Twenty-two *Operationsbefehls* were published by the Swiss high command throughout the war, and they contain annexes, appendices, reports, and correspondence that inform Swiss logistical preparation. Many of these orders discuss logistical matters in detail and offer significant insight for this manuscript.

Another key category of archival sources are reports and documents related to the various sections in the General Staff and Federal Military Departments dedicated to logistics. Documents and reports from organizations such as the Rear-Area Services [*Ruckwartige Dienste*], Territorial Services [*Territorialdienst*], Transport Services [*Transportdienst*], Department of Sanitation [*Abteilung fur Sanitat*], High War Commissariat [*Oberkriegskommissariat*], War Materiel Management Section [*Kriegsmaterialverwaltung*], and Field Postal Services [*Feldpostdienst*] were invaluable for this research.

The final category of sources consulted was the general histories of military logistics. Sources such as *Supplying War* by Martin van Crevald, *Feeding Victory* by Jobie Turner, and *The Lifeblood of War* by Julian Thompson, which all include discussion of World War II logistics, help ensure that the logistics concepts discussed are grounded in the historical logistics trends in warfare.[20] These sources also serve as a basis of comparison to help identify where the Swiss logistics approaches deviated from contemporary and modern militaries.

A Note on Swiss Geography

In 1933, Switzerland bordered Germany in the northeast along the Rhine River and Lake Constance. Switzerland's northern border with France began where the Rhine River turns and the border wraps westward around Switzerland until just south of Lake Geneva. A critical feature along most of the northern Swiss border with both France and parts of Germany is the Swiss Jura, a lesser mountain range that runs parallel to the Alps further south. In between the Jura and the Swiss Alps sits the Swiss Plateau, consisting of rolling hills, plains, rivers, and lakes which is Switzerland's most productive and industrialized region and home to most of Switzerland's population.[21] At both ends of the Swiss Plateau there are two lakes that serve as natural barriers: Lake Geneva in the southwest and Lake Constance in the north. The southern half of Switzerland, primarily bordering Italy, is dominated by the Swiss Alps which cover approximately 60% of the country and contain many of the Alp's highest mountains. The Swiss Alps are crossed by steep valleys and contain several historic and strategically important Alpine passes that enable north-south transit in an area that is generally considered impassable. During World War II, the St. Gotthard and Simplon passes were coveted and strategically significant terrain because of the transit opportunities they offered between Germany and Italy. During most of the war, transit was only authorized by Switzerland for non-war goods and specifically prohibited the transit of war

materiel; this fact often served as the motivating impetus for planned aggression against Switzerland, specifically by Germany. To the east, Switzerland borders Austria but in 1938, Germany absorbed Austria during the *Anschluss,* further extending the Swiss border with Nazi Germany.[22]

The geography of Switzerland played an important role in both Swiss strategy and Swiss logistics systems, processes, and requirements. The difficult terrain in both the Jura and the Alps favored the defense, especially in an era of mechanized and industrialized warfare such as World War II where concepts of maneuver dominated many battlefields. Tanks, and airplanes, all instruments that advantaged the attacker by enabling mobility, envelopment, breakthrough, exploitation, and other forms offensive warfare, were less effective in Alpine and pre-Alpine environments.[23] Mountainous terrain adversely impacts the logistics of both attacker and defender, especially regarding transportation. Commanders cannot rely solely on rail and heavily mechanized means of transportation as suitable roads and railroads are often scarce. Instead, armies must rely on man-pack, pack-animal, and light motorized movement of supplies and equipment.[24] Given the limited transportation and distribution infrastructure, fixed or prepositioned supply networks, including caches, logistical facilities, forts, and fortresses offset some of the disadvantages of the terrain but are often only available to the defender.[25] As it prepared for war, Switzerland took advantage of the weaknesses of maneuver warfare in mountainous terrain and leveraged the asymmetric logistics impacts the geography offered to the defender.

The Threat

To understand how Switzerland prepared for war, one must first identify possible adversaries and analyze their motivations for aggression against Switzerland. In the approach to World War II, Switzerland was bordered by three potential adversaries: Germany, Italy, and France.[26] France initially had a military justification to invade Switzerland, that of flanking the Germans through Switzerland, an eventuality that never manifested because France fell to Germany in 1940. Due to many strategic, military, and political reasons Germany, and to a lesser extent Italy, were the major adversaries to Switzerland after 1940. While Germany and Italy were the largest and closest threats to Switzerland, Switzerland's policy of absolute—yet armed—neutrality meant that the Allies' return to the continent in June of 1943 and 1944 also affected Swiss decision-making during the final phases of the conflict.

Over the course of the war, the political, strategic, and military justifications changed and weighed differently in the minds of the would-be aggressors. By overlaying the political, military, and strategic intentions of the conflict's belligerents, it is possible to discern the periods of greatest risk and danger for Switzerland and assess it against the Swiss Army's logistical readiness. World War II was first and foremost a war between ideologies. From the beginning, the rise of National Socialism in Germany presented a threat to Switzerland, a multi-cultural and multi-ethnic democratic state. Adolf Hitler and the Nazi's racial objective to unite all German-speaking people, captured first in Hitler's *Mein Kampf:* "Common blood must belong to a common Reich" directly demonstrated the threat to Switzerland with its majority German-speaking population.[27] The ideological threat remained throughout the war but was most prevalent in the early phases of the conflict. The Swiss were certainly aware of Nazi intentions before the war when the North American Digest stated the following in 1934: "The moment that Austria succumbs to the Nazi boa constrictor, Switzerland is marked as the next victim to be strangled in the coils."[28] After the Austrian *Anschluss* with Germany, the subsequent occupation of Czechoslovakia, and the fall of France, these sentiments increased; multiple *Sicherheitsdiesnt* [SS Security and Intelligence Service] reports in 1940 alluded to the inevitability of a German takeover of Switzerland stating "Switzerland too had to be 'cashed in' [referring to the Munich Agreement]," "Switzerland has yet to be swallowed," and "Switzerland may not be overlooked in the reorganization of Europe."[29]

Military imperative by the conflict's belligerents also factored as a justification to invade Switzerland. The initial military reasoning for Germany and France to invade Switzerland was to flank the adversary and achieve operational surprise or to bypass the fortified areas of the Maginot Line and Westwall by going through Switzerland.[30] Early in the conflict, France did not need to bypass the fortified German border region through Switzerland because a frontal assault directly into Germany was more practical as German forces were largely preoccupied in Poland.[31] In fact, France conducted a brief incursion into Germany during the "Phony War" period by briefly patrolling up to the Westwall's outpost line.[32] For the Germans however, France's Maginot Line, a series of fortifications along the Franco-German border specifically designed to counter a German invasion, presented a formidable obstacle for any invasion attempt.[33] After the fall of Poland and the completion of German Army redeployments to the Western Front, Germany stood to benefit most from an attack on France through Switzerland.[34] The axis of approach through Switzerland, which

would occur through the Swiss Plateau from Zurich to Lucerne, provided an alternative to Schlieffen's World War I envelopment maneuver through the Benelux.[35] The advantage of the southern flank attack through Switzerland was that it only required violating the sovereignty of one nation versus three nations to the north, many of whom had security guarantees with the Allies, and provided a direct route to threaten significant French war industry centered in Lyon. However, the terrain along the attack axis through northern and western Switzerland still included the mountains, hills, rivers, and lakes of the Swiss Plateau and Jura. This terrain, while not as formidable as the Alps in southern Switzerland, still presented an obstacle that factored in Germany's ultimate decision to attack through the Benelux.[36] Additionally, the difficult terrain in Alpine southern Switzerland and the associated complexities of executing and sustaining military operations in the Alps precluded the Italians from seriously considering invasion routes through Switzerland against France.

Secret agreements as early as June 1939 between General Guisan and the French Supreme Command resulted in military plans for cooperation stipulating that France would provide "protection…and direct support in case of a German attack" against Switzerland, effectively incorporating Switzerland and her fortifications as an extension of the Maginot Line.[37] This secret agreement and the subsequent fall of France on 25 July 1940, finally removed France as a potential threat to Swiss sovereignty—but it also meant that Switzerland was now encircled by the Axis. The initial phases of World War II, from the invasion of Poland through the fall of France, represented the period of highest risk for Switzerland for military reasons. This threat is showcased by the German military plans generated at the time including the Von Menges Plan and Operation Switzerland, both later amalgamated and renamed Operation Tannenbaum which is discussed later.[38]

Germany maintained other strategic justifications and objectives to invade Switzerland, most notably the Swiss war industry and Alpine transit routes. Germany coveted the strategically important Swiss military-industrial capabilities, whose factories supplied weapons, weapon components, and ammunition. The Germans relied heavily on Swiss specialty components and parts such as pinions, ball bearings, specialty ammunition, and precision tools that were not produced elsewhere in Europe and were required for German tanks, aircraft, and other major weapon systems.[39] Between 1941 and 1944 an overwhelming majority of Swiss armament exports in all categories went to European-aligned Axis powers including 84% of all munitions.[40] This is contrasted to 1940 when most

Swiss armament exports supported Allied war efforts.[41] There were two periods when Swiss armament's capability heightened risk for Switzerland. First, in 1940 because of German concerns of Swiss materiel support to the Allied powers before and after the Armistice with France.[42] The second period was late 1943 through 1944, when the tide of the war began to shift from Axis to Allies and Germany began to lose its influence over Swiss trade to the Allies, but Germany still required Swiss war materiel.[43] As the Allied strategic air bombing campaign began to erode the German war industry and the Swiss began authorizing fewer armament exports, Switzerland's security was significantly threatened by an increasingly resource-constrained Germany.

Another strategic reason why the Axis considered invading Switzerland was to secure the important rail transit routes through Switzerland. Citing its neutrality, the Swiss barred the movement of war materiel and soldiers through its territory during the war.[44] This did not have a significant impact early in the conflict because routes through Austria existed, albeit slower, and there was minimal demand for north-south movement of supplies and materiel. When France fell, additional alternative routes through occupied France and Vichy France became available. The transit routes and overall strategic position of Switzerland became increasingly important to Germany after the Allied invasion of Sicily and even more so after the Italian capitulation in 1943 when significant numbers of German soldiers continued to fight in northern Italy until shortly before the war's termination.[45] The increasing priority of the logistical effort in Italy grew as the Germans assumed more responsibility for defending the Italian front.

It was in 1943 when military imperative again returned to the fore as a possible justification for the invasion of Switzerland. As the tide of the conflict turned against Germany, the Nazis debated establishing an interior defensive perimeter within Europe, with the Alps designated as a new southern flank, if mainland Europe was invaded by the Allies.[46] After the Allies returned to the continent, the Nazis feared potential Swiss support to the Allies which would open alternative routes to pass stalemated fronts in the inner defensive zone toward Germany. Therefore, in addition to the much-needed transit routes required to supply their forces in Italy as part of their defensive strategy, German objectives also included invading Switzerland to preclude potential Swiss support to the Allies and eliminate potential invasion routes. The Germans believed that Switzerland needed to be invaded prior to an allied landing in Europe while resources were still available to execute the plan.[47] While Hitler instead elected to main-

tain the defense along the fronts it had already occupied, the 1943 "March Alarm," a threatened invasion of Switzerland of that month, prompted serious planning by the German General Staff which culminated in the creation of the Böhme Plan and a period of elevated danger for the Swiss.[48] Finally, in the concluding phases of the war, large portions of the German Army were trapped in northern Italy and the German leadership contemplated attacking through Switzerland to rejoin the Reich to establish a refuge of last resort from which to mount a final stand. This proverbial castle keep was planned for the mountainous parts of the Bavarian and Austrian Alps and may have incorporated portions of Swiss territory.

Germany's political-racial objective to unify the so-called German *"Volk,"* the military necessity for alternative invasion routes, their desire to seize Switzerland's strategically important transit system and armament industry, and the *Wehrmacht* desire to go on the strategic defensive within Europe indicate sufficient justification existed for an invasion of Switzerland throughout the war. Overlaying the political, military, and strategic motivations for Switzerland's neighbors to attack yields two conclusions: the first is that Germany was the primary threat to Switzerland, and second, late May 1939 through July 1940, late 1943 through 1944, and 1945 were the three periods of greatest danger for Switzerland.

It bears repeating that Swiss security was not a foregone conclusion. Swiss economic cooperation with the Axis alone was not enough to deter an attack on Switzerland. Swiss historian Hans Senn believes that "If the Swiss had not been prepared to defend their country with massive force, Hitler would hardly have missed the unguarded prey."[49] Even into the final years of the war Germany was a threat to its neighbors and maintained the offensive potential to invade Switzerland as demonstrated by the occupation of Hungary and the Ardennes Offensive. For the discussion on Switzerland's initial logistical preparation for war, focus is on Swiss logistical preparation from 1933 through 1941. The primary reason for concluding in 1941 is because Switzerland's most dangerous period from 1939 through 1940 had passed, Germany and her Axis partners were becoming decisively engaged with fighting the Soviet Union, and Swiss logistics preparations by 1941 ensured Switzerland did not present an "unguarded prey" to the Axis powers.

Swiss Military Tradition

Due to Switzerland's democratic political system, small size, limited resources, and its geopolitical position in the heart of western Europe around larger, more powerful neighbors, the Swiss Federation's military

strategy has always been inherently defensive. Switzerland's enduring geopolitical policies remain a posture of armed neutrality and its robust militia system centered on fighting from fortified positions. These traditions which were solidified after the Treaty of Westphalia and subsequent Napoleonic Wars together represent a Swiss "way of war" and had an important impact on Swiss logistics and preparation during World War II.[50]

Due to Switzerland's neutrality, the Swiss military strategy was inherently defensive. Defensive strategies have different sustainment requirements than offensive strategies and offer different opportunities and risks regarding logistics operations. One key benefit of the Swiss strategy is that the Swiss Army was expected to operate within interior lines. Operating within interior lines improves the efficiency and security of movement, distribution, and transportation as these operations typically occur behind friendly lines closer to the defender's supplies and industrial base.[51] The risk of defensive strategies is that they cannot easily achieve a decisive strategic outcome and therefore rely on attrition. Attrition-based approaches require greater quantities of materiel and manpower for longer periods which strains a military's logistics system. The evolution of the Swiss defensive strategy and the alignment of logistics to the military strategy is a topic of close examination in subsequent sections.

Coinciding with their focus on the defense, the Swiss have a historical relationship of leveraging fortifications to offset the superior numbers and technology of its invaders. J. E. Kauffman and H. W. Kauffman, two prominent experts on fortresses and fortifications, succinctly described the formula for Swiss defense before the Napoleonic Era: "The Swiss maintained their independence for centuries by creating an effective military force that eviscerated invading armies in their mountainous strongholds."[52] As early as the 13th and 14th centuries Wars of Independence against the Hapsburg Empire, the Swiss leveraged fortifications for cantonal defense. Peter Wilson, in his book, *Iron and Blood,* describes the effective use of fortifications and terrain against the heavily armored Hapsburg knights: "each village was required to maintain stone and earth barriers along their boundaries. Small detachments would hold these in the valley floor to delay the advancing cavalry, who were strung out in a long column of march. The main Swiss force then sprang the ambush, rolling boulders down the hillside to cause confusion, before attacking with swords, spears, and halberds."[53] Much like they did against the heavily armored knights of the Hapsburgs in the medieval period, the Swiss intended to use the combination of fortifications and rugged terrain to offset the advantages of the heavily armored Panzers of the German *Wehrmacht.* Fortifications formed

the cornerstone of all evolutions of the Swiss military strategy to resist and deter its adversaries in Europe.

The Swiss acknowledged early on that mobile warfare was not feasible because of their limited resources and relative inexperience with mobile and mechanized warfare. Instead, the combination of Swiss infantry, fortifications, and mountainous terrain in Switzerland would be the defeat mechanism against the Germans. The Swiss would deny the Germans the advantages offered by their mechanized and armored spearheads and their doctrines of infiltration, penetration, breakthrough, and envelopment. Fighting from entrenched positions in restricted terrain also enabled the Swiss to achieve a greater economy of force and promised to allow the Swiss to resist the much larger and better-equipped German and Italian Armies with its limited manpower. The Swiss intended to rely on the Clausewitzian tenant that the defense is the stronger form of warfare.

The Swiss military was and remains today a militia force. The Swiss model maintains a conscript force and small professional cadre to train and maintain the army during peacetime. This force is also available immediately during emergencies. During conflict or crisis Switzerland mobilizes its reservists, those previously conscripted and trained, to fill the ranks of its army. The Swiss system included all males aged 20 to 60 but was divided into several cohorts based on age.[54] The militia comprised of the *Auszug* or "elite" units (typically ages 20 to 36), the *Landwehr* or "first reserve" elements (ages 36 to 48), and *Landsturm* or "home guards," those specifically identified to mobilize last (ages 48 to 60).[55] There were also auxiliary forces and non-combat military personnel involved, which blurred the line between military units and civilian elements. This concept may be unfamiliar to readers today, but it is important to note that despite Switzerland's neutrality it had mobilized its entire society just as the active belligerents did during the conflict.

There are several important factors to note regarding Switzerland's militia system. The Swiss militia system enabled it to mobilize an enormous percentage of its military in a short period, up to 20% in 1940, which was proportionally among the highest in World War II.[56] The large army that the Swiss mobilization system enabled, while an advantage on the battlefield and a logistical accomplishment in its own right, presented significant challenges for the Swiss military and government to sustain. The number of Swiss citizens mobilized fluctuated drastically throughout the war because the costs required to sustain personnel in the army represented a risk to the economic health of the country. Soldiers and auxiliaries were often released to their homes and jobs but were still required to remain

ready for remobilization. However, the frequent cycle of mobilization and demobilization of personnel also presented a serious security risk for the Swiss government and often left them vulnerable during dangerous periods. Balancing the readiness of the army and the economic health of the nation is an important theme throughout Switzerland's experience during World War II.

The Swiss militia system encouraged local readiness to enable faster mobilization by allowing soldiers to store much of their personal equipment, including weapons and supplies, in their homes. This higher level of readiness contributed to the "armed" facet of its policy of armed neutrality and was the cornerstone of the nation's deterrence strategy. If the population could mobilize quickly, then the readiness of Swiss society at large factored heavily in determining the overall military readiness. The reliance on a militia force spread across Switzerland would introduce unique challenges, especially in basing and transportation, to Swiss logistics forces.

To understand the evolution of Swiss logistical preparation one must review and analyze how the overarching Swiss defensive strategies evolved over the course of the war. Switzerland's strategy had remained fundamentally unchanged in the 19th and 20th centuries. Only in World War II did the Swiss strategy change by undergoing four distinct evolutions. Each of the strategies implemented by Switzerland had different implications for Swiss logistical preparation and readiness. The four different strategies were: (1) The Frontier Strategy, (2) the Limmat Strategy or "Case North," (3) the National Redoubt Strategy, and (4) a graduated defense strategy. Each strategy levied different requirements on the military and imposed different burdens and logistical requirements. One of the primary contributions of this manuscript is how the logistical preparation responded and aligned with these strategies.

Was Switzerland Ready?

The primary goal of the Swiss military during World War II was to protect Swiss neutrality, sovereignty, and security by demonstrating to any belligerent the readiness, willingness, and capacity to mount sustained resistance to deny and punish the aggressor. The Swiss were keenly aware of the limitations of both their nation and military and thus primarily focused on preventing conflict through preparation. Key to achieving this state of deterrence is the strategic readiness and logistical capability of the force. The tool a military uses to assess and align its logistics efforts with its environment, strategy, expected operations, and army for an anticipated conflict is called "logistics preparation of the theater," "logis-

tics preparation of the battlefield," and more recently "sustainment preparation of the operational environment."[57] At the fundamental level, this manuscript examines and compares Swiss sustainment preparation of the operational environment with early Swiss preparation to determine its impact on the outcome of World War II. Switzerland's logistics preparation is analyzed across three general categories: mobilization, rearmament, and logistics organization.

Mobilization informs the Swiss ability to marshal its national resources for military service. The Swiss militia system provided the Swiss military with remarkable manpower and incorporated huge portions of their society into the war effort. The task of mobilizing hundreds of thousands of personnel, including equipping, mustering, organizing, and transporting—and doing so quickly—cannot be achieved without significant logistics capability, planning, and integration. This manuscript primarily discusses mobilization policy, reform, and supporting logistical actions.

When examining rearmament, one determines if the Swiss could produce or had the right equipment and provisions including general supplies, food, fuel, ammunition, and weapon systems, in the right quantities, to support their military strategy. Fortifications and fortress construction are also incorporated as forms of rearmament. To a lesser extent this manuscript also assesses Swiss economic and strategic resilience. By looking at Switzerland's capacity to sustain its industrial war economy and feed its population it is possible to evaluate the political will of the people to mobilize and resist.

Discussion on Swiss logistical organization pertains to the growth and change within Switzerland's logistics units and organizations and compares it to the requirements of a growing army. The Swiss Army's logistics enterprise changed in complexity, structure, and capability and is evaluated to identify patterns where the Swiss adapted and aligned with the Swiss military strategy and the evolving threats.

Juxtaposing the above logistical developments with events in World War II, the Swiss strategic situation, and the evolving Swiss strategy is critical to evaluating the impact of Swiss logistics preparation on Switzerland's ability to enforce their sovereignty. Using primary source accounts and documents it's possible to evaluate if the Swiss met their expectations and believed they were ready. Swiss perspectives are then compared to the German perspectives to determine to what degree Swiss logistical preparations were a determining deterring factor in dissuading the conflict's belligerents from attacking Switzerland.

This manuscript is divided into four sections each discussing a specific phase or period during the war. The first phase, captured in chapter 2, begins with the ascendency of Adolf Hitler to the German Chancellorship in 1933 and continues through to the initial Swiss response immediately after the outbreak of war on 1 September 1939. This chapter is centered on pre-war military reform, force structure changes, early rearmament based on the initial expectations of what the next conflict would look like, and the Swiss decision to defend along its borders.

Chapter 3 continues the narrative in the post-1939 period after the invasion of Poland and ends with the German armistice with France on 25 July 1945. Here the Swiss adopt a defense in depth along the Limmat Line, increase production, and expand mobilization. The theme in this chapter is Swiss adaptation and growth in logistics capabilities.

Chapter 4 picks up after the French armistice with Germany in the summer of 1940 and concludes after the German invasion of the Soviet Union on 22 June 1941. This period is also marked by the most dangerous period for Switzerland during World War II which came after the European Axis had completely encircled Switzerland and before the *Wehrmacht* attacked the Soviet Union. This period is notable for a major strategic and logistical pivot and growing resilience in Swiss logistics capability. This section also completes the narrative for Switzerland after 1941 to highlight the impacts of Swiss preparations and logistics initiatives set in place during the first three years of the war.

The final chapter showcases how the Swiss logistics preparations from 1933 to 1941 supported the Swiss capacity to deter and dissuade the Axis from attacking. Thus, 1933 through 1941 represents the most important period for Swiss preparation and the focus of this manuscript. Finally, this chapter assesses Switzerland's historical experience preparing for World War II and offers insights into today's era of renewed "Great Power Competition."

Before continuing, one must define several key terms. Put simply, logistics is "the practical art of moving armies and keeping them supplied."[58] The focus is on strategic and operational level military logistics and preparation for war and not tactical developments. Tactical logistics is largely the domain of junior officers and non-commissioned officers who attempt to solve problems using the resources at their disposal. When tactical logistics is referenced, it provides context or evidence of a larger discussion on high-level logistics. Of greater concern is how the logistics policies, force structure, and resourcing decisions provided the necessary resources to those junior leaders and the military.

Notes

1. Georg Kreis, ed., *Switzerland and the Second World War* (London: Frank Cass, 2000), xi.

2. Peter H. Wilson, *Iron and Blood: A Military History of the German Speaking Peoples since 1500* (Cambridge, MA: Belknap Press, 2023), 573–574.

3. Stephen P. Halbrook, *Target Switzerland: Swiss Armed Neutrality in World War II* (Rockville Centre, NY: Sarpedon, 1998), 19.

4. In 2007, Swiss policy changed and discontinued the practice of issuing 50 rounds of ammunition for storage at home, however, rifles are still issued and stored in private homes. "Soldiers Can Keep Guns at Home but Not Ammo," SWI Swissinfo.ch, 27 September 2007, https://www.swissinfo.ch/eng/soldiers-can-keep-guns-at-home-but-not-ammo/970614.

5. Halbrook, *Target Switzerland,* vii; Urs Schwarz, *The Eye of the Hurricane: Switzerland in World War Two* (Boulder, CO: Westview Press, 1980), xiii.

6. Rudolf Juan, "Military National Defense 1939-1945," in *Switzerland and the Second World War,* ed. Georg Kreis (London: Frank Cass, 2000), 194.

7. There are entire anthologies dedicated to controversial topics regarding Swiss neutrality. So fervent is this debate that there are also entire anthologies dedicated to rebuking criticisms of the Swiss. See: Kreis, *Switzerland and the Second World War;* Donald P. Hilty, ed., *Retrospectives on Switzerland in World War II* (Rockport, ME: Picton Press, 2001).

8. Roland Haudenschild, *Logistik Der Schweizer Armee* [*Logistics of the Swiss Army*], vol. 1–2 (Bern, Switzerland: Stämpfli AG, 2023).

9. Michael J. Bazyler, *Holocaust Justice: The Battle for Restitution in America's Courts* (New York: New York University Press, 2003), xi.

10. Willi Gautschi, *General Henri Guisan,* trans. Karl Vonlanthen (Rockville Centre, NY: Front Street Press, 2003), xi.

11. Halbrook books can be viewed as a two-part series. *The Swiss and the Nazis* was not intended to be a sequel to *Target Switzerland* but he admits that it can be viewed as such. However, both can be read and understood as entirely independent works. The two works are exceptionally complimentary, take different approaches and perspectives, and together form a comprehensive discussion on the topic of Swiss preparation for World War II. Halbrook, *Target Switzerland;* Stephen P. Halbrook, *The Swiss and the Nazis: How the Alpine Republic Survived in the Shadow of the Third Reich* (Havertown, PA: Casemate, 2006).

12. Klaus Urner, *Let's Swallow Switzerland: Hitler's Plans against the Swiss Confederation* (Lanham, MD: Lexington Books, 2002).

13. Urner's claim is that earlier war plans existed outside of Operation Tannenbaum. Urner, *Let's Swallow Switzerland,* 2, 12.

14. Jürg Stüssi-Lauterburg, "The Threat of Three Totalitarianisms: The Swiss Response," in *Switzerland under Siege 1939-1945: A Neutral Nation's Struggle for Survival,* ed. Leo Schelbert (Rockport, ME: Picton Press, 2000), 19–38; Hans Senn, "The Swiss Army Was Ready: Reasons Germany Dropped

'Operation Switzerland'," in *Retrospectives on Switzerland in World War II,* ed. Donald P. Hilty (Rockport, ME: Picton Press, 2001), 63–75; Hans Senn, "Defending Switzerland: The Impact of Armed Neutrality in World War II," in *Switzerland under Siege 1939-1945: A Neutral Nation's Struggle for Survival,* ed. Leo Schelbert (Rockport, ME: Picton Press, 2000), 3–18.

15. H. W. Kaufmann and J. E. Kaufmann, *The Forts and Fortifications of Europe 1815-1945: The Central States* (Yorkshire, England: Pen and Sword, 2014); J. E. Kaufmann and Robert M. Jurga, *Fortress Europe: European Fortifications of World War II* (Conshohocken, PA: Combined, 1999).

16. Schwarz, *The Eye of the Hurricane,* 9.

17. Senn, "The Swiss Army Was Ready," 63.

18. William Shirer, *Rise and Fall of the Third Reich: A History of Nazi Germany* (New York: Simon and Schuster, 2011); Williamson Murray and Allan Reed Millett, *A War to Be Won: Fighting the Second World War, 1937-1945* (Cambridge, MA: Belknap Press, 2000); Gerhard L. Wienberg, *A World at War: A Global History of World War II* (New York: Cambridge University Press, 2005).

19. Wilson, *Iron and Blood.*

20. Martin van Creveld, *Supplying War: Logistics from Wallenstein to Patton,* 2nd ed. (Cambridge, UK: Cambridge University Press, 2004); Jobie Turner, *Feeding Victory: Innovative Military Logistics from Lake George to Khe Sanh* (Lawrence, KS: University Press of Kansas, 2022); Julian Thompson, *The Lifeblood of War: Logistics in Armed Conflict* (Oxford, UK: Brassey's, 1991).

21. Gautschi, *General Henri Guisan,* 53–54.

22. Shirer, *Rise and Fall of the Third Reich,* 322.

23. Headquarters, Department of the Army (HQDA), *Mountain Operations,* Field Manual (FM) 3-97.6 (Fort Belvoir, VA: Army Publishing Directorate, 2000), 4-1 – 4-7.

24. HQDA, *Mountain Operations,* 5-7.

25. HQDA, *Mountain Operations,* 5-9.

26. Austria is not included because it was incorporated into Germany during the 1938 *Anschluss* and did not represent a significant threat against Switzerland prior to 1938.

27. Halbrook, *Target Switzerland,* 31.

28. Halbrook, *Target Switzerland,* 33.

29. Urner, *Let's Swallow Switzerland,* 16.

30. Shirer, *The Rise and Fall of the Third Reich,* 531.

31. Gautschi, *General Henri Guisan,* 52.

32. Murray and Millett, *A War to Be Won,* 52.

33. Wilson, *Iron and Blood,* 572.

34. Gautschi, *General Henri Guisan,* 52.

35. Halbrook, *Target Switzerland,* 24.

36. Halbrook, *Target Switzerland,* 87–88.

37. Urner, Let's Swallow Switzerland, 3; Halbrook, *Target Switzerland,* 29; Gautschi, *General Henri Guisan,* 78–80.

38. Senn, "Defending Switzerland," 28, 31.

39. Peter Hug, *Schweizer Rüstungsindustrie Und Kriegsmaterialhandel Zur Zeit Des Nationalsozialismus* [*Swiss Army Industry and War Material Trade at the Time of National Socialism*] Unabhängige Expertenkommission Schweiz–Zweiter Weltkrieg [Independent Expert Commission Switzerland–Second World War], vol. 11 (Zürich: Pendo Verlag GmbH, 2002).

40. Peter Hug, *Schweizer Rüstungsindustrie,* 1.

41. Peter Hug, *Schweizer Rüstungsindustrie,* 1.

42. Urner, *Let's Swallow Switzerland,* 11, 82.

43. Halbrook, *Target Switzerland,* 194.

44. Halbrook, *Target Switzerland,* 107.

45. Halbrook, *Target Switzerland,* 118; Halbrook, *The Swiss and the Nazis,* 250; "Swedes Hear of Swiss Crisis," *New York Times,* 11 September 1943, ProQuest.

46. Senn, "Defending Switzerland," 13.

47. Senn, "Defending Switzerland," 12.

48. Senn, "Defending Switzerland," 12.

49. Senn, "Defending Switzerland," 15.

50. Gordon E. Sherman, "The Neutrality of Switzerland," *The American Journal of International Law* 12, no. 2 (April 1918): 241–250.

51. It is important to differentiate transportation, distribution, and movement for this manuscript. Transportation refers to movement of equipment, personnel, and/or supplies, often in bulk and by a dedicated purpose-built logistics organization. Distribution refers to the movement of material and manpower to the right-place at the right-time and most often refers to the last-mile of logistics were manpower and materiel are moved to their final destination or issued to the end user. Movement is inclusive to the definitions of transportation and distribution but also refers to a unit's organic ability to relocate itself.

52. Kauffman and Kauffman, *The Forts and Fortifications of Europe,* 166.

53. Wilson, *Iron and Blood,* 60.

54. Halbrook, *Target Switzerland,* 76.

55. The Swiss maintained this tiered mobilization system until 1995. Halbrook, *Target Switzerland,* 76; Albert Niessel, "Switzerland's Defenses: The Maginot Line's South Wing," *Washington Post,* 12 June 1939, ProQuest; Wilson, *Iron and Blood,* 623.

56. Werner Richter, "The War Pattern of Swiss Life," *Foreign Affairs* 22, no. 4 (1944): 643–48, https://www.jstor.org/stable/20029861; Halbrook, *Target Switzerland,* vii; Senn, "The Swiss Army Was Ready," 64.

57. Thomas Goyette and William Knight, "Tools and Models for Sustainment Preparation of the Operational Environment," *Army Sustainment* 50, no. 1 (January-February 2018): 58–60, https://alu.army.mil/alog/2018/JANFEB18/PDF/194810.pdf.

58. Creveld, *Supplying War,* 1.

Chapter 2
Reform, Reorganization, and Rearmament (1933 to Summer of 1939)

> There should be no doubt anywhere concerning the will of Switzerland to defend her neutrality and capacity to do so.
>
> —Swiss Federal Council response to Germany's 1933 withdrawal from the League of Nations, quoted in Stephen P. Halbrook, *Target Switzerland*

Resisting the Gleichschaltung

In 1933, the Swiss Army was a small force that relied on the residual mobilization procedures, wartime policies, equipment, structure, doctrine, and strategy from World War I. The Swiss Army lacked heavy weapons and had made virtually no attempts of military modernization in the 1920s with the exception of incorporating the light machine gun which was fielded with the Swiss Army in 1925.[1] Switzerland, like many other nations in Europe, took advantage of the peace in Europe brought upon by what Herbert George (H.G.) Wells famously coined "the war to end all wars."

With the collapse of the Weimer Republic and rise of Adolf Hitler to power in Germany in 1933, Swiss leaders recognized the precarious position the nation was in and acknowledged the need to prepare. The "European War Scare" in 1933 immediately increased tensions on the continent and was the first warning for the Swiss. Fierce nationalism, concerns of secret rearmament by the Germans, and subsequent saber-rattling by Germany and Italy greatly alarmed France, Poland, Austria, and several Balkan nations.[2] Illustrating this tension, on March 13, 1933, the *Los Angeles Times,* reported: "At no time since 1914 has there been so much open and alarmed talk about war or a situation more immediately threatening."[3] Switzerland was quickly ensnared in the war scare when British news released purported German war plans to invade France through Switzerland.[4] *The New York Times* assessed the situation as dire for Switzerland in September 1933 stating: "though the Swiss are good soldiers they are untrained in modern warfare, poorly officered and lacking in mechanical equipment."[5] Despite Switzerland's vulnerability from the sharp turn of events and subsequent lack of preparation, the head of the Swiss Federal Military Department and later President of the Confederation, Rudolf Minger, perfectly captured Swiss resolve against the growing threat of fascism in his 9 July 1933, speech: "Our people will never allow this de-

mocracy to be tampered with. Violent appetites for dictatorship, whichever side they come from, will always properly be dealt with. Never will our people accept a German-style *Gleichschaltung* [forcing into line]. In Swiss fashion we will order our Swiss house."[6]

Although Germany vehemently denied the allegations and war plans in multiple forums, including in the League of Nations, Switzerland began to take immediate steps to reform its military long before the first major German extra-territorial acquisitions of the *Anschluss,* Munich Treaty, and two occupations of Czechoslovakia which occurred in 1938 and 1939.[7] In October 1933, the Swiss Parliament authorized the first installment of a multi-year investment of 100 million Swiss Francs for the military, the first defense budget increase since World War II.[8] Over the next 12 years, Switzerland would demonstrate its resolve and spirit of national resistance through a tremendous commitment of capital. Military spending increased until 1940 before finally leveling out. The Swiss spent 200 million Swiss Francs per year until 1938, 500 million Swiss Francs in 1939, and spending rose to an unprecedented level of 1 billion Swiss Francs per year from 1940 to 1945.[9] For a nation with only four million citizens, the Swiss financial commitments toward military expenditures placed an incredible strain on the Swiss people, economy, and government, representing a significant sacrifice for the small nation. Military expenditures only represented 1.4% of the net national product of Switzerland in 1934, and it rose to the high-water mark of 11.6% in 1940 and remained around 10% of Swiss net national product for the remainder of the war.[10] Military expenditures represented a dizzying 62% of the national budget in 1940, a sharp contrast from the normal levels of 20 to 25% seen from 1923 to 1936. For comparison, the United States, a major belligerent in World War II, spent approximately 37% of its gross domestic product at its peak and was sustained for a much shorter duration.[11] Switzerland's commitment to its defense in financial terms is exceptional, especially considering its small size, status as a neutral nation, and the much longer duration Switzerland would sustain its military spending.

The 1933 war scare and subsequent increase in defense spending becomes the starting point for the analysis of Swiss mobilization and wartime preparation because the threat, an aggressive Nazi Socialist Germany, came into focus. Initial assessments by the Swiss General Staff in 1933 determined that Germany would not be ready for an offensive war for another 10 years, with a general war estimated to begin by 1943.[12] However, after Hitler's occupation of the Rhineland in 1936, the Swiss General Staff brought this date forward and estimated that war might begin as early

as 1940.[13] Entering into 1933, the Swiss Army's total expected mobilizable end-strength was 520,000 across all of its mobilization categories: *Auszug, Landwehr, Landsturm* and unassigned components, however, only 150,000 soldiers were typically available and regularly drilled for training.[14] The initial force structure of the army in 1933 roughly maintained three cavalry brigades and six infantry divisions with three infantry brigades, one artillery brigade, and one mountain brigade within each division.[15] As Switzerland prepared to meet the challenges ahead and prepare for the potentiality of war, Swiss logistical requirements would mount and strain the Swiss Army and government.

With the threat clear, a rough window for preparation established, and given the state of the Swiss Army, the Swiss government faced three critical challenges in 1933: (1) they had to implement a viable defensive strategy that played to their geographic and military strengths that could reasonably dissuade or defend against Axis aggression by 1940; (2) they needed to complete mobilization reform and update their force structure to ensure they could quickly mobilize a sufficiently large force and equally large logistics enterprise to support their chosen strategy; (3) the Swiss Army needed to begin rearmament and modernizing its equipment. Switzerland's pre-war innovations in mobilization, force structure, and rearmament and their alignment to their strategy from 1933 to 1939 proved to be exceptionally farsighted and foundational for its survival in the early phases of World War II.

Defending the Frontier

Swiss strategy in 1939 was not fundamentally different from their strategy during World War I. In that conflict, Switzerland rapidly mobilized 450,000 men and organized them into 6 divisions.[16] Three divisions were arrayed along the borders of France and Germany and three divisions were positioned further back as a reserve. Additionally, four brigades were positioned in the mountains near the southern border with Italy.[17] At the outset of World War II, approximately 430,000 soldiers were again mobilized and three elements, this time corps, were positioned along the borders with France and Germany with two divisions positioned further south in the Bernese Seeland and Upper Aargau regions as a reserve.[18] As during World War I, the Swiss guarded their southern border with several brigades arrayed to conduct an area defense.[19] This strategy was referred to as the "occupation of frontiers" or Frontier Strategy.[20] Only minor differences existed between the two implementations of the Frontier Strategies of World War I and World War II, namely the size of the echelon arrayed

at the border (corps versus divisions) and the number of reserve elements (two versus three divisions). However, each iteration was conceptually the same; they included a linear defense along the political borders with the expected belligerents, reserve forces positioned further back, and brigade-sized elements dedicated to area security in the southern mountains.[21]

Figure 2.1. Troop Dispositions According to *Operationsbefehl Nr. 1* Depicting the Frontier Defense in 1939.

Source: "Operationsbefehl Nr. 1 [Operation Order #1,]" 2 September 1939, E5560D#2019/243#141*, Swiss Federal Archive, Bern.

Due to Switzerland's historically defensive tendencies and the chosen strategy to defend along Switzerland's borders at the outset of the war, one of the first war time initiatives the Swiss implemented was to build and improve fortifications on the border. Over the course of the war, the Swiss would spend 657 million Swiss Francs, or approximately 15% of the wartime defense budget, toward the construction and improvement of fortifications.[22] Fortress construction began in 1934 after the Swiss parliament

authorized fortress development largely to employ the jobless.[23] Some of the earliest evidence of Swiss investments in the construction of forts and fortifications occurred in 1935, a direct albeit delayed result from the 1933 war scare where "$7,000,000 (21,540,400 Swiss Francs) were allocated to build fortifications along the German border."[24] The Swiss invested a much larger amount, $100,000,000 (331,250,00 Francs) in April of 1936 and in January of 1937, Swiss population was again "being asked to subscribe $76,375,000 (332,964,450 Francs) more for a defense loan. From this, $55,000,000 (239,778,000 Francs) will be spent on new defenses, with $16,000,000 (69,753,600 Francs) going for anti-aircraft defenses."[25] The border positions primarily consisted of machine gun bunkers, blockhouses, obstacles, and obstructions but also consisted of several fortresses of various sizes.[26] Preparation for the border positions also included placing demolition charges on bridges to slow or delay any advance by enemy armies in the event of an invasion.[27] During the early period from 1933 to 1939, the Swiss primarily invested in their border positions, however, they also began dedicating resources to fortress and fortification construction in the interior of the country which would become relevant later as the Swiss strategy evolved.

Switzerland's fortifications and fortresses influenced Swiss logistics planning. In total, there were 5 major forts, 377 tank barricades and 250 fortifications that required management, maintenance, resupply, and logistical support by the fall of 1939.[28] Many fortifications were equipped with troop quarters and munitions storage, however, the storage and logistical capabilities of these forts and fortifications largely existed to support the organic capability of the position itself, most were not self-sufficient, and not meant to support a large garrisons for an extended period.[29] However, the border positions did contain several major fortresses, such as Fort Pré-Giroud, built on a mountain slope at the northern edge of the Jura, which had a larger garrison and could sustain its garrison. Fort Pré-Giroud had a garrison of 100 to 150 men, maintained 2 months of supplies, and had 2 ammunition magazines.[30] Outside of fortifications, the larger logistical infrastructure of the Swiss Army was expansive and included 84 main depots, 29 armories, 19 intermediate depots, and 172 forward depots spread across the nation reflecting the disbursed nature of its militia army.[31] Switzerland's early investments in fortifications and logistics infrastructure highlights their understanding of the danger looming on the horizon, commitment to armed neutrality, and defensive posture to enforce their neutrality. The next challenge for the Swiss would be to update their militia system for the new threats they expected to encounter.

Mobilization Reform

The Swiss defensive strategy and mobilization capabilities in 1933 were also still artifacts of their efforts during World War I. Early mobilization procedures also reflected the uneasy peace in Europe and were hampered by the depressed economic situation in the 1930s.[32] In his 1916 book, *A Citizens Army: The Swiss System,* Julian Grande provides an informative account of Swiss mobilization procedures during World War I. He described one example where the entire mobilization and deployment activities for a division, including notification, muster, preparation, and deployment on assigned railcars took only four days.[33] The only caveat Grande provided was that this division had received one month's advance notice for the affected soldiers.[34]

Innovations in German military doctrine, capabilities, and mechanization, including the integration of the panzer and aircraft, meant that the speed and destructiveness of warfare was increasing after World War I. From 1933 to 1939, the Swiss were not fully aware of the effectiveness of the new German doctrine, as the rapid demonstrations of *Wehrmacht* power and doctrine in Poland, Belgium, and France had not yet occurred. However, in 1937, the Swiss began to suspect that warfare was becoming increasingly rapid and destructive. Military leaders understood Switzerland's vulnerability to this type of warfare as indicated by this statement by a member of the Swiss General Staff, "When war comes, we will be unable to mobilize our entire army. The Germans will probably destroy our railroad centers, Aarau and Olten, within forty-eight hours."[35] Despite the orderly efficiency that Grande describes, the Swiss sensed that a 34-day mobilization would not be fast enough to defend against the innovations of mechanized warfare represented by German *Blitzkrieg.* To prevent rapid defeat and resist Axis invasion, the Swiss needed to rapidly mobilize, place units in their assigned positions, and be ready to fight before the first day of battle.

From 1933 to 1939, the Swiss implemented substantial mobilization reform to meet that need. The early mobilization reforms implemented in this period were crucial for Switzerland's survival when the first full mobilization occurred at the end of August 1939. The first significant reforms in mobilization began in 1934.[36] A successful Swiss plebiscite in 1934 implemented a policy in 1935 that extended initial recruit training from two months to three months and expanded non-commissioned officers and officer training capabilities.[37] Most notable were the innovative organizational and force structure changes implemented by the Swiss:

> Particular arrangements have been made for the defense of the frontiers, and to cover the mobilization, by the creation of special defense brigades. These are formed of men of all classes, down to the 'Landsturm' (all men capable of bearing arms), recruited on the spot and specially trained for the purpose in view. They are called up every two years. Each of these brigades has as its nucleus one permanent company of two hundred men, all volunteers serving for six months. Important industries and points of entry into the country are permanently garrisoned, and all arrangements for destroying them, if necessary, have been made.[38]

These foundational new reforms and *Grenztruppen* [border brigades], represented the first Swiss mobilization policy update that aligned with the Frontier Strategy which better accounted for the faster and more lethal battlefields expected during World War II. The Swiss now had a permanent presence on the border capable of conducting screening and covering tasks to provide early warning. If threatened, these units would buy time for the remainder of the Swiss Army to mobilize and deploy. The border brigades would also serve as a reception mechanism, able to assist with the integration of other mobilized units that would be deployed to the border. The Swiss high command believed this covering force, and the time they bought, to be so important that orders such as the following were issued to the border troops: "[the border garrisons] shall resist to the last shell, even if they have been bypassed and are totally isolated" and, more ominously, "the border troops shall maintain their positions without thinking about retreating and without hoping to be saved. They know their mission and are aware of the sacrifice that it entails."[39]

The next major round of reforms would come in the spring of 1939 when the Swiss government implemented policies to further expand the army's readiness. After the *Anschluss* and the Munich Treaty in 1938, the Swiss Federal Council "authorized the government to call up army reservists for training as complete units during 1939 and to hold them in service as long as necessary" representing a stark departure from previous policies where only parts of units would train together at different times.[40]

Until the summer of 1939, the risk for Switzerland remained acute and mobilization efforts were primarily restricted to policy and force structure changes within the Swiss military system. While the establishment of the *Grenztruppen* did represent a new armed and ready presence on the border as early as 1935, only fractions of the border units were active at any time. No major mobilization of combat power occurred until August

1939. To properly leverage the manpower available to Switzerland after its mobilization reforms, the Swiss Army also substantially updated its logistics force structure and took significant steps to modernize the logistics elements that would support a growing army.

Army Reorganization

The size, composition, and structure of the logistical organizations within the Swiss Army provides insight into the Swiss military's readiness. From 1933 to 1939, the Swiss Army's logistical structure became larger, more capable, and more sophisticated to account for the additional divisions and personnel it expected to mobilize during war. Additionally, many of the major structural changes were tailored to support the unique needs and requirements of Switzerland's militia army. Through 1939, the Swiss Army significantly expanded its logistics capabilities at all echelons, increasingly specialized its logistical units, concentrated logistics capabilities at higher echelons, and tailored its logistics capabilities toward its border defense strategy.

At the highest level within the Swiss military, there were two major organizations within the Federal Military Department or *Eidgenössische Militar Department* General Staff which focused on developing policy, providing support, and coordinating logistical services to the Swiss Army: The *Rückwärtige Dienste* [Rear-Area Services] and *Transportdienste* [Transport Services]. The Rear-Area Services, established in 1932, and its subordinate department's primary tasks included the providing sustainment services, provisioning of all materiel, ammunition, and supplies, and managed the army's facilities including medical centers, supply depots, and armories of their respective commodities.[41] Key organizations assigned to the Rear Area Services were the: *Abteilung für Sanitat* [Department of Sanitation] which focused on providing medical support, *Oberkriegskommissariat* [High War Commissariat], Kriegsmaterialverwaltung [War Materiel Management Section], and *Feldpostdienst* [Field Postal Services].[42] The Transport Services administered rail and motor transport services at the strategic and operational level and consisted of the *Eisenbahndienst* [Rail-Service], Transitdienste [Transit Services], *Motorwagendienst* [Motor Vehicle Service], and *Abteilung für Heeresmotorisierung* [Army Motorization Department].[43]

Due to the growing tensions on the continent, on 19 June 1936, the Federal Council approved a major reorganization of the army which also resulted in significant updates for Swiss logistics organizations.[44] The force structure changes manifested in the new 1936 *Truppenordnung* [Troop Or-

ganization]. The speed at which the Swiss political leaders, citizenry, and Federal Military Department raised the necessary funds for restructuring was commendable. Upon public announcement of the reorganization, then Chief of the General Staff, Jakob Labhart, stated the following regarding the new 1936 *Truppenordnung:*

> Almost two years ago, with an unparalleled willingness to make sacrifices, the Swiss people bore witness to their great will to defend themselves, which forms the basis for our country's independence. Within a few days, through voluntary subscription, the financial resources needed to expand our national defense and enable the implementation of the new troop organization were raised.[45]

By 1938, the 1936 reforms were generally complete and would form the foundation for the Swiss Army during the war. The 1936 *Truppenordnung* expanded the Swiss Army force structure from its World War I configuration by adding three divisions and one mountain brigade and organized divisions and brigades under corps headquarters. The major combat components in a standard Swiss division were three infantry regiments, a field artillery regiment, and smaller specialized artillery elements (for example motorized or heavy artillery) consisting of approximately 15,000 to 17,000 men. Supporting an infantry division was a supply and *Verpflegungs-Abteilung* [support battalion] which typically consisted of one supply company, a motorized distribution column, an ammunition truck column, and two infantry park columns. The nucleus of the logistics support of these battalions was the supply company and motorized distribution column which managed and distributed all manner of supplies and equipment and evacuated broken equipment for repair. Within this nucleus, each division's supply and distribution companies contained 297 men consisting of 19 officers, 44 Non-commissioned officers, 238 soldiers, 13 bicycles, and 59 motor vehicles.[46] Also assigned to the supply battalions were the two infantry park columns (*Infantarie-Park-Kompagnie*) and an ammunition truck column (*Munitions-Lastwagen-Kolonne*). The infantry park columns, while assigned to the support battalion were typically task-organized in direct support to the infantry regiments. Their primary purpose was to carry, maintain, and distribute the division's second combat load of ammunition near the frontlines.[47] Of note, their ammunition logistical lift, transportation, and distribution consisted entirely of horse-drawn wagons, typically containing a total of 58 wagons and 164 personnel.[48] The final logistics element assigned to a division within the support battalion was the ammunition truck column, a large platoon-sized element

consisting of 60 personnel, 12 light trucks, and 5 heavy trucks responsible for the bulk transportation of ammunition to supply areas for distribution to the infantry park columns.[49] Not all divisions within the Swiss Army were uniform. For example, the 6th Division, mobilized out of Zurich, Switzerland's most populous city, contained an additional fourth infantry regiment and had larger variants of the same logistics organizations previously discussed.[50] Additionally, the mountain brigades, which normally consisted of two infantry regiments, also had different support profiles and logistics elements. They typically had smaller supply companies and no dedicated battalion logistics headquarters.[51] The corps levels of the Swiss Army had only a few logistics elements directly assigned to them, however, the capability contained in their elements was significant. The corps contributed five to six additional ammunition transportation companies depending on how many heavy artillery regiments were assigned at the corps level. Each corps had an ammunition truck company for each artillery regiment assigned with most corps having two or three heavy artillery regiments.[52] The other three ammunition transportation companies, under an ammunition transportation battalion, were larger variants of the ammunition truck companies with those companies often being two or three times larger than the standard ammunition truck company assigned to the division.[53]

The 1936 *Truppenordnung,* represented an overall increase in the capacity of Swiss logistics and quantity of logistical organizations from 1933 to 1938. Meanwhile, the number of combat formations remained relatively static. In 1933, the Swiss had approximately 1,186 company-level, or equivalent, combat units (loosely defined as infantry, cavalry, artillery, engineer, and aviation units), and approximately 1,253 combat units in 1938 representing approximately a 6% growth in combat units from 1933 to 1938.[54] Logistic units, specifically supply and transportation units, experienced a disproportionately larger growth than that of the combat units. Beginning in 1933, the Swiss Army had approximately 164 dedicated company sized logistics elements (including companies, groups, detachments, and columns).[55] By 1938, the Swiss Army had approximately 281 dedicated logistics units representing just shy of 60% growth, with much of the growth occurring in rail units and various motor transport units assigned above the division level, often in the Rear Area Services and Transport Services.[56]

When looking specifically at dedicated motorized transportation units, the growth is even more pronounced. The 1924 *Truppenordnung* only accounts for 19 transportation companies at the corps and below lev-

els, with 6 tasked to support the divisions (equaling 1 per division), 6 dedicated to general or area support where needed, 6 dedicated to supporting heavy artillery, and 1 staging transportation company designed to support mobilization.[57] At the army and rear-area levels, 10 additional motor parks, also company-sized elements, existed. Motorized transport units at the division level doubled and transportation units at the corps levels and higher almost tripled, going from 22 company and detachment sized organizations to 56.[58] There was also tremendous growth in the number of personnel dedicated to transportation. The number of personnel associated with Motor Transport Services grew from 4,070 personnel in 1924 to 22,599 personnel in the 1936 *Truppenordnung*.[59]

Coinciding with the growth of logistics units and capability, one also sees increasing specialization of logistical organizations within the Swiss Army. For example, in 1936, the *League of Nations Armaments Yearbooks* began to indicate new logistical unit types: new formations such as ammunition lorry columns and tractor columns appeared in the tables of organizations alongside the existing motor transport and supply organizations. After the 1936 *Truppenordnung* went into effect, the number of different types and variants of logistics organizations had proliferated substantially. Before 1938, most task organizations indicate only a handful of different logistical organization types.[60] "Unser Heer" [Our Army], the comprehensive illustrated reference publication for the 1936 *Truppenordnung* reforms shows 40 different sustainment and logistics organizations types and variants ranging from differentiated transportation companies to medical detachments. The intense proliferation of specialized logistics units and headquarters represents the incorporation of new technologies, specifically motorized capability, but also the increasing sophistication of the Swiss logistics systems and wartime planning.

The larger and more specialized logistics apparatus was extremely important for sustaining the large force generated by Switzerland's updated mobilization system. The reforms discussed earlier dramatically expanded the mobilization capability of the army from its World War I numbers, especially considering that three new divisions and an expanded air force were added to the army. The 1936 force structure changes to the Swiss logistics capability would become especially prescient after the 1939 mobilization reforms. Entire units now had to be supported instead of just cohorts or fractions of units. Additionally, mobilized personnel received more training and were expected to be mobilized for longer periods of time. A larger logistics enterprise, which provided better and more ef-

fective support through specialized units provided the sustainment foundation needed to mobilize a large army for longer.

Another notable trend of the Swiss Army was to concentrate most of its logistics capabilities at the highest echelons, especially its ammunition, and transportation capability. In the 1924 *Truppenordnung,* the only logistics units that existed above the division level were rail units and a transportation group consisting of nine truck companies assigned to support mobilization and three ammunition groups consisting of nine transportation companies.[61] The first evidence of a new logistics structure that emphasized logistics elements being retained in higher echelons is within the ammunition elements: the divisions and mountain brigades maintained 12 ammunition truck companies while the 3 Swiss Corps' maintained 16 ammunition truck companies, and the army level maintained 12 additional ammunition truck companies.[62] Remember, many of the corps and army ammunition transportation companies were significantly larger than those assigned at the division level. Therefore, 28 of the army's 40 ammunition truck companies, or greater than 70% of the ammunition transportation capabilities, operated at the army's two highest echelons.

At the army or *Armeetruppen* level, one sees a similar centralization of logistics capabilities at the top, especially general supply and personnel transportation. The army level maintained four motor transport battalions, each with three companies, a light, heavy, and tractor transportation company, with many being up to twice as large as those assigned to the divisions.[63] This is in addition to the four supply battalions with their four organic distribution companies. Therefore, the Swiss Army level maintained 16 general cargo transportation and distribution companies while the divisions and brigades maintained only 13.[64] Again, one sees greater than 60% of the transportation capabilities concentrated at the highest echelons. This analysis also does not include the capabilities of the 16 personnel transportation units, the train troops with their 50 train sections, the medical troops, and other logistics units that supported the air force and other enabler units. Outside of transportation and ammunition management, the Swiss also retained other specialized logistics services at the highest levels including all of their 13 dedicated bakery and field feeding companies.[65]

Concentrating logistics assets at the highest levels, especially transportation capability, was another critical force structure change for the Swiss military given its mobilization profile. Concentrated logistics provided flexibility to the army to apply resources to the area of greatest need. For example, centrally managed transportation assets enabled the Swiss

Army to rapidly move mobilized personnel, supplies, and equipment from their mobilization points in the interior of the country to the areas where they were needed. This was especially important as many of the mobilization centers and depots were not near the borders. The *Grenzetruppen* would buy the army time, and the army level would prioritize transportation, including trains, trucks, and buses, for the units that needed the most support moving into the most critical positions. Additionally, the exact threat to prepare for during the late 1930s was still uncertain. Switzerland had to design a force structure that could rapidly shift significant forces and equipment to counter either the German, French, or Italian Armies or some combination of the three. It would not be until after the 1939 where threat and specific locations of battle, namely along the German border, could be predicted.

The 1936 reforms represented a stark departure from the previous organization of the Swiss Army. The larger and more specialized logistics organizations addressed the diverse requirements of a growing army. The concentration of logistics capabilities at the highest levels was also important given Switzerland's strategy and militia system and the requirements to rapidly shift or move significant materiel and manpower quickly. The force structure changes, which improved the organization and increased the sophistication and capability of the Swiss Army, would become even more important as Switzerland shifted to its Limmat and Redoubt strategies. Subsequent strategies later placed incrementally higher demands on the Swiss logistical system then the initial Frontier Strategy.

Initial Rearmament

During the interwar period, many nations focused on organization, policy, and doctrine reform over more expensive initiatives such as modernization, industrial production, and rearmament.[66] Germany focused on less tangible development because of the constraints of the Treaty of Versailles while democratic nations focused on the same due to political, social, and economic pressures. Switzerland followed a similar arc as the democratic nations regarding rearmament during the interwar period. Swiss rearmament lagged behind organizational and policy innovation; however, the Swiss recognized the need to focus on rearmament to equip their growing army much earlier than most other democratic European nations.

The Swiss war industry was substantially drawn down after World War I. Compounding the issue, war production was also significantly affected by the Great Depression.[67] However, an assessment by the US

defense attaché in 1932 reported that the Swiss war-production facilities were sufficient to meet the needs and wartime demands of the Swiss Army and could be scaled up as required.[68] Despite this optimistic outlook by the US in 1933, several issues plagued rearmament efforts. Swiss capacity to produce artillery systems was meager, limited only to one factory at Soluthurn. The Swiss also had no replacement parts or supplies for their modern artillery pieces. While some stocks did exist for their obsolescent artillery, the Swiss Army lacked modern artillery, anti-tank, and anti-aircraft weapons.[69] In 1933, the Swiss war industry was primarily centered on the manufacture of small arms and small arms ammunition with only limited capability for artillery, artillery ammunition, and fuzes. Swiss manufacturing was concentrated in seven government and privately owned facilities with the factories at Lenzburg, Zurich, Bern, and Soluthurn located in the Swiss Plateau, and Altdorf, Thun, and Wimmis located further south in the Swiss Alps or foothills.[70] Most importantly, from 1933 to 1937, political and military leaders associated with the Social Democrats political party initially resisted allocating funds to rearmament.[71]

Shortly after the 1936 reforms and reorganizations were implemented, the Social Democrats began to favor rearmament. By 1938, domestic ammunition and weapons production was ramping up. For example, in 1937, the private Swiss firm Sulzer Brothers began production of the Swedish-licensed 105-mm motorized 1935 L42 artillery system. Initially, the order was for 80 pieces, but the War Technology Department quickly expanded the order to 160 guns with the first gun made entirely in Switzerland being fired in Thun in March 1938.[72] By the end of 1938, 24 domestically produced L42 guns had been delivered, 6 more guns were being delivered monthly, and the Swiss expected production to increase to 8 per month.[73] Additionally, by 1938, many of the early production orders for major weapon systems being manufactured domestically were beginning to be delivered including five batteries of twelve 75-mm mountain artillery pieces each and eight 75-mm motorized artillery pieces initially ordered in 1936 and 1937 respectively.[74]

The Swiss Government also began growing the labor force in war industries; 561 additional workers were hired across Swiss Federally owned factories, representing a 15% increase in labor at the Federal facilities. Admittedly, the Swiss War Technology Department was still short on labor relative to demand stating: "Although the number of staff increased by 561 people in 1938, there was still not enough to cope with the many tasks. Further proliferation cannot therefore be avoided."[75] To further speed up production, the Swiss also implemented innovative techniques enabling

Swiss manufacturers to import unfinished foreign gun barrels and use them to complete the production of artillery system within Switzerland. In 1938, 157 unfinished gun barrels of various calibers from three different firms across Europe were delivered in 1938 or expected to be delivered in early 1939.[76] The Swiss also implemented a similar technique of purchasing and stockpiling components from private firms for ammunition production "in order to be able to begin large-scale production at any time."[77]

Despite the improvements in production by the Swiss industrial base, issues remained. By the beginning of the war in the Fall of 1939 only 250 of the 750 million Swiss Francs allocated for modernizing the army were spent.[78] At this time, the Swiss could only field 12 reconnaissance tanks, 80 modern 105-mm motorized cannons, 40 Messerschmitt E-109 fighters, and 1,600 artillery pieces, split evenly between mortars and smaller 75-mm artillery.[79] Additionally, post-war reports also indicate "many troops did not have sufficient arms" or still wielded outdated weapons because "the relatively large armament credits approved before the war had not been turned into weapons yet."[80] When compared to other European neutral states in similar situations, such as Belgium and the Netherlands, the Swiss were receiving major armaments much earlier. Despite having larger armies and nearly twice the population of Switzerland in 1939, the Swiss rearmament was well ahead of the Benelux states in many respects. For example, the Belgian Army had 1,338 artillery pieces and the Dutch Army only had 656 artillery pieces in 1940.[81] These materiel advantages highlight the reward of foresight and early investment by the Swiss. After 1939 and the outbreak of hostilities, the Swiss would continue to adapt and substantially increase military production and materiel build up.

Swiss Innovation

The Swiss General Staff prediction of a German offensive war in 1940 proved to be surprisingly prescient and was only off by a few months. World War II in Europe would begin with the German invasion of Poland on 1 September 1939. On the eve of war, the Swiss would find themselves much more prepared than many of their European neighbors because of their foresight, early commitment to prepare, and their pre-war innovations.

For Switzerland, the 1933 to 1939 period of innovation is highlighted by structural reform and policy changes regarding their army and mobilization, and their initial steps toward rearmament. Switzerland's pre-war efforts were tailored to their circumstances. The Swiss designed a strategy that fit their unique military system, their geography, and dangerous

geopolitical situation based on increasingly uncertain assumptions on how war would be fought from the experiences observed in World War I. During this period, the Swiss became increasingly aware of the changing character of war by recognizing that warfare was becoming faster and more destructive. In response, they developed mobilization systems and a force structure that could blunt an initial attack with the formation of the *Grenztruppen* and enabled a larger army to be mobilized faster and remain in service longer. Coinciding with the mobilization reforms, the Swiss continued to honor their long-held traditions by restarting and accelerating field fortification and fortress construction and developing their logistics infrastructure. The Swiss also adopted a larger and more flexible logistics structure, one that could allocate resources to the greatest point of need by controlling it at the highest levels and by developing specialized units with greater capability. This logistics structure supported their mobilization strategy ensuring that mobilized men and materiel could quickly be transported where needed.

Army reorganization and mobilization reform appear to be the most successful areas of pre-war innovation within the Swiss Army. Rearmament in the form of fortification and fortress construction was also successful and greatly improved the defensive posture of the army on the border. However, the Swiss still lagged in conventional rearmament largely due to domestic political reasons and the initial size of their military-industrial base. Despite the early investments of large sums of capital for their war industry from 1933 through 1936, the Swiss struggled to convert the capital raised into weapons and war materiel and only began to see growth in their war industry and weapons stockpiles from 1937 through 1939. To compensate for the delays, the Swiss frantically attempted to grow their industrial base and applied their innovation within the acquisition process by purchasing components and unfinished weapons so they could be produced faster domestically. Regarding spending, it is important to note that Switzerland was one of the few democracies during the interwar period that did not hesitate to commit financial resources early to war-time preparation. In *Military Innovation in the Interwar Period,* Allan Millet states that:

> The three democracies [Britain, France, and the United States] staggered under postwar debt and deferred industrial modernization and public spending. Democratic governments showed little inclination to increase revenues by postwar taxation, and the portion of the money they did collect and spend for defense represented a miniscule portion of national incomes.[82]

Switzerland, also a democracy, did not suffer from this compulsion and instead raised capital and spent money for defense much earlier and more readily. While the Swiss sometimes struggled to spend the raised money on rearmament, nonetheless they still began spending earlier than their democratic counterparts and were still able to effectively deploy capital for fortress and field fortification construction, mobilization reform, and army reorganization. In the next phase of Switzerland's preparation, their efforts would be put to the test as Germany began the war.

Notes

1. Senn, “Defending Switzerland,” 3.

2. “Saber Rattling Scares Europe,” *Los Angeles Times,* 13 March 1933, ProQuest.

3. “Saber Rattling Scares Europe,” *Los Angeles Times.*

4. “War Peril Stressed in London Press,” *New York Times,* 24 September 1933, ProQuest.

5. Augur (Vladimir Poliakoff), “Reich Plan to War on France Alleged,” *New York Times,* 22 September 1933, ProQuest.

6. The President of the Swiss Confederation is the head of Switzerland’s seven-member Federal Council which is the country’s executive branch. Rudolf Minger was the president in 1935. Stüssi-Lauterburg, “The Threat of Three Totalitarianisms,” 24.

7. The League of Nations headquarters, where Goebbels denied the accusation to Swiss Minister of Foreign Affairs Guisseppe Motta, was based in Geneva Switzerland. The claim was also claimed to be “highly imaginative nonsense” by then Reich Defense Minister Von Bloomberg. Halbrook, *Target Switzerland,* 29.

8. Halbrook, *Target Switzerland,* 29.

9. Stüssi-Lauterburg, “The Threat of Three Totalitarianism,” 25.

10. Stüssi-Lauterburg, “The Threat of Three Totalitarianism,” 25.

11. While there are some differences between “net national product” and “gross domestic product,” they are similar and roughly equal and useful for comparison. “The Cost of US Wars Then and Now,” Norwich University, accessed 27 November 2023, https://online.norwich.edu/cost-us-wars-then-and-now#:~:text=Though%20it%20lasted%20fewer%20than.

12. Senn, “Defending Switzerland,” 3.

13. Senn, “Defending Switzerland,” 3.

14. Stüssi-Lauterburg, “The Threat of Three Totalitarianism,” 26.

15. League of Nations, *League of Nation’s Armaments Yearbook 1933* (Geneva, Switzerland: Series of League of Nations, May 1933), 658, https://digital.nls.uk/league-of-nations/archive/195479746; Haudenschild, *Logistics of the Swiss Army,* 1579–1580.

16. Halbrook, *Target Switzerland,* 19.

17. Halbrook, *Target Switzerland,* 19.

18. Gautschi, *General Henri Guisan,* 50.

19. “Operationsbefehl Nr. 1 [Operation Order #1],” 2 September 1939, E5560D#2019/243#141*, Swiss Federal Archive, Bern.

20. Halbrook, *Target Switzerland,* 19.

21. Gautschi, *General Henri Guisan,* 51.

22. Senn, “The Swiss Army Was Ready,” 63.

23. Kaufmann and Jurga, *Fortress Europe,* 153.

24. “Swiss Doors: European War-Scare Leads ‘Isle of Peace’ to Fortify Its Frontiers,” *The Literary Digest,* 23 January 1937, ProQuest.

25. “Swiss Doors,” *The Literary Digest;* “Measures of Worth, Inflation Rates, Saving Calculator, Relative Value, Worth of a Dollar, Worth of a Pound, Purchasing Power, Gold Prices, GDP, History of Wages, Average Wage,” Measuring Worth, www.measuringworth.com, accessed 16 April 2024, https://www.measuringworth.com/datasets/exchangeglobal/result.php?year_source=1935&year_result=1945&countryE%5B%5D=Switzerland.

26. Kauffmann and Jurga, *Fortress Europe,* 154.

27. Kauffmann and Jurga, *Fortress Europe,* 155.

28. Kauffmann and Jurga, *Fortress Europe* 154.

29. Kauffmann and Jurga, *Fortress Europe,* 154.

30. Fort Pré-Giroud appears to be an exception on the Border Positions with relation to its ammunition storage with its two magazines. The other major fortification along the Border, Fort Reunthal, which overlooked the Rhine, only had one magazine but still maintained two months of supplies. Kaufmann and Jurga, *Fortress Europe,* 155.

31. “Motorfahrzeuge fur Grenz-Zeughauser [Motor Vehicles for Border Armories],” 10 October 1938, E4261A#1982/100#1013, Swiss Federal Archives, Bern.

32. While Switzerland was not spared the global economic malaise of the 1930s, with 50,000 people unemployed and the tourism and industrial export industries suffering, the Swiss economic and financial situations were relatively more stable than the rest of the world. Switzerland was viewed as a safe haven for capital, experienced significant foreign investment, had many profitable industries, and had one of the strongest banking sectors in the world. “Swiss Depression Only Moderate,” *Wall Street Journal,* 30 March 1932, ProQuest.

33. Julian Grande, *A Citizens’ Army: The Swiss System* (1916; repr., London: Forgotten Books, 2012), 133–136.

34. Julian Grande, *A Citizens’ Army: The Swiss System,* 133.

35. “Swiss Doors,” *Literary Digest.*

36. “Hitlerism’s Spread in Europe Impels Governments to Act,” *New York Times,* 7 January 1934, ProQuest.

37. Niessel, “Switzerlands Defenses.”

38. Niessel, “Switzerlands Defenses.”

39. Gautschi, *General Henri Guisan,* 54–55.

40. “Swiss to Call Reservists,” *The New York Times,* 3 February 1939,ProQuest.

41. The Swiss Army underwent various reorganizations within its logistics structure between 1907 and 1939, however, the general structure of the Rear Area Services of World War II was initially organized in 1932. Haudenschild, *Logistics of the Swiss Army,* 423–443.

42. Initially the Rear-Area services organization also included the territorial services, responsible for overseeing the territorial defense forces, but by 1940 the territorial services was reorganized and merged with the intelligence services. *Bericht des Chefs des Generalstabes der Armee an den Oberbefehlshaber der Armee über den Aktivdienst,* 1939-1945 [*Report from the Chief of the Army*

General Staff to the Commander-in-Chief of the Army on Active Service, 1939-1945], E27#1000/721#15062*, Swiss Federal Archives, Bern.

43. *Report from the Chief of the Army General Staff to the Commander-in-Chief of the Army on Active Service 1939-1945,* E27#1000/721#15062.

44. League of Nations, League of Nation's Armaments Yearbook 1936 (Geneva, Switzerland: Series of League of Nations, August 1936), 785–786, https://digital.nls.uk/league-of-nations/archive/195479746.

45. K. Egli, ed., *Unser Heer: Illustriertes Nachschlagewerk Für Jedermann Zur Truppenordnung* [*Our Army: Illustrated Reference Book for Everyone on the Troop Organization*] expanded ed. (Olten, Switzerland: Otto Walter A.-G., 1938), 3.

46. Most Swiss infantry divisions contained the type-A *Verpflegungs-Abteilung* discussed in this section. Egli, *Our Army,* 98–99.

47. It is important to note the relationship between the infantry park columns with the infantry regiments and support battalion as the infantry park columns, while having a logistics mission, were not generally categorized as a logistics unit because their mission was solely in support of their divisional infantry and combat elements. These elements would seldomly be expected to operate in a general support capacity or operate outside of their division. In the comprehensive force structure documentation, *Unser Heer,* they are listed under the "Infantry" section, not the "Logistics" section. Egli, *Our Army,* 18.

48. Egli, *Our Army,* 18.

49. Egli, *Our Army,* 103.

50. Zurich's 6th Infantry Division contained the *Verpflegungs-Abteilung* type-B containing 340 men and 67 motor vehicles. Egli, *Our Army,* 141.

51. Egli, *Our Army,* 137.

52. *Bericht der Abteilung Heersmotorisierung uber den Activdienst, 1939-1945* [*Report of the Army Motorization Department on Active Service, 1939-1945*], E27#1000/721#14890*, Swiss Federal Archives, Bern; Egli, *Our Army,* 135–145.

53. Munitions-Lastwagen-Kolonne Type F supported the supplemented the division and supported the corps artillery. Egli, *Our Army,* 104.

54. League of Nations, *League of Nation's Armaments Yearbook 1933,* 821; League of Nations, *League of Nation's Armaments Yearbook 1936,* 784; League of Nations, *League of Nation's Armaments Yearbook 1938* (Geneva, Switzerland: Series of League of Nations, October 1938), 781–782, https://digital.nls.uk/league-of-nations/archive/195479746.

55. League of Nations, *League of Nation's Armaments Yearbook 1933,* 663; League of Nations, *League of Nation's Armaments Yearbook 1936,* 667.

56. League of Nations, *League of Nation's Armaments Yearbook 1936,* 788–793; League of Nations, *League of Nation's Armaments Yearbook 1938,* 780–787.

57. *Report of the Army Motorization Department on Active Service, 1939-1945,* E27#1000/721#14890.

58. Egli, *Our Army,* 135–145; *Report of the Army Motorization Department on Active Service, 1939-1945,* E27#1000/721#14890.

59. *Report of the Army Motorization Department on Active Service, 1939-1945,* E27#1000/721#14890.

60. League of Nations, *League of Nation's Armaments Yearbook 1936,* 789; League of Nations, *League of Nation's Armaments Yearbook 1938,* 781; Haudenschild, *Logistics of the Swiss Army,* 1562–1585.

61. Haudenschild, *Logistics of the Swiss Army,* 440, 1579–1580; *Report of the Army Motorization Department on Active Service, 1939-1945,* E27#1000/721#14890.

62. *Report of the Army Motorization Department on Active Service, 1939-1945,* E27#1000/721#14890; Egli, *Our Army,* 135–145.

63. *Report of the Army Motorization Department on Active Service, 1939-1945,* E27#1000/721#14890; Egli, Our Army, 103–106, 144.

64. Egli, *Our Army,* 135–144.

65. Egli, *Our Army,* 144.

66. Barry Watts and Williamson Murray, "Military Innovation in Peacetime," in *Military Innovation in the Interwar Period,* ed. Allan Millet and Williamson Murray (New York: Cambridge University Press, 1996), 371–372.

67. Wilson, *Iron and Blood,* 573.

68. "Switzerland Combat Estimate," 15 August 1932, Record Group 165, Folder 003206-004-0550, US Military Intelligence Reports: Combat Estimates, Europe, 1920-1943, National Archives, Washington, DC, https//congressional.proquest.com/histvault?q=003206-004-055&accountid=28992.

69. "Switzerland Combat Estimate," Record Group 165, Folder 003206-004-0550; Gautschi, General Henri Guisan, 49.

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Chapter 3
Wartime Adaptaion (Fall 1939 to Summer 1940)

> A people defends itself in two ways: by its moral force, expressed by its patriotism, and by its materiel force, represented by its army.
> —General Henri Guisan, quoted in Stephen P. Halbrook, *Target Switzerland*

War Erupts

The initial phases of World War II in Europe represent a dynamic period for Switzerland because its geopolitical situation was transformed in the 10 months from September 1939 to June 1940. Caught between Europe's greatest powers when World War II began, Switzerland initially prepared for all contingencies including fighting France, Germany, and Italy. As the conflict progressed, skillful diplomacy with the French and German aggression against its neutral neighbors "demonstrated that [Switzerland] was threatened primarily by Germany, the most active among nations involved in the war."[1] In response, Switzerland implemented its first strategy shift between Germany's campaign in Poland and its offensives in Western Europe. The Swiss implemented Case North which established the Limmat Line and primarily oriented Switzerland's military forces north against the Germans. Ultimately, this period concludes with the titanic events of the Spring of 1940 which saw the allied Anglo-French Armies defeated, the French forced out of the war, and Switzerland again encircled.

This period is defined by Switzerland harnessing all of its national resources to prepare for a total war to protect its sovereignty. During two full-scale mobilizations, the Swiss mobilized the largest proportion of its population of any democratic nation in the war. Additionally, the Swiss expanded mobilization to include private property by requisitioning facilities, foodstuffs, and a massive fleet of vehicles in preparation for conflict. The Swiss leveraged these requisitioned capabilities to expand its logistical capability and fully realize the 1936 *Truppenordnung* reorganizations. Finally, the Swiss accelerated their national rearmament to strengthen its military capability. Where shortfalls remained in Swiss war production, they adapted existing munitions, modified their doctrine, or leveraged the strengths of their defensive strategy, terrain, and fortifications to offset materiel weaknesses.

By June of 1940, the Swiss Army's capability was still dramatically constrained by the limited resources of the Swiss state, especially when compared to the armies of its neighbors and potential adversaries. The success of Switzerland's logistical war-time preparations was its alignment to a distinctly Swiss strategy that leveraged the nation's unique set of national circumstances and characteristics including its mountainous geography, its militia system, and its spirit of national resistance. From 1939 through 1940, Switzerland's logistics efforts were tailored toward optimizing the speed of mobilization, maximizing the effectiveness of the available war materiel for its determined militia army, and preparing to sustain the war effort while fighting from fortified positions in its rugged and defensible terrain.

The First Full Scale Mobilization

In August of 1939, two significant factors emerged sparking concern among the Swiss about potential violations of their sovereignty, or worse, becoming the target of invasion. The first cause for concern was for ideological reasons. The Austrian and Sudeten German-speaking populations had recently been absorbed into the Reich leaving Switzerland as one of the few remaining German-speaking states yet to be dominated by Nazi Germany in their aspirations to build a *Grossdeutschland* [Greater German State]. Germany's anti-Swiss propaganda campaign in southern Germany beginning in August of 1939 caused significant concern in Bern that Switzerland was the next potential target for invasion.[2]

The other major concern for Switzerland's political and military leaders was that either side would seek to violate Swiss sovereignty to gain a military advantage during a conflict between Germany and France. Tensions between Germany and Poland had been boiling since 1938 after Germany demanded territorial and transit concessions; these tensions culminated when Germany demanded the City of Danzig in August of 1939.[3] The subsequent invasion of Poland drew France and England into war and the Swiss were gravely concerned about a German or French invasion through Switzerland to bypass the Maginot Line or Westwall. H. R. Kurz, a Captain in the Swiss Army, eloquently captured the sentiment of Switzerland and the other small European nations at the outset of the war: "It was a great temptation for both parties concerned to outflank the lines of fortifications through neutral territory. The construction of [The Maginot Line and Westwall] had considerably worsened the position of neutral small nations."[4]

The Swiss detected these risks and initiated the first partial mobilization of combat units on 22 August 1939. The *National Zeitung of Basel* via the New York Times reported: "in addition to the regular frontier forces fifteen battalions of infantry, seventeen battalions of heavy artillery, twenty units of light infantry and four aviation companies have been assigned to duty near the German and Italian Frontiers."[5] Swiss mobilization efforts continued despite the 26 August, German envoy's claim that it would respect Switzerland's neutrality.[6] Less than three days later, on 29 August, the Swiss Federal Council mobilized an additional 100,000 soldiers and stationed them on the borders of France and Germany.[7] The decree on August 29th was not only significant because of the number of soldiers it mobilized, which represented approximately 20% of the Swiss militia army's available strength at the time, but also because of the other wartime measures it implemented.[8] The decree implemented a "state of active service" or "state of alert" which placed prohibitions and controls on civilian aviation and vehicle movement along highways.[9] The army also took control of communications networks, rail infrastructure, and hospital administration.[10] One of the most important developments of the 29 August decree was the elevation of Colonel Henri Guisan to the position of General by the Swiss Federal Council, a significant event for Switzerland politically, socially, and militarily.[11] The highest rank in the Swiss military during peacetime is colonel and "only in a national emergency shall Parliament elect a commander-in-chief who will have the rank of general, but only for the duration of the emergency. He is the only general in the Swiss army."[12] By August of 1939, before the formal beginning of hostilities in Europe, Switzerland was indisputably on a war footing but had not yet mobilized the manpower levels needed to fully defend the border positions or match their initial mobilization efforts during World War I.

On 1 September 1939, Adolf Hitler invaded Poland. Immediately after the invasion began, the Swiss high command and newly elected General of the Swiss Armed Forces, General Guisan, issued *Operationsbefehl Nr. 1,* the Swiss Army's first wartime order. It proclaimed "The army stands ready to protect the country against violations of neutrality, on the ground or in the air, and to defend [Switzerland] against any aggressor."[13] This order coincided with the first full-scale mobilization of the army and issued specific directives regarding the task organization of forces, defined missions and tactical tasks for each unit in their sector, and set guidance for the integration of the field army with the elements already at the border areas since 1935 and the forces mobilized in late August of 1939.[14] By 3 September, only two days after formal hostilities began between Germany

and Poland, the Swiss had completed full mobilization and fielded an impressive 435,000 soldiers and another 200,000 auxiliary forces—greater than 10% of its population had been mobilized in less than a month.[15] It is in this first mobilization period that one sees the Swiss leverage a new mobilization category during the World War II era, that of the auxiliary, specifically the *Hilfsdienst* [Auxiliary Service]. Originally established in 1909, the *Hilfsdienst* was an unarmed component in the Swiss Army originally comprised of men who were unable to meet the requirements of combat that carried out non-combat tasks in support of the military and served in *Hilfsdienst* detachments or were assigned directly to army units.[16] In 1939 women were first incorporated into the *Hilfsdienst* with the establishment of the *Frauenhilfsdienst* [Women's Auxiliary Service].[17] The *Hilfsdienst* would play an important role in carrying out many of the logistics and support tasks from driving vehicles, operating mobilization sites, and later, by 1940, they also expanded to include an armed component (*Hilfsdienst-Wachkompanien*) and served as guards. Despite the significant initial mobilization at the outbreak of hostilities, total mobilization levels would fluctuate significantly in the early phases of the war. For example, in December of 1939, the Swiss had incrementally demobilized and only retained 175,000 soldiers in active service, a stark contrast to its high-water mark of September 1939.[18]

There was significant concerns in Swiss society about the impacts of mobilization on the economy, especially from trade unions who pressured the government to allow soldiers to return to their work.[19] Men, horses, and vehicles were also needed to bring in the fall harvest.[20] Maintaining large amounts of soldiers in an active status was also incredibly expensive for the Swiss government and represented the single largest financial line-item cost of the Swiss military.[21] Balancing the economic impacts, the costs of retaining soldiers on active service, and maintaining the required manpower for defense would be a persistent issue throughout the war. Because of these costs, the Federal Council and the military high command assumed the risk that in crisis not all servicemen and women might be able to reach their reporting stations in time.[22] Swiss fluctuations in mobilization would also present significant challenges for Swiss logisticians and mobilization planners—for most of the war, only parts of the Swiss Army were mobilized, on duty, and in position, and thus Swiss logisticians always needed to have the resources, capability, and plans in place to mobilize and transport the remainder of the Swiss Army.

To sustain the enormous amount of mobilized personnel and equipment as they moved to and occupied their assigned positions required sig-

nificant logistics planning and capability in the form of support units, vehicles, trains, facilities, and local support. Housing and feeding represented a specific challenge for Swiss logisticians: "Except for units assigned to fortifications, there was far too little space in existing barracks to lodge the whole army. Each company was assigned to a village or small town for shelter. It was the responsibility of the company quartermaster to organize lodgings."[23] To address this issue, Swiss federal law authorized the requisition of hotels, restaurants, schools, and other public and private buildings as billeting and bivouac sites.[24] The quartermaster was also responsible for procuring food from the local area's butcher, bakers, and grocers. From 1939 through 1940, the procurement of foodstuffs and the local requisition of facilities highlights one area where logistical support was not managed or controlled at the highest levels, however, Swiss national law and widespread public support were the driving forces that enabled the efficient procurement of food and lodging at the tactical unit levels. Highlighting the widespread public support for war preparation, "very rarely did the quartermaster have to refer to the requisition law, because the population did everything they could to support the army."[25]

During World War II, rail remained the most effective mode of transportation for bulk supplies, equipment, and personnel.[26] The Swiss would rely heavily on trains to move most of their equipment and personnel for mobilization and major unit movements especially after they were assembled at mobilization areas.[27] However, the Swiss Army also relied on a substantial amount of vehicle transport to collect and distribute their forces and equipment to and from the major logistical nodes such as mobilization sites, depots and train stations, and the unit's assigned positions.

Motorized transportation played a significant role in the movement of personnel and equipment to and from unit's battle positions and assembly areas and provided general mobility for the Swiss Army. During mobilization, the 1936 *Truppenordnung* reforms and their subsequent focus on building logistics capability proved critical as they provided the transportation organizations who were responsible for the movement of equipment and personnel. For personnel, the Swiss Army's 16 personnel transport columns (*Mannschafts-Transport-Kolonne*) equipped with 26 to 30 civilian busses each, were one organization that played an important role in bringing mobilized soldiers from the surrounding villages to their initial mobilization sites and train stations within larger towns and cities but also for the movement of large units.[28] The number of personnel transport columns would be expanded to 18 by May 1942, further highlighting the importance of these organizations.[29] These columns were operated by

the Field Postal Services or Military Mail Services [*Feldpostdienst*], a militarized department of the civilian Swiss Postal System [*Die Post-, Telefon- und Telegrafenbetriebe*], due to the traditional role that the post office played in connecting the major towns and cities, including carrying passengers, with the villages in the hinterlands since the 19th century.[30] Motor transportation was vital in Switzerland's distinctive mobilization system, which regularly deployed, deactivated, and relocated extensive amounts of troops and equipment. Consequently, the Swiss Army required trucks and vehicles to offer flexible transportation, linking key logistics hubs, mobilization zones, and military units. To solve this problem, the Swiss also mobilized—or requisitioned—a vehicle fleet from its civilian population.

Army Requisition

Prior to the war, in March 1939, the Swiss Army only had a few hundred trucks in the army's inventory with which to move men and materiel. However, they initially estimated their total war-time requirement at 7,972 trucks.[31] To address the shortfall, the Swiss planned to requisition up to 7,805 trucks from private owners and businesses. Upon registration with cantonal authorities, their owners had to make them immediately available to the military and war effort if required.[32] The total trucks available to the Swiss in 1937 was 8,148 representing a surplus of 176 total trucks available.[33] Preliminary analysis suggests that the Swiss may have possessed sufficient vehicles for wartime operations. However, revised assessments made after the conflict began in September of 1939 increased the expected vehicle requirements to 13,626 vehicles and trailers.[34] Additionally, the requisition of such a significant number of trucks imposed a serious burden on Swiss society. Official reports indicated that only 19,864 trucks were registered and existed in Switzerland in 1939.[35] Swiss war plans to requisition trucks for military mobility and transport thus represented greater than 65% of the total available trucks in the country. As a comparison to highlight the limited resources available to the Swiss, at the start of the German invasion of the Soviet Union in June of 1941, the Germans had over 500,000 motor vehicles on the Eastern front.[36]

Further compounding Switzerland's motor transport situation was the age and lack of standardization in the available vehicle fleet to requisition. The Swiss military and war-industry operated dozens of different makes and models of trucks, many of which were imported, difficult to repair, or had long-exceeded their lifespans or had fallen into disrepair.[37] The Swiss Federal Council received a constant flow of reports and requests for

replacement vehicles throughout the war. One such report, a Joint Military Department and Finance and Customs Department report submitted to the Swiss Federal Council on 23 November 1939, describes how multiple trucks supporting operations at Swiss arms and armaments factories that had been in use since 1917 and 1918, were unable to be repaired, and required prompt replacement to maintain continuity of operations.[38] The report cites "extraordinary strain" from increases in production volume and the upcoming commission of a new assembly plant as justification for replacements. The situation described was far from an isolated event as hundreds of applications for new vehicles and replacements from departments across the military and government were generated throughout the war, many of which echoed the same problems and similar requests for additional support.[39]

Given that these reports were adjudicated at the highest level of the Swiss government, the Swiss Federal Council, indicates the importance of the procurement and allocation of trucks. A notable shift in tone is detected in the government's guidance from 1938 to 1939; guidance in January 1938 stated that "whenever possible and to the extent that it can be justified in terms of costs, the [trucks] are repaired so that they can be used for some time to come. However, this is not possible in all cases, which is why the outgoing vehicles have to be replaced."[40] which contrasts the language in October of 1939 which mandated that trucks are to be operated and only replaced when they are "completely unusable."[41] This change was attributed to the scarcity of motor vehicles and the 12-month lead times for deliveries of new vehicles in 1939 prompting strict prioritization by the different organizations of the Swiss government for newly procured and requisitioned vehicles.

Further highlighting the importance of and shortage of motor vehicles, one 1940 report states: "From a military point of view, the current fleet of motor trucks is absolutely insufficient…the departure of every single motor truck means a direct weakening of the army…every effort must be made to significantly increase the number of motor trucks suitable for requisitioning, which is currently absolutely insufficient…(and) any official impediment to the purchase of motor trucks, any interference with the normal development of truck traffic, amounts to a significant weakening of national defense."[42] The outbreak of war had changed the Swiss government's paradigm from one of cost and efficiency to one of urgency, austerity, and necessity.

The Swiss Army grappled with motor transport shortages for the duration of the war, would maintain strict control over the allocation of

new vehicles, and actively sought to procure and produce higher quantities and more reliable trucks. By 1940, the Swiss were making steady progress; Swiss industry had 496 additional trucks in production for the army, 200 on order purchased from abroad, and the Swiss government recently allocated another 28,310,150 Swiss Francs toward vehicle procurement.[43] The first full mobilization of both personnel and equipment would have significant impacts on Swiss logistics structure and policy but represented only one-half of the new challenges that Swiss logisticians and senior leaders faced. The other challenge came from a significant strategy change from defending the Swiss frontier to a defense in depth in the interior of Switzerland.

Defense in Depth

During the campaign in Poland, the Swiss high command recognized that the geopolitical situation around Switzerland was changing and began implementing a new strategy in September 1939.[44] First, the Swiss determined that France was no longer a threat. There were minimal German forces stationed along the Franco-German border during late 1939, therefore a French frontal assault directly into Germany was more likely despite Germany's fortifications, precluding the need for any French flanking maneuver through Switzerland. General Guisan, also believed the French were not capable of conducting offensive operations against Germany through Switzerland and believed an attack through Switzerland would be politically unfeasible for the Allies as invading a neutral democratic state would contradict their war objectives.[45] Swiss secret agreements of planned military cooperation with France, which explicitly stated that French armies would assist Switzerland but would never enter Switzerland unless requested, came into effect by December 1939 and finally removed France as a threat to Switzerland.[46] Contrary to Switzerland's policy of strict neutrality, the door was opened for the possibility of military support from its neighbor and did not discount the possibility for Swiss involvement in World War II. Finally, the Swiss General Staff recognized that defending the Swiss-German border was unfeasible due to the recent developments in military technology and German doctrine. Between the Swiss senior leadership's lack of confidence in their capability to defend the border, the more plausible option for France to attack Germany directly, and the secret Franco-Swiss agreements, it was clear Switzerland needed to orient its forces and defensive efforts north against Germany.

Figure 3.1. Troop Dispositions According to *Operationsbefehl Nr. 2* Depicting the Limmat Strategy.

Source: "Operationsbefehl Nr. 2 [Operation Order #2]," 4 October 1939, E5560D#2019/243#147*, Swiss Federal Archive, Bern.

The new strategy, codified in the war plan Case-North and ordered in *Operationsbefehl Nr. 2,* called for establishing a defensive line along the key features of Lake Zurich, the Limmat River, Boezberg Mountain, and Hauenstein Mountain.[47] This new strategy quickly became the top priority for Switzerland's war planners: "'Operation North', the possibility of a large-scale German offensive through Switzerland, became the most important factor in connection with our defensive plans."[48] This line, called the Limmat Line [*Limmatstellung*] or "Army Positions" because most of the army would be positioned along this line, was anchored in the west by the Swiss Jura and in the east by the Fortress Sargans.[49]

The Limmat Line was adopted in acknowledgment that many positions along the relatively flat border area were not defensible against modern mechanized and combined arms formations with the available number of soldiers. More defensible positions specifically needed to counter tanks, provide cover against aircraft, and create operational depth for early warning and to disrupt the enemy were needed.[50] The *Wehrmacht's* overwhelming successes unfolding in Poland prompted action by the General Guisan, and the Swiss General Staff, specifically Colonel Oskar Germann,

the chief advocate of the Limmat Line concept, to accelerate the planning of a new defensive line further south.[51]

The deeper the Swiss chose to defend the better the terrain supported the defense but at the cost of leaving more of Switzerland's most productive and populated areas vulnerable. The Limmat Line was approved on 27 September 1939, by General Guisan, and was implemented in *Operationsbefehl Nr 2,* issued on 4 October 1939, and coincided closely with the fall of Poland on 6 October 1939.[52] The new plan represented a compromise between defending enough of the Swiss heartland to placate Swiss public opinion and political leaders and to satisfy military necessity by defending from more defensible terrain.[53] While the bulk of the Swiss Army would occupy positions along the Limmat Line, the border positions would not go unoccupied or undefended. The new strategy maintained the *Grenztruppen* along the border inside existing fortifications that served as an early warning for invasion and to conduct delaying operations.[54]

This new strategy required additional fortifications, and this meant more funding. From 30 October to 26 March 1940, the Swiss would allocate 130 million Swiss Francs to fortifying the new positions of which only 57 million Swiss Francs would be spent by 1940. The Limmat Line was built mainly using troop labor. Swiss soldiers, under the supervision of army engineers, were ordered to build pillboxes and fortifications, to establish obstacles and set barbered wire "at a rapid pace."[55] One first-hand account from a soldier turned historian, Alfred Ernst, describes some of the logistical and engineering challenges while the Swiss Army frenetically built the Limmat Line during the winter of 1939 through 1940:

> The heavy volume of construction work created considerable difficulties in the beginning, as we were not prepared for this important task. There were no drawings for the different types of structures, we did not use any carefully thought-out working methods, nor did we have prefabricated elements available. In addition, using troops to dig and do masonry work was not very efficient. It would have been better to use construction companies that would have done the job much faster.[56]

The use of soldiers as manpower to construct fortifications was a contentious decision at the time as it took substantial time away from training. up to two-thirds of a Swiss soldier's time was spent on construction or improving fortifications.[57] The Limmat Line, with its blockhouses, heavy bunkers, robust series of obstacles, and five major forts was completed between 1939 and 1940.[58]

The Limmat Line presented new challenges for Swiss logisticians. First, the new Swiss strategy ceded one-half of the most populous areas of Switzerland, meaning that much of the mobilizable manpower and unit equipment would have to be quickly moved to their assigned positions further south if Switzerland was attacked. While both the Frontier Strategy and the Limmat Strategy were daunting for logisticians in scale and speed needed for the mobilization and movement of personnel and equipment, the Limmat Strategy meant that many logistics operations now needed to occur forward of the main line of defense while contested and under threat of attack. In this environment, rail transport, distribution nodes, major depots, and magazines would be vulnerable and subject to attack.[59] The *Grenzetruppen* were expected to partially mitigate this problem and buy time for mobilization and logistics operations, however, the delaying forces were only expected to delay for a short time requiring that Swiss logisticians move quickly. Second, "[Switzerland's] most important arms and munition factories are in the north close to the German frontier and can be taken and destroyed easily overnight," which presented challenges for Switzerland's domestic production of war materiel and its ability to sustain itself for an extended duration.[60] As long as Switzerland could expect to receive materiel and military support from potential future European allies, as the Franco-Swiss secret agreements would suggest, Swiss supply challenges would remain manageable.

The Second Full Scale Mobilization

On May 11, 1940, Switzerland began its second full-scale mobilization in response to large-scale fighting in Western Europe. During this mobilization, the Swiss brought 700,000 men, including 450,000 soldiers and 250,000 auxiliary troops, into active service.[61] Swiss intelligence, citing troop movements, exercises, and demonstrations by the *Wehrmacht* in southwestern Germany suggested that an invasion of Switzerland was imminent.[62] Ultimately, this posturing by the Germans was part of a more elaborate deception operation to fix French Forces along the Maginot Line.[63] However, the Swiss feared "if the German offensive had been stopped decisively [in Belgium or France] a supplementary operation through Switzerland may have followed" and "if the decisive forward thrust of the German offensive failed, the German General Staff would have been compelled to switch to a new and unprepared strategy," one that may have involved invading Switzerland.[64]

The period between the second full-scale mobilization on 11 May 1940, until after the fall of France on 22 June 1940, represented the second

dangerous period for Switzerland. This time the Swiss deployed the bulk of their forces along the Limmat Line in accordance with their new strategy but continued to allocate some forces to the borders.[65] It was during this period of heightened tension that Switzerland would again escalate its mobilization efforts with the introduction and formation of the *Ortswehren.* The *Ortswehren* were local defense units consisting of old men, young boys, and women, many of whom were former soldiers or part of the *Jungschützen* ("Young Shooters," members of Swiss shooting clubs) who were experienced marksman.[66] The *Ortswehr's* primary mission was to combat saboteurs, fifth columnists, and paratroopers but could also be used to reinforce the army.[67] The *Ortswehren* were primarily equipped with their personally owned rifles, however, an additional 70,000 Model 1889 long rifles and 48 rounds per person were issued from Swiss reserve stocks to those without personal weapons.[68] Halbrook argues that "The *Ortswehren* not only filled the actual military needs, but also satisfied the desire of a growing number of Swiss to make a personal contribution to the defense of the country. These local units, helping to unify the country militarily and politically, were an immediate success, and volunteers were plentiful."[69] At its peak, *Ortswehren* totaled 127,563 people in January 1941. Mobilization of the *Ortswehren* was only possible because of Switzerland's long history and tradition of private firearms ownership and the wide-spread hobby of marksmanship in Switzerland. However, the *Ortswehren* presented an additional challenge for Swiss logisticians as they did not have enough ammunition or weapons to equip all the *Ortswehren.*

On May 13th, the German Army conducted several pontoon bridging exercises across the Rhine within sight of Swiss territory and German artillery was reported to be in position behind an estimated 20 to 25 German divisions between Basel and Schaffhausen by May 15th.[70] In response to these continued warnings and indicators, Swiss mobilization would eventually reach 800,000 personnel by May 15th.[71] On June 9th as Italy appeared poised to enter the war, *The Washington Press* reported "Switzerland seemed in greater danger tonight than at any time since the war began."[72] At this point in the war, fear of a German flanking maneuver around Maginot Line through Switzerland was at its highest.

Motorization and Transportation

An important theme in the Swiss Army's logistics development was motorization. The introduction of the Limmat Strategy necessitated a force that could be mobilized and positioned faster and be more mobile within the disruption zone north of the Limmat Line. Critical to all facets

of the Swiss national defense is the assumption that "Once mobilized… [the Militia] could be sent anywhere in Switzerland."[73] Switzerland is only slightly longer than 200 miles at its widest. Motor transport in that era also maintained rough parity with rail movement for small loads up to 200 miles. It was also more secure and less easy to target than rail transport. Therefore, motor transport was a feasible and more secure alternative to rail for Switzerland.[74] Motorized lift played a key role in addressing many of Switzerland's transport shortfalls and aligned extremely well with Switzerland's military strategy and their system of mobilization.

The civilian vehicle requisition program discussed earlier would play a key role in Swiss mobility and logistics support because it enabled the Swiss Army to rapidly induct a large fleet of vehicles into service for the Swiss Army. Despite vigorous requisitioning of automobiles, "full motorization is neither possible nor planned" because there were not enough vehicles to motorize every desired component of the army.[75] The Swiss needed to make important decisions and prioritize which elements of their army they would motorize.

The 1936 *Truppenordnung* called for motorization across the army, however focused on motorizing several distinct parts of the army: the *Leichte Brigades* [light brigades], the artillery, and across logistics organizations. The light brigades served as the reconnaissance elements for the corps but also "represents the first immediate reinforcement of the border guard, as it is ready for use more quickly than the other parts of the army proper."[76] However, each light brigade, with its two regiments, had less than five motorized companies that were equipped with cars and trucks including three motorized light machine gun companies (18 to 26 cars and 4 trucks), a motorized sapper company (1 car and 12 trucks), and a motorized *Infantariekanonen* or anti-tank company (26 cars and 7 to 8 trucks).[77] The majority of the forces within the light brigades were horse-cavalry but some also had bicycles and motorcycles. The Swiss Army never fully motorized any maneuver element above the company level. The largest motorized combat element in the Swiss Army order of battle, the *Infantariekanonen* company, with its 33 to 34 vehicles, had less cars and trucks assigned than all but the smallest transportation and distribution units.[78]

Within artillery units, organic motorization at the battery level was also limited to 10 to 20 vehicles for each of the motorized artillery batteries.[79] Most divisions and mountain brigades only maintained two motorized artillery batteries, and most corps only had four motorized artillery batteries.[80] Because of the limited availability of heavy trucks and tractors, the Swiss were especially constrained in motorizing heavy artillery units.[81]

There are several other reasons why motorization for combat units would be limited by 1940 besides the limited availability of motor vehicles. First, the requisitioned civilian vehicles were generally unsuitable for cross-country movement and operating in combat conditions, meaning they were more effective in important support and logistics roles where they were expected to generally remain on roads. Second, the Swiss were gradually accepting a static defense in depth largely because, as Hans Senn suggests, the army command "realized that the Swiss infantry divisions would be unable to launch counterattacks against a mechanized enemy."[82] This analysis is supported by General Guisan who "discarded the doctrine on mobile warfare that had been officially adopted in 1927" while he was developing the Limmat Strategy.[83] From a practical standpoint, motorizing a largely infantry force that was expected to defend fixed and fortified positions was not practical. Overall, the mechanization and motorization of army combat units would be limited. The Swiss only fielded a handful of armored cars, tanks, and other mechanized fighting platforms and only dedicated a limited number of requisitioned vehicles to combat roles or to non-logistics organizations.

Therefore, the Swiss Army overwhelmingly motorized its logistics elements. Most of the new logistics organizations created from the 1936 reforms were motorized and most of the Swiss Army's requisitioned and military vehicles were assigned to logistics organizations. Motorizing logistics instead of motorizing combat units was better aligned to the Switzerland's mobilization system and the Swiss strategy. The Swiss mobilization system and Limmat Strategy imposed a heavy upfront transportation requirement to move large numbers of personnel and equipment and required substantial motor vehicles to sustain forces once in the field.

Even though the Swiss allocated most of their trucks to the logistics services, the Swiss Army lacked trained motor vehicle operators and crews. The General Staff was initially hesitant to pull significant troops from combat units and assign them solely to the driver roles.[84] The Swiss quickly adapted to overcome this challenge in 1939 when the Federal Military Department issued a directive stating that any trained driver, regardless of category of military service including active, auxiliary, or even civilians, could be used to replace unavailable or insufficiently trained driver positions during mobilization muster and assembly.[85] Post-war reports curtly describe this policy as unsatisfactory but also acknowledge its importance stating: "but despite the inadequacies that arose during mobilization, this system has not been abandoned to this day."[86] The policy would remain in effect for the remainder of the war highlighting the emphasis

on resourcing the logistics force with vehicles and crews specifically to support mobilization.[87]

The primary rationale for prioritizing the motorization of logistics organizations was because it was better supported by the Swiss strategy and their unique form of mobilization. The Swiss Army aimed to rapidly move troops, ammunition, and materiel to their defensive positions when tensions increased to be best postured before an invasion. However, the Swiss were also prepared to quickly move the same men and materiel if the enemy achieved strategic surprise. The Swiss needed flexible mobility during crisis or invasion, especially considering how the mobilization levels fluctuated wildly, with soldiers being frequently activated and released as circumstances required, often on short notice. Pooled, centralized, and motorized logistics elements also enabled commanders to prioritize evacuating soldiers and equipment out of areas most at risk of being captured during an invasion, specifically from the populated areas on the Swiss Plateau closest to Germany and in front of the Limmat Line. With German operational thought becoming clearer for the Swiss as France fell in the summer of 1940, avoiding the loss of large amounts of personnel and equipment to German encirclement became critical.

While many nations experimented and focused on motorizing its combat units, such as armored, infantry, anti-tank, artillery, and reconnaissance units during the inter-war period, the Swiss instead elected to prioritize motorizing its logistics elements, especially those at the highest echelons.[88] No other nation in Europe emphasized motorizing its logistics elements as much as the Swiss. The *Wehrmacht,* famous for mechanized warfare, egregiously under-prioritized distribution and transportation requirements, notoriously relying on horse and pack animals throughout the war.[89] Even the Soviet Union, with its intense doctrinal focus on the deep battle, relatively high quantity of motorized and mechanized units, and powerful industry prioritized the production of tanks, airplanes, and other weapon systems and relied heavily on imported American Studebaker trucks to fill its logistics organizations.[90] Only the Americans, with their colossal industry and production capacity, prioritized motorizing their logistics elements to the extent that the Swiss did.[91]

Continued Rearmament

Late 1939 and into 1940 also represents the period where Swiss rearmament accelerated dramatically. Pistol and rifle ammunition stocks, including G.P. 11 (7.5x55mm) and pistol ammunition increased substantially beginning in the late spring and summer of 1940.[92] Production of

artillery shells, a key weakness before 1940, was also increasing; 75-mm mountain artillery stockpiles spiked in June of 1939 while standard 75-mm and 105-mm artillery production continued to increase.[93] Shortfalls in magazine depth and production in other areas remained. Anti-aircraft and anti-tank round production remained low and the heavy artillery, including 125-mm, 120-mm, and 150-mm howitzer ammunition stocks, remained flat through 1940.[94]

Despite the improvements by 1940, Swiss artillery production and capability were still significantly lacking especially when compared to German capabilities. In his final report after the war concluded, General Guisan stated the following regarding 1940 artillery stocks: "We had no large calibers and too few medium calibers; In addition, our entire field artillery, as well as some of our 'heavy' cannons, were…extremely vulnerable to Luftwaffe strikes."[95] To account for this overall disparity in artillery, General Guisan actively encouraged his subordinate commanders to place artillery under the control of infantry units to improve the flexibility and responsiveness of the limited artillery available.[96]

In the fall of 1940, the Swiss Army also lacked significant anti-tank capabilities; so acute was the issue that General Guisan recommended using artillery systems as direct-fire weapons against enemy tanks, further straining the existing Swiss artillery systems and capability by expanding their target and mission sets.

The Swiss also adapted by relying on the terrain and the construction of fortifications to address enemy armored vehicles. One Swiss citizen describes his father's plan to offset the advantages of enemy armor in a narrow valley near the border with Germany: "Having no weapons against armored vehicles, his *Grenschutz* [border defense] unit built tank obstacles to cause delays and force crews to leave their tanks so snipers could pick them off. Everyone knew how difficult such a defense would be without heavy weapons. We were angry but not discouraged. Later when we got antitank guns morale went up."[97]

High explosives were also lacking when the Limmat Line was being established. To set the necessary traps and demolition charges along the Limmat Line, 32 chambers of reserve mines were removed from their storage in the Simplon Pass Tunnel and allocated to the Limmat Line.[98] The Swiss would consistently apply tactical adaptation, use non-standard ammunition, and leverage their terrain and fortifications to address German equipment overmatch and shortfalls in ammunition.

Another area where the Swiss logistical and materiel weakness was seen was in the development and production of tanks. The Swiss general staff acknowledged early that it did not have the resources and capability to develop and produce enough tanks to meaningfully impact a conflict and because of concerns regarding training.[99] The Swiss continually made deliberate decisions to forgo tanks and elected to rely on its static defensive strategy and terrain to counter mechanized threats.[100] Each time the discussion re-emerged, as it did in 1940 during a debate between General Guisan and one of his corps commanders on whether to attempt to purchase tanks or construct artillery casemates, General Guisan chose to invest the money in the construction of fortifications citing that it was more worthwhile investment.[101] When the Swiss could not adapt by using suitable materiel solution or substitute, the Swiss found a solution in their strategy and terrain.

Swiss Adaptation

By taking inventory of Switzerland's position leading up to the offensives in the west, it appears that Switzerland had thoroughly prepared and resourced against a viable strategy, one based on solid assumptions of its own capability, its potential enemies' capabilities, and that of its partners. The key underlying assumptions in 1939 and early 1940 were, first, that operations on the western front would be long and slow. Second, General Guisan believed that "in all likelihood, if not most certainly" the Swiss could expect assistance from the French Army, which many believed to be the most powerful army in Europe.[102] Finally, while the character of warfare was changing, Swiss preparation and logistical adaptation through June 1940 remained adequate to support the army's Limmat Strategy.

Switzerland had completed its mobilization reforms and refined its mobilization processes during the first two full mobilization periods in 1939 and 1940, building upon an already prominent legacy of mass mobilization by leveraging and expanding its militia system with the introduction of the *Hilfsdienst* and *Ortswehren.* The Swiss also leveraged the full extent of its national resources as seen by the local procurement of foodstuffs, and the requisition of facilities and civilian vehicles. The Swiss capacity to requisition vehicles and subsequent prioritization of motor vehicles to logistics organizations within its force structure optimized mobilization timelines while local procurement and requisition policies enabled at least short-term sustainment of the mobilized militia forces. The decision to motorize logistics also provided the resources for the Swiss to evacuate both personnel and equipment from at-risk areas if an invasion

were to occur. Due to the reforms and motorization decisions above, when the call for the second full mobilization was announced on 11 May 1940, the Swiss Army and auxiliaries arrived in record time, 300,000 personnel were in position by May 13th, with full mobilization of 800,000 personnel being achieved by May 15th. Remarkably, 20% of the Swiss population was mobilized and in position in only four days.[103] The Swiss had far exceeded the benchmarks set in World War I and in September of 1939 in both speed and scale. Next, the Swiss were entrenched along improved and developed positions along the Limmat Line, screened by units in positions along the border.

While lacking higher-end and specialized weapon systems such as anti-aircraft and anti-tank weapons, and short on artillery, the Swiss Army had adequate arms, provisions, and supplies to hold a World War I-style front against Germany for a short period to enable outside assistance to arrive. Production of most major weapon system ammunition was also rapidly expanding by the summer of 1940. The Swiss supply position was sufficient that it was able to issue the swelling *Ortswehren* formations with weapons and ammunition. Where ammunition and weapon system weaknesses existed, the Swiss adapted what they had available and used alternative munitions and weapon systems as a substitute to ensure they could still achieve their tactical and operational objectives.

Swiss preparations combined with the Swiss *Widerstandsgeist* [fighting spirit] and *Geistige Landesverteidigung* [spirit of national resistance] indicated that the Swiss Army and people were confident and determined to resist any encroachment on their sovereignty. In both September 1939 and May 1940, Swiss military assessments and outlooks were positive.[104] Additionally, the Swiss had successfully reacted, engaged, and repulsed German aircraft that had unintentionally violated Swiss air space multiple times in early May 1940. Using anti-aircraft weapons and fighter aircraft the Swiss had driven off all German aircraft, downing multiple aircraft in the process.[105]

German reports also indicated that Swiss military preparations until May 1940 were successful and contributed meaningfully to dissuading German invasion and enforcing Swiss sovereignty. German General and Chief of Staff of the Army High Command, Franz Halder stated "Switzerland is determined to resist invasion by exerting all her strength" in August 1940. The Germans also understood Swiss mobilization capability, one assessment by the German General Staff stated that the "Armed forces are functionally organized and capable of quick mobilization."[106] Acknowledging both this spirit of resistance and the Swiss capacity to rapidly mo-

bilize, all of the various German war plans for Switzerland emphasized that "the operation must be built upon surprise and speed," must "shatter the forces of the confederation and occupy as fast as possible the capital Bern with its surrounding industrial area" and "the operations must be conducted in such a way that the armed forces of Switzerland are unable to withdraw to the high alps."[107] It is important to note that the Germans are referencing the Limmat Line when discussing the "high alps" at this phase in the war.[108]

As the events of late 1940 continued to unfold, the Swiss attitudes of quiet confidence and resolve in September of 1939 and May of 1940 turned to anxiety and defeatism. The humiliating evacuation by Anglo-French forces at Dunkirk and the fall of France demonstrated and finally validated the power of German mechanized doctrine and tactics in the minds of the Swiss. Furthermore, the defeat of the Finns by the Soviet Union meant the Swiss could no longer draw inspiration from heroic Finnish defense against a numerically and technologically superior foe.[109] With France defeated, the British Empire driven from the continent, and Poland partitioned, Switzerland's primary adversary, Germany, and her partners, Italy and the Soviet Union, were the masters of the continent.[110] After the June 1940 Franco-German armistice, with the Swiss Army facing north, the Swiss flank was turned and the Swiss would find themselves again surrounded. Switzerland's preparations in June of 1940 quickly appeared woefully inadequate and required a new strategy with an entirely new logistics profile.

Notes

1. Hans Rudolf Kurz, "The Menace of Military Aggression against Switzerland during the Second World War," *Association of Swiss Officers* 117, no. 11 (November 1951), tran. US Government, D754.S9 K8713 1952, U.S. Army Heritage and Education Center, Carlisle PA, 3.

2. "Swiss Strengthen Borders," *New York Times,* 20 August 1939, ProQuest.

3. Weinberg, *A World at Arms,* 32; "Mass Germans at Corridor," *Chicago Daily Tribune,* 23 August 1939, ProQuest.

4. Kurz, "The Menace of Military Aggression against Switzerland during the Second World War," 2–3.

5. "Swiss Strengthen Frontiers," *New York Times,* 23 August 1939, ProQuest.

6. "Reich to Respect Neutral Bordes," *New York Times,* 27 August 1939, ProQuest.

7. "Switzerland Puts Services on War Footing," *New York Times,* 29 August 1939, ProQuest.

8. "Switzerland Puts Services on War Footing," *New York Times.*

9. "Switzerland Puts Services on War Footing," *New York Times.*

10. "Swiss Broaden War Precautions," *Los Angeles Times,* 30 August 1939, ProQuest.

11. "Switzerland Puts Services on War Footing," *New York Times.*

12. Gautschi, General Henri Guisan, 39.

13. "Operation Order #1," 2 September 1939.

14. "Operation Order #1," 2 September 1939; Gautschi, *General Henri Guisan,* 42.

15. "Full Mobilization Ordered by Swiss," *New York Times,* 2 September1939. ProQuest; Gautschi, *General Henri Guisan,* 49.

16. It is also important to note that the Swiss Red Cross was the predecessor and first *Hilfsdienst* organization. Prior to its integration with the *Hilfsdienst* it was the first additional service of the Swiss federal government. During World War II it executed many of the medical and relief functions for the Swiss Army. Hervé de Weck, "Hilfsdienst [Auxillary Service] (HD)," *Historisches Lexikon der Schweiz HLS* [*Historical Lexicon of Switzerland HLS*] (*Schweizerische Akademie der Geistes- und Sozialwissenschaften* [Swiss Academy of Humanities and Social Sciences], 25 April 2013), https://hls-dhs-dss.ch/de/articles/008692/2013-04-25/.

17. Women accounted for up to 10% of the *Hilfsdienst* at its peak with approximately 23,000 women enrolled. For more detailed information on the expanding role of women in the military in Switzerland during World War II see Thomas Maissen, "Unsung Dedication: Women in Switzerland's Mobilization," in *Switzerland under Siege 1939-1945: A Neutral Nation's Struggle for Survival,*

ed. Leo Schelber (Rockport, ME: Picton Press, 2000), 39–68. Wilson, *Iron and Blood,* 626.

18. Schwarz, *The Eye of the Hurricane*, 11.

19. Gautschi, *General Henri Guisan,* 248; Schwarz, *The Eye of the Hurricane,* 11.

20. "Swiss Free Some Troops," *New York Times,* 25 September 1939, ProQuest.

21. Hans Rudolf Fuhrer, ed., *Réduit I: Militärgeschichte Zum Anfassen* [*Réduit I: Hands-on Military History*] (Educational Pamphlet, Swiss Military Academy n.d.), 51.

22. Senn, "The Swiss Army Was Ready," 64.

23. Halbrook, *The Swiss and the Nazis,* 78.

24. Halbrook, *The Swiss and the Nazis,* 78.

25. Halbrook, *The Swiss and the Nazis,* 78–79.

26. Turner, *Feeding Victory,* 152.

27. For additional information regarding the military railway services see Paul Winter, *Die Geschichte des Militäreisenbahndienstes* [*The History of the Military Railway Service*] (Bern: Command of the Military Railway Service and General Secretariat SBB, 1985).

28. Egli, *Our Army,* 107.

29. Haudenschild, *Logistics of the Swiss Army,* 1595.

30. Arthur Wyss, *Die Post in Der Schweiz: Ihre Geschichte Durch 2000 Jahre* [*The Post Office in Switzerland: Its History through 2000 Years*] (Schönbühl, Germany: Hallwag, 1987), 219–220.

31. "Unterlagen zum Problem: Motor und Pferd in Der Armee [Documents on the Problem: Motor and Horse in the Army]," 4 March 1939, E27#1000/721#18833*, Swiss Federal Archives, Bern.

32. *Report of the Army Motorization Department on Active Service, 1939-1945,* E27#1000/721#14890; Halbrook, The Swiss and the Nazis, 93.

33. "Documents on the Problem: Motor and Horse in the Army," 27#1000/721#18833.

34. *Report of the Army Motorization Department on Active Service, 1939-1945,* E27#1000/721#14890.

35. "Motorfahrzeugbestand nach Kantonen und Städten am 31. August 1939 [Motor Vehicle Inventory by Canton and City on 31 August 1939]," 27 May 1940, E27#1000/721#18833*, Swiss Federal Archives, Bern.

36. Turner, *Feeding Victory,* 152.

37. Halbrook, *The Swiss and the Nazis,* 93.

38. "Anschaffung von Motorfahrzeuge [Purchase of Motor Vehicles]," 23 November 1939, E27#1000/721#18821*, Swiss Federal Archives, Bern.

39. "Beshaffung von Motorwagen und Motorrädern, [Procurement of Motor Vehicles and Motorcycles], "E27#1000/721#18821*, Swiss Federal Archives, Bern.

40. "Anschaffung von Motorfahrzeugen [Purchase of Motor Vehicles]," 28 January 1938, E27#1000/721#18821*, Swiss Federal Archives, Bern.

41. “Purchase of Motor Vehicles,” 23 November 1939, E27#1000/721#18821.

42. *Report of the Army Motorization Department on Active Service, 1939-1945,* E27#1000/721#14890.

43. “Ankauf von Motorlastwagen [Purchase of Motor Trucks],” 20 March 1940, #1000/721#18821*, Swiss Federal Archives, Bern.

44. Despite maintaining the same conceptual strategy for several decades prior to World War II, the Swiss quickly abandoned the Frontier Strategy only five weeks after the war broke out and after the first full mobilization. Gautschi, *General Henri Guisan,* 52.

45. Gautschi, *General Henri Guisan,* 52.

46. Schwarz, *The Eye of the Hurricane,* 20.

47. The exact front of the Limmat Line would shift and adjust over the course of war however would always remain defensively oriented north against the Germans. “Operationsbefehl Nr. 2 [Operation Order #2],” 4 October 1939, E5560D#2019/243#147*, Swiss Federal Archive, Bern; Gautschi, *General Henri Guisan,* 53.

48. Kurz, “The Menace of Military Aggression against Switzerland during the Second World War,” 12.

49. Kaufmann and Kaufmann, *Forts and Fortifications of Europe,* 192.

50. Gautschi, *General Henri Guisan,* 52.

51. While the Limmat Line was implemented in the fall of 1939, the concept had been under development and debated by Swiss Army engineers as early as 1938. Jürg Keller, ed., *Operationen Der Schweizer Armee Während des Aktivedienstes 1939-1945: von der Armeestellung 1939 Über das Reduit 1940/1944 zum Schutz der Westgrenze* [*Operations of the Swiss Army during Active Service 1939-1945: From the Army Position in 1939 to the Reduit in 1940/1944 to Protect the Western Border*] (Zurich, Switzerland: Schweizer Gesellshaft für Militär Historische Studienreisen Bücherdienst, n.d.), 25–26.

52. Keller, *Operations of the Swiss Army during Active Service 1939-1945,* 26–27.

53. Gautschi, *General Henri Guisan,* 52; Keller, *Operations of the Swiss Army during Active Service 1939-1945,* 25–26.

54. Gautschi, *General Henri Guisan,* 54.

55. Gautschi, *General Henri Guisan,* 55.

56. Gautschi, *General Henri Guisan,* 55.

57. Senn, “Defending Switzerland,” 4; Gautschi, *General Henri Guisan,* 55.

58. Kaufmann and Jurga, *Fortress Europe,* 154.

59. *Report from the Chief of the Army General Staff to the Commander-in-Chief of the Army on Active Service, 1939-1945*, E27#1000/721#15062.

60. Augur (Vladimir. Poliakoff), “Reich Plan to War on France Alleged,” *New York Times,* 22 September 1933, ProQuest.

61. Gautschi, *General Henri Guisan,* 140–141.

62. Tensions had been increasing following the completion of the German campaign in Poland in late September of 1939 as Swiss intelligence began to assess that a German western offensive was inevitable. During this period, dubbed the "November Alert," some soldiers were recalled from leave, and troops on the border were placed on high alert. Swiss intelligence ultimately accurately assesses Hitler's intentions as the attack against France was originally scheduled for November 9th, but after multiple delays was postponed until the spring of 1940. Gautschi, *General Henri Guisan,* 57–58, 140–141.

63. Halbrook, *The Swiss and the Nazis,* 30.

64. Kurz, "The Menace of Military Aggression against Switzerland during the Second World War," 5, 12.

65. "Swiss Ready to Check Nazi Push to France," *Chicago Daily Tribune,* 14 May 1940, ProQuest.

66. Halbrook, *Target Switzerland,* 106.

67. Halbrook, *Target Switzerland,* 97, 106.

68. Halbrook, *Target Switzerland,* 103.

69. Halbrook, *Target Switzerland,* 106.

70. "Nazis Again Throw Bridge Across Rhine at Switzerland," *Washington, Post,* 15 May 1940, ProQuest; "Nazis Train Guns on Swiss Across Rhine," *Washington, Post,* 16 May 1940, ProQuest.

71. Halbrook, *Target Switzerland,* 102.

72. "Nazis Poised to Move Across Switzerland: Blow at French by Skirting Maginot Line Threatened," *Washington, Post,* 10 June 1940, ProQuest.

73. Halbrook, *The Swiss and the Nazis,* 89.

74. Van Crevald, *Supplying War,* 143.

75. Haudenschild, *Logistics of the Swiss Army,* 514.

76. Egli, *Our Army,* 31.

77. Egli, *Our Army,* 27–29, 74.

78. Only the two smallest variants of transportation units barely had fewer vehicles than the *infantariekanonen* companies. Egli, *Our Army,* 100, 103.

79. Egli, *Our Army,* 52-61.

80. Egli, *Our Army,* 135–142.

81. Haudenschild, *Logistics of the Swiss Army,* 451.

82. Gautschi, *General Henri Guisan,* 54.

83. Gautschi, *General Henri Guisan,* 54.

84. *Report of the Army Motorization Department on Active Service, 1939-1945,* E27#1000/721#14890.

85. *Active Service Report, 1939-1945,* E27#1000/721#14890.

86. *Active Service Report, 1939-1945,* E27#1000/721#14890.

87. *Active Service Report, 1939-1945,* E27#1000/721#14890.

88. A key exception was in the motorization of anti-aircraft capabilities and support. The Swiss military prioritized some of the heaviest vehicles to motorize anti-aircraft weapons. Haudenschild, *Logistics of the Swiss Army,* 451; Walter E. Kretchik, *US Army Doctrine: From the American Revolution to the War on Terror* (Lawrence, KS: University Press of Kansas, 2011), 145–148.

89. Robert M. Citino, *The German Way of War: From the Thirty Years' War to the Third Reich* (Lawrence, KS: University Press of Kansas, 2005), 270.

90. The US Lend-Lease program provided approximately 409,000 cargo trucks and 47,000 jeeps to the Soviet war effort. Millet and Murray, *A War to Be Won,* 388; Richard E. Simpkin, *Deep Battle* (London, UK: Brassey's, 1987), 146–147, 151.

91. The "Red Ball Express," a continuous series of truck supply convoys meant to sustain the Allied war effort in France after the breakout at Normandy is among the best examples of motorized logistics. Peter R. Mansoor, *The GI Offensive in Europe* (Lawrence, KS: University Press of Kansas, 1999), 177–178.

92. *Allgemeiner Bericht über den Aktivdienst, 1939-1945* [*General Report on Active Service, 1939-1945*], E27#1000/721#14889, Swiss Federal Archives, Bern.

93. *General Report on Active Service, 1939-1945,* E27#1000/721#14889.

94. *General Report on Active Service, 1939-1945,* E27#1000/721#14889; Gautschi, *General Henri Guisan,* 265.

95. *Bericht an die Bundesversammlung über den Aktivdienst 1939-1945 von General Henri Guisan* [*Report to the Federal Assembly on the Active Service, 1939-1945 of General Henri Guisan*], 1946, E27#1000/721#15058*, Swiss Federal Archive, Bern.

96. *Report to the Federal Assembly on the Active Service, 1939-1945 of General Henri Guisan,* 1946, E27#1000/721#15058*.

97. Halbrook, *The Swiss and the Nazis,* 80.

98. Gautschi, *General Henri Guisan,* 55.

99. Senn, "Defending Switzerland," 4.

100. Senn, "Defending Switzerland," 4.

101. Gautschi, *General Henri Guisan,* 266.

102. Gautschi, *General Henri Guisan,* 63.

103. Halbrook, *Target Switzerland,* 99–103.

104. Gautschi, *General Henri Guisan,* 140.

105. The first instance of a German-purchased ME-109 being used by the Swiss to shoot down German aircraft was recorded in May 1940. Halbrook, *Target Switzerland,* 98–99.

106. Halbrook, *The Swiss and the Nazis,* 121.

107. Halbrook, *The Swiss and the Nazis,* 121–122.

108. Halbrook, *The Swiss and the Nazis,* 121-122.

109. Kurz, "The Menace of Military Aggression against Switzerland during the Second World War," 4.

110. Halbrook, *Target Switzerland,* 120.

Chapter 4
Building Resiliance (Fall 1940 to 1941)

Danger in the West

The Swiss believed that the major reason for a potential German invasion in the middle of 1940 would be for consolidating their western front victories. Germany desired to conquer the last German speaking area in Europe and take the key transit routes that linked Germany and northern Europe with its ally, Italy, and southern Europe.[1] The Swiss General of the Armed Forces, General Guisan, said: "Switzerland is a valuable transit country for the Axis Powers; its railways across the Alps should remain intact in order to be available for their transit traffic which is certain to increase. Nevertheless, we must be prepared for Germany to threaten us with an invasion at any given time, especially if we put up resistance against their threats."[2] The Swiss maintained their neutral stance and allowed the transit of Axis civilian goods as a means of survival. If the Axis showed themselves to be aggressive, the transit routes, which were well known to the Germans to be prepared with demolitions for destruction, could be destroyed. Thus, the transit routes represented an important bargaining chip for the Swiss in 1940. However sound the Swiss logic was in the summer of 1940, they understood that they were dealing with an unpredictable foe. Swiss Officer, H. R. Kurz sums up this sentiment in a 1952 article: "After the victorious conclusion of the campaign in France, we had to take into consideration the possibility that the winner, blinded by his own success, might have tried to take over Switzerland." General Guisan summarized the linkage between the transit routes, the danger to Swiss sovereignty, and the Swiss spirit of national defense when he stated:

> Germany's demands could sooner or later become such that they are no longer compatible with our independence and our national honor. Switzerland can avoid the threat of a direct German attack only if the German Supreme Command becomes convinced during it preparations, that a war against us would be long and costly and that it would kindle an unnecessary and dangerous conflict in the heart of Europe, thereby jeopardizing the execution of its plans. Consequently, henceforth our national defense has to have the purpose and the principle of showing to our neighbors that such a war would be a difficult and costly endeavor. If we are drawn into a conflict, we will have to sell ourselves as dearly as possible.[3]

In the final days of the Germany's campaign in France, Captain Otto Wilhelm von Menges, a junior member of the German General Staff, outlined a surprise attack against Switzerland across the German, Italian, and recently conquered French borders. His plan included an attack from eastern France near Geneva into Switzerland. Several incidents involving the Swiss had agitated Hitler in the early summer of 1940, which could have triggered the planned invasion of Switzerland. Air engagements between German and Swiss pilots had already elevated tensions but German intelligence discovery of documents outlining Franco-Swiss cooperation if Switzerland was attacked was the most problematic because it represented a blatant violation of Swiss neutrality from the German perspective.[4]

The German force designated to attack Switzerland from France was the 12th Army Group, which included a Panzer Corps led by General Heinz Guderian, several mountain units, totaling 245,000 men.[5] This attack into southwest Switzerland involved maneuvering across the lightly defended Franco-Swiss border to "isolate major Swiss units, preventing them from reinforcing one another or escaping to a fortified stronghold in the alps."[6]

Before being identified to attack Switzerland, the 12th Army Group was originally tasked with occupying the territories immediately around Geneva to cut the Swiss off from France so was already near its attack positions if the invasion was ordered by Hitler.[7] By 20 July 1940, the German Army was in position and ready to execute the attack.[8] The reason July of 1940 was so dangerous for Switzerland was because the Swiss Army was dangerously overextended and out of position. The Swiss Army was primarily facing north along the border and Limmat positions, while a German attack was also planned against southwestern Switzerland, where the Swiss had minimal forces of which many were preoccupied with disarming and detaining military refugees. The Swiss Army initially responded by extending their existing forces to cover possible German approaches through the Jura from Basel to Geneva which weakened the overall front.[9] Hans Senn, former Swiss Chief of Staff of the General Staff from 1977 to 1980 and prominent Swiss military historian, later described the military situation in Switzerland: "The Swiss army thus formed a weak front in all directions and there was highly vulnerable."[10]

Another factor that contributed to the danger of the situation was that the Swiss had again demobilized a substantial portion of their force in July 1940.[11] German estimates stated "The Swiss army has a total strength of 220,000 men. It currently consists of: 6 infantry divisions, 3 mountain divisions, 3 mountain brigades, 1 border brigade and border battalions.

There is no armored force. The air force is weak and only partially modernized; the antitank forces are being built up."[12] In reality, the Swiss had actually demobilized down to 200,000 men with 80,000 of them on leave or actively guarding and processing interned personnel from France, leaving an effective fighting force of approximately 120,000 men.[13] Almost two entire Swiss divisions, the 3rd and 7th, were disarming and detaining French and Polish military refugees along the Franco-Swiss border.[14] Urs Schwarz, a soldier in the Swiss Army during the war who also later became a historian, stated "Had Guderian's Panzers struck at the same moment, chaos and tragedy could hardly have been avoided."[15] Curiously, it was when the danger was highest that Switzerland was de-mobilizing and rotating units. Von Menges' plan and the Swiss disposition of forces indicates that late July of 1940 was the period when Switzerland was in the greatest danger during the early phases of the war.

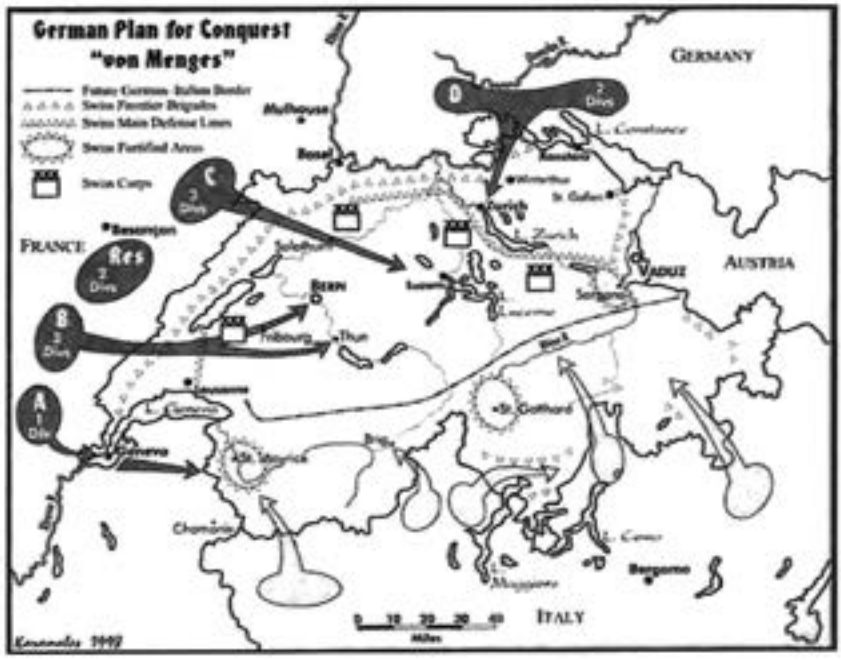

Figure 4.1. German Invasion Plan Outlined by Captain Otto von Menges and Submitted to the German General Staff to the German Army High Command (OKW) on 12 August 1940.

Source: Stephen P. Halbrook, *Target Switzerland: Swiss Armed Neutrality in World War II* (Rockville Centre, NY: Sarpedon, 1998) 134.

NOTE: The main thrust of the attack comes from the northwest and west.

It is uncertain why the attack plans outlined by Captain von Menges were not put into motion. Schwarz, who predicted chaos and tragedy if the Germans struck also stated: "However, the Germans had other objectives in mind, and if they ever intended to attack Switzerland, they felt sure that they could do it later at a better moment."[16] Historian, Klaus Urner, suggests that Hitler still held onto hope that the British would negotiate a truce after France fell so did not want to further aggravate the situation.[17] After it became clear that Britain would not sue for peace, Hitler's fixation on the British Isles during the Battle of Britain and his plans for a potential channel crossing is believed to have distracted him from seizing Switzerland, therefore the order to attack Switzerland was never given.[18] The plan, adapted multiple times now on draft #4 and codenamed Operation Tannenbaum, was canceled in October of 1941 when the General Staff ordered a halt to preparations stating "plan 'Tannenbaum' is no longer relevant because it has been overtaken by events," almost certainly as a result of the invasion of the Soviet Union.[19]

Early Swiss mobilization was impressive and represented one of the three areas where Switzerland was ready to defend the northern border and Limmat Line successfully. However, the Swiss were only properly manned if the attack came before July of 1940 and if the French could protect the Swiss western flank. After the defeat of France on 22 June 1940, Switzerland's strategic situation was substantially altered. Switzerland now had to defend significantly more territory including borders that were previously protected by the French Army. Even during the height of Swiss mobilization, the Swiss would not have been able to defend their new extended borders after France fell. Emboldened by their recent victories, the German political leadership now also believed Swiss preparation efforts were insufficient. An eye-witness account stated that Hitler believed: "that in the course or at the conclusion of the Western campaign the occupation of Switzerland would only present a modest task. That can be done by Dietrich with my bodyguards."[20]

The Swiss recognized their perilous situation and in response General Guisan issued his famous speech to his subordinate commanders at Rütli Meadow on 25 July 1940.[21] At Rütli Meadow, General Guisan highlighted the dire circumstances Switzerland was in and evoked Swiss history to inspire his commanders by announcing: "We have reached a turning point in our history. Switzerland's existence is at stake. Here the soldiers of 1940 will gain strength from the lessons and the spirit of the past in order to face the country's present and future with determination and hear the secret spell that emanates from this meadow."[22] Here General Guisan

also announced the new strategy, the Swiss National Redoubt [*Schweizer Reduit*], stating: "On August 1st the new positions that I assign to you are where your weapons and courage will serve your country best under these new circumstances."[23] The Redoubt offered a more viable strategy to defend Swiss sovereignty; a strategy that could better leverage the available manpower, maximize the use of Switzerland's terrain, and minimize the strengths of the enemy's combined arms.

The Swiss Redoubt

The new strategy outlined by General Guisan involved the creation of the Swiss National Redoubt. Historian Kyle Lockwood defines a "national redoubt" as "a concept where the military forces of a nation can be withdrawn to in…the case of a military defeat. Redoubts are typically chosen to be used in areas where geography favors a defensive fight, such as mountains, and are designed so an effective resistance movement can arise to counter the invading forces."[24]

The strategic concept was first seriously introduced for discussion in May of 1940, was subsequently developed and debated by the Swiss General Staff and Corps Commanders, and was formally implemented on July 17th by General Guisan in *Operationsbefehl Nr. 12*.[25] The rapid collapse of Anglo-French cohesion in the Benelux and Northern France from German *Blitzkrieg* and the encirclement of Allied forces at Dunkirk prompted the initial development of the Redoubt concept.[26] As with the Limmat Line, Colonel Oskar Germann, the architect of the Limmat Line, would again be the driving force for the Redoubt Strategy. However, the fall of Paris on 14 June, which occurred while the Redoubt Strategy was being developed, expedited and strengthened the arguments for the strategy's implementation, and several other high-ranking officers in the Swiss Army also recommended a pullback of forces into the Redoubt.[27] French capitulation on June 22nd was especially jarring for the Swiss as they could no longer expect any assistance from the French which validated the need for an urgent strategy update.[28]

The Redoubt concept involved concentrating the bulk of the Swiss forces in the Alps around several major fortified areas: the St. Maurice Fortress on the west, Fortress Sargans securing the easternmost edge, and the St. Gotthard Fortress as the anchor in the center.[29] These fortresses overwatched and protected key passes and transit lines, including the Simplon and St. Gotthard passes, which represented major objectives for the Germans and Italians as potential lines of communication and lines of supply.[30] The strategy was premised on the idea that the Alpine and

pre-Alpine conditions would further negate the German advantage in armor and aircraft. The Swiss Alps represented some of the most difficult terrain in Europe to fight in.

Retrograding and fighting from the Redoubt would not only enable the Swiss to attrit the Axis if they attacked into the mountains but would also provide a platform from which the Swiss would mount counter-attacks to impose cost on and bleed the invaders.[31] Halbrook eloquently captures the essence of the Redoubt Strategy when he stated: "This was resistance, not retreat: the Redoubt would not be a refuge for the army, but rather its chosen place of engagement."[32] As with the Limmat Strategy, previous defensive positions including the initial frontier positions and Limmat Line itself would continue to be improved, manned and used to conduct delaying actions to buy the Swiss Army time to complete any remaining mobilization and allow the retrograde of more forces to the Redoubt.

While serious discussion for the development of the Redoubt Strategy began in the spring of 1940, the concept of repositioning or retrograding to more favorable terrain in the Alps was neither new nor a spontaneous decision by General Guisan.[33] Even while the Limmat Strategy was in effect, the 2nd Corps Commander, the General Staff Operations Chief, and the Chief of the General Staff, had already discussed contingency plans to retreat to the Alps going back as early as November 1939.[34] As a contingency, the Redoubt made little sense as the 2nd Division Commander, Colonel Jakob Huber pointed out: "Keeping a major army unit in the mountains under the current circumstances would hardly be feasible. It would require stocking a significant amount of additional provisions there, and special steps would have to be taken for the wartime economy."[35] The Swiss were prepared to do just that, the Redoubt would no longer be a contingency operation. Instead, it would become the chosen strategy requiring the deliberate prepositioning of most of the army and a significant amount of supplies and equipment into the mountains before a potential attack. Finally, the decision to move into the Redoubt was a difficult one for the Swiss; it entailed ceding almost all of Switzerland's population, cultural, political and economic centers to the Germans in the event of an invasion. Prior to forwarding his Corps' recommendation to adopt the Redoubt Strategy to General Guisan, Colonel Jakob Labhart, the former Chief of the General Staff and now a Corps Commander, added: "There is no doubt that such a decision is very grave and will be difficult to make. However, during the difficult times that we are currently going through, wholehearted decisions are urgently needed if we want to survive with honor."[36]

Fortress Helvetia

The first instructions to reinforce the Redoubt occurred in the summer of 1940 coinciding with *Operationsbefehl Nr. 12*.[37] General Guisan outlined his expectations that the Redoubt would need to be able to hold the bulk of the Swiss fighting force, about 300,000 soldiers, and sustain them for at least 3 months.[38] An additional 300,000 Swiss civilians already lived in this sparsely populated and relatively underdeveloped area in Switzerland. The area chosen for the Swiss Redoubt begins at the St. Gotthard pass in south-central Switzerland, follows the Swiss-Italian then Franco-Swiss borders west until it touches the eastern corner of Lake Geneva. The boundary then traces north-east along the edge of the Swiss Alps just north of several major lakes including the Thunersee, Brienzersee, and Vierwaldstattersee, but south of the Zurichsee and Walensee lakes until it meets the border with Liechtenstein. From here the Redoubt's boundaries extend directly south-west until the Gotthard pass and St. Gotthard fortress, omitting the southeastern quarter of Switzerland, containing the cantons of Ticino and Grisons. This area, also referred to as the Central Region [*Kernzone*] by the military, encompasses the Bernese, Glarus, and Pennine alpine regions which include most of the Alps highest mountain peaks. The army's core of 300,000 soldiers were spread out within the Redoubt area but primarily occupied three major fortress complexes within the Redoubt: Fortress Sargans in the east, St. Gotthard in the center, and St. Maurice in the west.

However, the Redoubt contained a massive variety of defensive positions ranging from the largest fortress complexes, with multiple satellite forts, to blocking positions that were rigged with demolitions.[39] Many of the fortifications within the Redoubt were like that of the border and Limmat positions with pillboxes and bunkers while the smaller forts and satellite forts were more similar to the border forts, such as Fort Pré-Giroud discussed earlier, in facilities and equipment. The key difference was the layout which accounted for the radically different terrain.[40] The three major fortress complexes anchored the Redoubt area and guarded the major approaches into the Swiss Alps and some were positioned on or near key passes and tunnels. Each of the fortresses were equipped with dozens of turrets and casemates many of which contained multiple artillery pieces ranging initially from 75-mm to 150-mm in caliber.[41] Each of the forts also contained numerous machine gun blocks, fighting positions, bunkers, observation posts, and even searchlights. Explosives and traps were expected to play a critical role in the Swiss Army's defensive plans within

the Redoubt. Fortress historians Kaufmann and Jurga provide the most succinct description in their book *Fortress Europe:*

> Two to four rows of holes were drilled and capped in narrow defiles to create anti-tank obstacles similar to those used in bridges. In certain narrow passages small chambers secured by a door were prepared and loaded with explosives, ready to be detonated by local militia. The rail tunnels were also readied for destruction. Thus passage through this alpine fortress was easily controlled and blocked with a judicious use of forts and explosives.[42]

Figure 4.2. Map Depicting the Swiss Redoubt or Central Region.

Source: "Reduit 1945," 1945, E27#1000/721#14299*, Swiss Federal Archives, Bern.

St. Maurice was an older fortress that overlooked the Rhone River valley near the Franco-Swiss border where the river empties into Lake Geneva. St. Gotthard was another older fortress near the southern border with Italy. Its significance was that it covered the only two roads into the Alps from the south and the historically important St. Gotthard pass. Fortress Sargans was one of the newest and most extensive fortification

projects of World War II and best highlights Swiss preparation during the conflict. Near the German and Austrian borders, it was developed beginning in 1938 after the Swiss drained the Linth Plain, which enabled movement through the valley and offered a new approach into Switzerland.[43] The fortress complex was built between 1938 and 1942 in three phases. The Rhine barrier forts of Fort Schollberg and Fort Anstein were built in 1938. Magletsch, Kastels, Furkels, and Passatiwand were built in 1939. Forts Molinaera and Haselboden, guarding the southern approach to the area were built in 1941. The final phase, which included further supplementing the Rhine barrier with three additional forts, Tschingel, Nussloch, and Tamina Ragaz, were built between 1941 and 1942. Due to its location, Fortress Sargans has the distinction of being a component of all three Swiss strategies; it was the right flank's defensive position for the Frontier and Limmat Strategies against Germany, and in late 1940, it was a critical anchor in the Redoubt. The Sargans complex would eventually become one of the most modern and heavily fortified areas in Switzerland after its completion in 1942.[44]

When the war broke out in September of 1939, 12 forts were being completed or near completion and an additional 19 forts were already under construction. The Swiss General Staff estimated that 220 million Swiss Francs would be needed to finish construction of the Redoubt fortifications. 73 million Swiss Francs were still available and unused from the Limmat Line construction, which could be used immediately.[45] Thirty-three million Swiss Francs were allocated to Fortress Sargans and 29 million was allocated for the rest of the Redoubt. However, additional money needed to be raised to complete construction.[46] The large commitment of capital toward developing the Redoubt highlights its importance and scope to the Swiss Army; the 220 million Swiss Franc price tag to develop the Redoubt represented almost 20% of the 1940 and 1941 military budgets.[47] Over the next several years and until the war's completion, the defensive positions in the Swiss Redoubt would continue to be developed and expanded.

Building the Redoubt presented unique challenges for military leaders and logisticians. The Swiss had to accelerate the movement of an enormous amount of construction materiel for fortress and fortification construction. Not only did they need to resource existing, already accelerated, construction efforts but they also had to support a frenzy of smaller construction activities. General Guisan prioritized the construction of anti-tank barriers, followed by the construction of numerous smaller concrete emplacements and fighting positions.[48] Historian and soldier, Alfred Ernst, once again provides commentary on fortification construction describing

the efforts to build the Redoubt: "once the troops had been deployed to the Redoubt…the construction activities reached a level that our country had never experienced before in the domain of the military."[49] This time logisticians and engineers also leveraged operational contracting support and used construction companies for the more difficult and technical construction tasks.[50] This important decision increased efficiency, freed units to train, and reduced mobilization requirements and thus cost.

Many of the issues with developing the Redoubt were like the broader rearmament problems the Swiss Army faced. Much of the equipment and weapons needed to outfit the Redoubt's fortifications were imported and no longer easily available. For example, the steel-armor plates, 53-mm cannons, and 120-mm artillery used in the fortresses before the war came from the German Krupp Works but long delays in deliveries forced the Swiss to produce this material domestically, find a substitute, or acquire it elsewhere.[51] Other equipment came from nations that, by 1940, had been conquered by the Germans and was no longer readily available including the metal cloches and 75-mm anti-aircraft guns which came from Czechoslovakia and France respectively.[52]

Fortunately, the early investments and weapons licensing helped mitigate these issues when the Swiss needed to outfit new or modernize existing forts. Recall that the Swiss firm Sulzer Brothers was also already producing 105-mm artillery under Swedish Bofors licenses for the L42 motorized artillery system. Most division and corps artillery modified the L42 cannons to fit in artillery casemates requiring mechanics and technicians to install the cannon within the fort or reverse the process if the unit needed its artillery motorized again.[53]

The Swiss had also acquired new licenses since the beginning of the war and had adapted known weapon systems. For example, the Swiss began producing 75-mm anti-aircraft guns domestically under license from the French Schneider Creusot Company which enabled many forts in the Redoubt to receive anti-aircraft capability.[54] Alternatively, as with the case of the 75-mm fortress cannons (*Bunkerkanone*), the Swiss simply produced an adapted version of the Swedish Bofors 75-mm mountain gun. Fortress Sargan's major cannon and artillery armaments were exclusively 75-mm and 105-mm caliber reflecting Switzerland's new capacity to build those weapon systems domestically. Thus, new construction like Fortress Sargans, reflected the constrained environment for Switzerland while the older fortresses, such as St. Gotthard and St. Maurice carried over its older 120-mm and 150-mm artillery from before the war. The Swiss would gradually replace many of those 120-mm and 150-mm tubes across the

Redoubt with newer, domestically produced, 75-mm, 105-mm, and, by the end of the war, 155-mm artillery.[55] By mid to late 1940 most of the equipment for the new forts was produced in Switzerland, especially weapons and optics.[56]

By 1940, the Swiss were gradually beginning to realize the benefits of its forward-thinking fortress development and rearmament programs. Early rearmament efforts did not just benefit the Swiss field army; it synergized and aligned with its strategy by benefiting the fortress garrisons of the Redoubt. While the Redoubt's facilities were not as formidable as the French Maginot Line's in scope and capability, the Redoubt's defenses combined with Switzerland's terrain was formidable. Swiss foresight in regard to rearmament and investment and overall Swiss ingenuity enabled the Swiss to viably support and align their defensive strategy with their logistics capability and industrial base.

The Alpine Arsenal

Moving the bulk of the Swiss Army into the Redoubt presented three major challenges for Swiss logisticians. First, the Swiss Army needed to quickly transport and relocate the army and its equipment into the Redoubt without compromising Switzerland's security in the short term. After the Redoubt was established, the Swiss Army also needed to retain the ability to move the remaining mobilized personnel quickly into the Redoubt. Second, they had to resource adequate facilities to support the army and store supplies in the Redoubt. Finally, they had to stockpile adequate amounts of supplies and equipment within the Redoubt not only to support the army but also execute their assigned counter-offensives if attacked.

When developing the Redoubt, Colonel Hans Frick, Commander of the "Linth Group," responsible for defending the country's northeastern sector, stated "It is obvious that preparation for this move would have to be ordered immediately; particularly ammunition, provision, and other indispensable material would have to be stocked there."[57] While there was a general consensus that the army needed to move into the new positions quickly for the Redoubt to be effective, General Guisan had also assured the Swiss Federal Council that the country would remain continually defended during the transition.[58] To account for this requirement, *Operationsbefehl Nr. 12* called for a two phased movement into the Redoubt; the first phase was called the "Timid Redoubt."[59] However, the Timid Redoubt was also a consequence of logistical considerations and limitations. The Swiss were constrained by a lack of infrastructure and logistics bases in the Redoubt and could not initially position as many forces as desired

in the Redoubt.[60] Swiss logisticians simply needed more time to secure buildings and transport the equipment and supplies into the Redoubt. *Operationsbefehl Nr. 12,* issued on 17 July 1940 called for the immediate relocation of 3rd, 4th, and 5th Corps' to the Redoubt area.[61] As before, the border troops would cover the re-mobilization of the army while 1st and 2nd Corps, maximizing the existing fortifications, would defend the Swiss Plateau.[62] Therefore, this partial implementation of the Redoubt was necessary both for security and logistical considerations and represents the interplay of operational logistics and strategy.

To find the infrastructure capacity for the army inside the central area, the Swiss underwent a frenetic effort to build, expand, and requisition the appropriate facilities for the Army. Unlike the first two years of the war, local requisition at the company quartermaster level of public facilities such as schools and dance halls would not be sufficient to provide the necessary billeting and storage for the army as it relocated to the Redoubt. Competition between the different military organizations resulted in inefficiencies and caused friction. Due to the sheer number of soldiers and mobilized personnel that were being concentrated in the relatively sparsely populated areas and less developed mountainous areas of the Redoubt a central authority was required to deconflict and prioritize the use of existing private and public facilities, but also manage the construction of new infrastructure to support the army. To overcome this challenge, the *Kriegsmaterielverwaltung* [War Materiel Department] and General Staff took a much larger role in centralizing the requisition, allocation, and construction of facilities. The decision was especially helpful in adjudicating and allocating facilities to different logistics organizations within the Swiss military and became even more important when, on 18 December 1940, General Guisan doubled the required quantity of supplies in the Redoubt from three to six months' worth.[63]

The existing military installations in the Alps, at locations such as Sarnon, Stens, Schwyz, and Altdorf "were insignificant in terms of storage space that they played no role in solving the evacuation problem."[64] After exhausting existing military facilities, the War Materiel Department turned to renting and requisitioning facilities.[65] Hotels and abandoned factories were ideal locations. The department also coordinated the construction of a large number of facilities and camps and they also expanded facilities within the fortress infrastructure.[66] Many of the storage depots, maintenance areas, and medical facilities were in temporary camps and facilities built or located within the Redoubt area but far enough away from the expected frontlines for security purposes.[67] By 1941, 9 airfields

and 11 armories were built enabling all major units and the entire air force to be stationed inside the Redoubt.[68] A key concern for the Swiss was an air-attack on logistics infrastructure, which could be mitigated by moving facilities underground. As the Swiss continued to develop the Redoubt more infrastructure, storage capacity, and underground tunnels were built within the fortresses or in tunnels. Due to the threat from the air, priority for underground storage was given to ammunition magazines. In the largest and most developed areas of the Redoubt, rail and truck loading areas were also eventually built underground.[69] By 1942, a total of 10,000 barracks, many of which were outfitted with offices, kitchens, and medical facilities, and capacity existed for storage of the entire army and its supplies in the Redoubt.[70]

On 24 May 1941, General Guisan issued *Operationsbefehl Nr. 13* and the rest of the army was directed to move into the Redoubt.[71] This final decisive stage was implemented in the spring of 1941 which ordered the 1st and 2nd Corps' and their divisions to pull back into the Redoubt. The entire Swiss field army order of battle of 12 major units, including all divisions, mountain brigades, and the fortress garrisons were all stationed in the Redoubt. The only units assigned outside of the Redoubt were the border troops, the highly mobile light troops, consisting of cavalry and bicycle infantry with some small motorized elements, and engineer demolition detachments. *Operationsbefehl Nr. 13* would remain active and valid through the war's termination and was finally suspended on 5 July 1945.

While all major units were assigned to the Redoubt and could technically be billeted in the central area by May 1941.[72] Not all soldiers physically remained within the Redoubt all the time. Mobilization and demobilization tendencies of the Swiss Army did not change in the war because of the economic and financial costs of maintaining solders in an active status. Units and personnel still rotated in and out of an active status and only a portion of the army would be in the Redoubt at any moment. At times the number of total soldiers in the Redoubt fell below 100,000 men.[73] This meant that the logistician's previous challenge to rapidly evacuate and transport a substantial part of the field army and its equipment to their assigned areas, now in the much more distant and rugged terrain of the Swiss Alps, remained.

Further complicating matters, Swiss logisticians expected very little time to evacuate personnel to the Redoubt. General Guisan estimated that the border troops would be able to defend for two days. He expected the light troops would be able to defend two additional days. Therefore, Gen-

eral Guisan expected German armor elements, followed by infantry and other motorized units, to reach the Redoubt on the fourth or fifth day.[74] These estimations included the adverse effects of the terrain and the Swiss Army's impacts, especially the demolition troops and territorial forces, on the enemy's supply lines even if the *Wehrmacht* was able to quickly penetrate the Swiss defenses. Although General Guisan admits that this was a pessimistic calculation, he believed that "this was just enough time to begin fighting under acceptable conditions"[75] at the edge of the Redoubt. For perspective, Belgium, with 650,000 personnel already mobilized, was overrun by the *Wehrmacht* in 18-days during World War II.[76] While differences in terrain, military structure, equipment, and training existed, Belgium's resistance provides useful context for the analysis of Swiss mobilization.

To ensure General Guisan's "acceptable conditions," Swiss logisticians needed to stockpile adequate supplies in the Redoubt before an inva-

Figure 4.3. Final Troop Dispositions within the Redoubt after *Operationsbefehl Nr.13*.

Source: "OP. BEF. 13," 1941, E27#1000/721#14299*, Swiss Federal Archives, Bern.

sion so that only personnel and limited amounts of equipment needed to be moved during the five-day contested retrograde. Rail was initially important for the transportation of bulk supplies and equipment into the Redoubt, however, after the materiel had been relocated to major hubs within the Redoubt, follow-on distribution was mostly on road.[77] The rail network was limited in the Alps when compared to the Swiss Plateau because of the terrain and relatively low population density.[78] Rail routes primarily existed for transit across the Alps. Once again, policies that enabled robust requisitioning of vehicles, a strong focus on logistics reorganization during the 1936 *Truppenordnung,* and the choices to motorize and resource transportation organizations continued to pay off. By late 1940, the Swiss Army had repositioned itself in the Redoubt where its rail would be less useful and thus had to fall back on its motorized means of transportation and distribution. Movement of equipment and personnel within the mountains would still be possible using motor-vehicles. Additionally, during an invasion, the rail network on the Swiss Plateau would have undoubtedly been a major target for the German *Luftwaffe.* Motorized logistics elements, especially the transportation organizations, would have undoubtably played a key role in retrograding the army to the Redoubt during re-mobilization. In the context of a Swiss defense in the Alps and a contested mobilization and retrograde to the Redoubt, the motorization decisions by the Swiss Army were well aligned with the Redoubt Strategy. The Swiss motor-vehicle fleet would have ensured that the Swiss transportation capability within the Redoubt remained as robust as possible.

As facilities issues were being addressed, the Swiss Army spent the better part of late 1940 and 1941 relocating supplies to the central area. All of the army's centralized warehouses as well as the corps' and division's equipment were relocated. The final report by the War-Material Department aptly summarizes the scale of the movements in their final war report by describing some of the major movements:

> The Interlaken Armory was set up for supply operations as a replacement for Thun/Gwatt. The Bern Armory evacuated all of its supplies to the Barocken Camp in Zweilütschinen and prepared for the movement of the Funkor-Ropa-Raturwurkstätte from Bern to Lauterbrunnen. Obwalden and the Engelborgertal served as a reception area for the Krion's Armory. Obwaldon and the Engelborg Valley were available to Krion's Army as a storage space for supplies. In Sarnon, a larger armory was built to relieve and support Krions.[79]

Additionally, by the end of 1941 almost all ammunition depots had been relocated in or near the Redoubt.[80]

The Swiss did not only relocate military equipment such as weapons and supplies. Raw materials, unfinished goods, and other types of equipment were also moved to the Redoubt. Ten-thousand tons of coal, reserve rail cars, and other supplies needed for rail operations such as ramps and bridging material were also retrograded to the relative safety of the Redoubt, possibly to support the planned counter-attack back onto the Swiss Plateau.[81] General Guisan also became personally involved in the relocation efforts. After visiting Zurich he wrote the following to his chief of staff: "I noticed that the army's iron supplies in Killwangen, which had begun to be stocked in the winter of 1939-1940 for the construction of fortifications along the Limmat front, were still considerable. I would like to ask you to examine whether it would not be advisable to relocate this valuable material, at least temporarily, to a central place near the Redoubt."[82] Considering fortress construction was still on-going in the Redoubt, this represented a wise intervention by the Swiss Army's senior leader.

By 1941, the Swiss operational plans to fight from the Redoubt were in place and by 1942, the logistics preparation in the Redoubt had caught up with the operational plan. The logistics and support facilities were built, fortresses construction was largely complete, and the necessary war materiel was stockpiled to enable the Swiss strategy. Most of what has been described so far has been strictly military means of preparation, however, other important diplomatic and economic considerations that supported the Army's resilience and Redoubt Strategy need to be addressed.

Swiss Resilience

1940 through 1941 was defined by Swiss efforts to improve the country's resilience in the context of a strategically altered geopolitical situation after the fall of France. The Swiss withdrew its army into the Redoubt capitalizing on the strengths offered by Switzerland's geography and defensive infrastructure. The Swiss Army was also now out of reach of the *Wehrmacht's* primary asymmetric advantages of tactical airpower and concentrated mechanized formations. If the *Wehrmacht* attacked, it would be denied a decisive victory and would be forced into an attritional fight against a determined, well-supplied, and entrenched enemy. Despite the robust preparations by the Swiss and the soundness of the Redoubt Strategy, Switzerland also needed to improve its resilience through diplomatic and economic means to ensure its military survival and continue preparation for as long as possible.

The Swiss war industry depended on imported raw materials which would certainly be unavailable if Switzerland was invaded by the surrounding Axis powers.[83] Additionally, most of the factories lay outside of the Redoubt and were expected to be captured early in the conflict. Therefore, Swiss war production largely mattered only before the outbreak of any potential hostilities as only limited production of new weapons or ammunition could be expected after a war involving Switzerland commenced. As tensions continued to rise with Nazi Germany, the diplomatic capability of the Swiss government to maintain the flow of raw materials to continue preparation for the possibility of war as long as possible was extremely important.[84]

Continued war production and materiel preparation by Switzerland became a factor in its relationship with the war's belligerents. In addition to relying on food imports to feed its population, the Swiss civilian economy depended on imported raw materials, fuel, and other partially finished goods, as well as access to foreign markets for which to sell its finished goods. Both the supply of raw materials and access to markets were controlled by Germany after 1940 as Germany and her partners surrounded Switzerland and because of permitting requirements for Swiss finished goods to enter or pass through Axis-controlled territory for export.[85] The Swiss also had to contend with Allied influence on trade, specifically British and later American influence. To limit economic support of neutral nations in Europe to the Axis powers, the British initially implemented a blockade on Switzerland. After successful negotiations by the Swiss in 1940, the British relaxed the blockade but instead implemented the "Navicert" system which maintained some restrictions on Swiss trade.[86] Under the Navicert system, British officials monitored and approved goods imported and exported from Switzerland.[87] For Switzerland to maintain acceptable levels of employment and domestic economic stability, Switzerland was forced to simultaneously navigate Allied trade restrictions and economically cooperate with Germany, which included selling war materiel to Germany. News correspondent Percival Knauth highlights the paradoxical situation and two-fold purposes for Swiss trade with Germany: "for by manufacturing arms for Germany they have been able to make arms for themselves and by producing for the Axis they have been able to stave off unemployment, the forerunner of internal dissension."[88] By continuing trade with Germany, Switzerland both maintained its civilian economic survival and built its capacity to resist any future aggression.[89] With the flow of resources vulnerable to both Axis and Allied influence, a critical factor in Swiss war planning was that they would largely go to war with

the weapons and materiel they had on hand if they became embroiled in the conflict. Fortunately for the Swiss, ammunition stocks became acceptable for the Swiss high command at the end of this period as evidenced by ammunition production. Swiss production in 1941 of 240 million rounds represented the high point in Swiss ammunition production with only 120 million rounds being produced in 1942 and only 60 million rounds were produced in 1943.[90]

Another military-diplomatic component of Switzerland's resistance was the unique role that Britain was expected to play after an invasion of Switzerland. After retrograding to the Redoubt, the Swiss intended to secretly send a delegation to Britain to request assistance. General Guisan expected British support in the form of tactical air and logistics support and even hoped that British paratroopers would fight alongside the Swiss in the Redoubt.[91] General Guisan expected 100 fighters and bombers, including Spitfires and Hurricanes, to assist in the defense by operating out of the airfields within the Redoubt.[92] From a logistics point of view, the delegation would also request critical supplies such as fuel, mines, explosives, food, and medicine to be airdropped.[93]

Food security was another key component of Switzerland's resilience. The Wahlen Plan, created by Frederick Wahlen a member of the Swiss Federal Council and agriculturalist, entailed maximizing food production in Switzerland.[94] It called for increasing food output by bringing more farmland into use and by restricting less productive farming methods such as cattle herding so the land could be used for more efficient crops. The Wahlen Plan effectively doubled Switzerland's productive farmland from 453,374 acres in 1934 to 904,030 acres in 1944.[95] By providing ample food and fending off starvation for the Swiss people, the scheme denied fascist agitators fertile ground to sow the seeds for dissent, defeatism, and fifth-column activity. The psychological component for an army built entirely on citizen-militias cannot be understated. Wahlen's Plan also ensured that the food stores needed within the Redoubt to sustain operations and resist a siege would remain stocked. Through the Wahlen Plan, the Swiss Federal Council both buttressed the Swiss spirit of national resistance and military feasibility of the Redoubt Strategy.

The Swiss hastily shored up deficiencies in trade to ensure their war industry could continue production until the last moment before any potential hostilities. Skillful diplomacy ensured the flow of goods and raw materials into Switzerland from both the Axis and Allies. Considering Switzerland's geographic position and that both parties attempted to hold Switzerland economically hostage to advance their own objectives the

very fact that the Swiss imported or exported anything during the war is an impressive feat, one that had far-reaching consequences for the Swiss war effort. Maintaining trade also enabled the Swiss economy to carry on and provide livelihoods for the Swiss population, fending off Axis opportunities to erode the Swiss national will. Diplomatic efforts even held hope for potential military support from England if Switzerland were attacked.

More directly, the Swiss built resilience by stockpiling enormous amounts of materiel needed to fend off invasion from within the Redoubt. Important benchmarks were met in facilities construction, magazine depth, supply stockpiles, and regarding transportation and distribution. Battle plans and mobilization schedules were also adjusted to evacuate the most precious resource of all to the Redoubt: manpower. Despite the Swiss strategy being defensive and reliant on geography and static fortifications, early motorization decisions maximized lift capacity, mobility, and speed in Swiss logistics operations and undergirded all aspects of the Swiss strategy—from mobilization to resistance.

Both German and Swiss perspectives at the end of 1941 and into 1942 highlighted Switzerland's newfound resilience and confidence. According to German intelligence reports, the *Wehrmacht* viewed the terrain, fortifications, and Swiss preparations, especially the Redoubt, with respect.[96] They assessed that operations in the Alps were only possible on main routes and during fair weather. They also stated, "the mountainous, scarcely populated center of Switzerland has been reinforced like a fortress and turned into a National Redoubt."[97] The Germans also severely overestimated Switzerland's preparation. A report from the German minister in Basel to the German foreign office estimated that Switzerland had stockpiled enough food and raw materials to facilitate resistance for as long as two years.[98] While this report was inaccurate, as the Swiss had only managed to stockpile five months of resources for their army by 1942, short of their six month target, it nonetheless highlights the appreciation the Nazis had of Swiss preparation thus far.[99]

By the end of 1941, the Swiss had also overcome their anxiety and were beginning to regain their confidence from the despair that followed France's defeat. Swiss newspapers highlighted this new confidence and defiance with a headline in the *Neue Berner Zeitung* being *"Wir machen nicht mit!"* [we are not taking part] or more loosely as [we are not playing ball].[100] A statement by General Guisan, while slightly more muted than the press, represents the confidence of the nation's military and political leaders in their preparation and capacity to resist: "We knew that our equipment was not the most modern. But we were convinced that our ar-

mament, fortifications, optimal use of our territory, and our determination would give us a chance. More recently, with much more modern arms, the wars in Indochina or Yugoslavia show that this was not merely wishful thinking."[101]

The period from September 1940 to when the Germans initiated Operation Barbarossa and invaded the Soviet Union on 22 June 1941, represents the timeframe when the Swiss finished setting in motion their war-time preparations. The Swiss were ready for war at the conclusion of 1941. If invaded, Swiss preparations were sufficient to execute their strategy with some degree of success and, based on German perspectives, were demonstrating that a war with Switzerland would be a costly endeavor which contributed to their ability to maintain their sovereignty and dissuade attack. Subsequent preparation efforts were largely continuations, extensions, and expansions of existing policies, ideas, and initiatives. With the Swiss Army firmly entrenched and supplied in the Redoubt, Switzerland would continue to maintain its upward trajectory in rearmament, improving mobilization procedures, stockpiling materiel, and fortifying the nation.

The Final Years

Switzerland built upon the foundation they established in the first three years of the conflict and continued to improve in preparation and readiness over the next three years. These efforts were less dramatic than the initiatives from the 1933 to 1941 period. While the risks for Switzerland from 1942 through 1945 were certainly lower than those of 1939 through 1941, Swiss leaders could never be certain that Hitler would not decide that Swiss neutrality was less important than Germany's misbegotten military adventures.[102] The Swiss continued to respond to the events in Europe and staunchly prepared for any eventuality through the war's termination.

By 1942, the tide of the war began to turn against the Axis after the United States joined the war on the side of the Allies and after the surrender of the German 6th Army to the Soviet Union in Stalingrad in 1943. In the spring of 1942, the Allies began negotiating with Switzerland to limit Swiss trade with Germany. The Swiss were only able to participate in these negotiations because of their military and logistical preparation so far. With the Swiss Army firmly entrenched and secure in the Redoubt and with logistics preparations largely complete, the Swiss began to rely more on their military power to dissuade Axis aggression and could accept the risks of reduced economic cooperation with Germany.

The events in North Africa and in southern Italy in late 1942 and early 1943 also impacted the Swiss defense calculus. After the Allied invasion of North Africa and the Axis occupation of all of France, the Swiss began to further refine the Redoubt Strategy to best enforce their sovereignty against an increasingly desperate enemy. Senior leaders in the *Wehrmacht* and SS sought to persuade Hitler to adopt a more defensive strategy along the European frontiers and develop a subsequent second "inner defensive zone."[103] To establish this Nazi vision of "Fortress Europe," Germany would need to control the Alps to cover its southern flank for the new, smaller perimeter. Even before the invasion of Sicily, General Guisan directed his General Staff, to develop plans to better defend the southern Swiss border to deter the Axis from incorporating Switzerland in part of a German defensive stronghold. The need for a strategy refinement continued to grow after the Allied landings at Sicily, subsequent overthrow of Mussolini, and the eventual surrender of Italy to the Allies.

A modified Redoubt Strategy with renewed emphasis on defending more Swiss territory was first implemented on 1 January 1944, with the release of *Operationsbefehl Nr. 16* which significantly reinforced the southern Alpine border. Shortly after, *Operationsbefehl Nr. 17* was issued which called for additional divisions on the northern Swiss Plateau. The resulting strategy envisioned "a highly graduated defense beginning at the country's borders."[104] This new updated and modified Redoubt Strategy represented a better balance of forces across Switzerland, however, the preponderance of military forces remained in the Redoubt.

By the spring of 1944, the Swiss anticipated that an invasion of northern Europe was imminent and again developed plans to position more of the Swiss Army on the border, specifically the northern border. Implemented on 21 March 1944, *Operationsbefehl Nr. 18* called for most of the army to return to Switzerland's border facing France and Germany overwatching the Jura. This plan was also suitable for defending against attacks from the southwest and northeast across the Swiss Plateau as four corps were positioned side-by-side and arrayed in depth along this axis. Any attack into Switzerland across the Swiss Plateau would have to fight most of the Swiss Army in depth.

While the Swiss would vacate the Redoubt of most of its forces, it would remain a cornerstone of Swiss strategy for the remainder of the war. General Guisan maintained that the Redoubt could not be left exposed and needed to remain a viable location for a Swiss Army retreat if necessary.[105] The Allied landings at Normandy, in southern France, and the subsequent

Allied march across France highlighted the Swiss operational and strategic foresight. The subsequent *Operationsbefehls Nr. 19, 20, 21,* and *22* were all variations of a border defense but still maintained the Redoubt as a key component. All of these orders generally positioned most of the Swiss Army near the northern Swiss border oriented toward the Germans and Allies as the front advanced east further reinforcing the Swiss desire to deter either of the two armies from violating Swiss territorial sovereignty.[106]

In the new dispersed strategy, General Guisan wanted to dissuade any incursion into Swiss territory from any belligerent. The Swiss were especially concerned that either party would see Swiss territory as a shortcut to bypass enemy positions either in retreat to escape encirclement, as was expected for the Germans, or as an offensive maneuver in the case of the Allies.

As the war reached its final years and the Allies and Soviets drew closer, Swiss military dispositions demonstrated the Swiss resolve to remain neutral and protect its sovereignty against any army, not just German and Italian forces. Hans Senn provides insight into the Swiss state of mind when they were developing Operationsbefehls 16-22:

> Had Switzerland not guarded its borders effectively at this time, it might have been drawn into the final phase of the war's turmoil. It also would have been placed into an extremely delicate situation if the Americans had followed Stalin's advice and by-passed the German positions of defense via the Swiss lowlands in order to punish the "swine" (as Stalin called Switzerland) because of its coldness towards the Soviet Union and its supposed collaboration with Hitler's Germany. Switzerland would not only have to turn down German support, but also to guard against German troops in order to live up to its position of neutrality. That would have led to war on two fronts until an accommodation could have been reached with the invading Americans.[107]

Despite the concerns regarding the Allies, General Guisan never lost sight of the Nazis as the real enemy. While discussing troop dispositions with his General Staff, he asked: "Which opponent would be most interested in the *Reduit* in the event of a battle in France between Germans and Anglo-Saxons?" He answered his own question by stating "Above all the Germans, in order to maintain their communication lines with Italy, while the Anglo-Saxons wills strive to destroy them."[108]

The Nazi occupation of Hungary in March of 1944 and the *Wehrmacht's* Ardennes Offensive of 1944 into early 1945 highlight the real danger that remained for Switzerland from Germany into the late phases of the conflict. Considering most German war plans concerning Switzerland called for between 9 and 21 divisions and the Hungary and Ardennes operations involved 7 and 21 divisions respectively, both events show that the *Wehrmacht* may have been able to assemble sufficient forces for a successful attack on Switzerland even as the German Army was rapidly running out of resources.[109]

Despite the danger that existed into the latest stages of the war, in the fall of 1944 Switzerland's confidence in their preparation and military grew to a point where they no longer believed they needed to economically cooperate with the Axis powers. They assessed they could finalize the trade restrictions that began in 1942 and completely sever military-economic ties with Germany. On 1 October 1944, the Swiss ceased to export war materiel to any belligerent engaged in the conflict.[110] This prohibition was extremely risky for the Swiss as it primarily agitated Germany. At this point in the war, the Axis war effort benefited far more from Swiss trade. In the same month, the Swiss completely closed the Simplon Pass transit route between Germany and Italy. While the Swiss had not allowed war materiel to transit this route during the war, other goods such as coal had been permitted and closing this route still represented a serious blow to the Nazi war effort.

The presence of 600,000 to 1,000,000 Axis soldiers cut off in northern Italy represents a final dramatic episode for Switzerland in the war. Beginning in March of 1945, Swiss intelligence suggested that the German Army Group C, led by Field Marshall Albert Kesselring, considered a plan to fight through Switzerland to return to Germany.[111] The plan's validity was corroborated by similar Allied assessments of the Nazis desires for a last stand in their own national redoubt, or *Alpenfestung,* in the mountains of Bavaria and Austria. These assessments were also briefed to General Dwight D. Eisenhower, then Supreme Allied Commander in Europe.[112] This was extremely concerning for the Swiss. Given that Kesselring was known to be moody and impulsive, that this unit was acknowledged to be as stubborn and faithful to the Reich as those defending Berlin, and because this force was expected to play a decisive role in the Nazi's last stand in the German Alps demonstrates that real danger of being brought into the war that existed for Switzerland until as late as April 1945.[113] The Swiss had serious interests in removing this force from their southern bor-

der and Swiss intelligence officers would participate in mediating the surrender. Max Weibel, an intelligence officer in the Swiss Army acting in a private capacity would play an important role alongside American Allen Dulles in coordinating the surrender of Kesselring's Army. On 29 April 1945, the remaining isolated Axis troops in Italy surrendered. A day later Hitler would commit suicide and World War II in Europe would come to its dramatic conclusion on 8 May 1945. Through determination and preparation, despite being in the center of the maelstrom, Switzerland maintained its neutrality and spared itself the devastation of the greatest conflict the world had ever experienced.

Notes

1. Halbrook, *Target Switzerland,* 166.

2. Gautschi, *General Henri Guisan,* 250.

3. Gautschi, *General Henri Guisan,* 251.

4. Urner, *Let's Swallow Switzerland,* 51; Schwarz, *The Eye of the Hurricane,* 32.

5. Halbrook, *The Swiss and the Nazis,* 117; Urner, *Let's Swallow Switzerland,* 57, 162.

6. Halbrook, The Swiss and the Nazis, 117; Urner, *Let's Swallow Switzerland,* 121.

7. Halbrook, *The Swiss and the Nazis,* 117; Urner, *Let's Swallow Switzerland,* 117.

8. Halbrook, *The Swiss and the Nazis,* 117; Urner, *Let's Swallow Switzerland,* 117.

9. Kurz, "The Menace of Military Aggression against Switzerland during the Second World War," 12.

10. Senn, "Defending Switzerland," 7.

11. "Swiss Partly Demobilize," *New York Times,* 29 June 1940, ProQuest.

12. Urner, *Let's Swallow Switzerland,* 162.

13. Halbrook, *The Swiss and the Nazis,* 120, 123.

14. The Germans were aware and acknowledge that the Swiss were busy interning almost 50,000 allied soldiers and understood that the internees represented both threat and opportunity. The internees could tie down Swiss Forces with internment operations, or the Allied soldiers could be rearmed and fight alongside the Swiss in the event of an invasion of Switzerland. Urner, *Let's Swallow Switzerland,* 162; Halbrook, *The Swiss and the Nazis,* 120–122.

15. Schwarz, *The Eye of the Hurricane,* 28.

16. Schwarz, *The Eye of the Hurricane¸* 28.

17. Urner, *Let's Swallow Switzerland,* 63.

18. Urner, *Let's Swallow Switzerland,* 63.

19. Halbrook, *The Swiss and the Nazis,* 128. Wilson, *Iron and Blood,* 574.

20. This statement refers to *Leibstandarte SS Adolf Hitler,* a Nazi SS Regiment under the command of Sepp Dietrich at the time. This regiment was later incorporated into the Waffen-SS and expanded into an SS division. Urner, *Let's Swallow Switzerland,* 50.

21. General Guisan's speech at Rütli Meadow is especially symbolic because Rutli Meadow was the same location where the Swiss Confederation had initially been established in 1291. Halbrook, *The Swiss and the Nazis,* 118.

22. Gautschi, *General Henri Guisan,* 222.

23. Gautschi, *General Henri Guisan,* 217; Halbrook, *The Swiss and the Nazis,* 118.

24. Kyle Lockwood, "National Redoubt: The Last Stand," World at War Magazine, 2 November 2015, http://www.worldatwarmagazine.com/waw/national-redoubt-the-last-stand/.

25. Gautschi, *General Henri Guisan,* 246.

26. Gautschi, *General Henri Guisan,* 242.

27. Gautschi, *General Henri Guisan,* 243–244.

28. Gautschi, *General Henri Guisan,* 242.

29. Halbrook, *Target Switzerland,* 121.

30. Halbrook, *Target Switzerland,* 121.

31. Gautschi, *General Henri Guisan,* 269.

32. Halbrook, *Target Switzerland,* 121.

33. Gautschi, *General Henri Guisan,* 241.

34. Going further back, Swiss military leaders in the 18th and 19th centuries had also debated the merits of positioning the bulk of their forces in the Alps. Gautschi, *General Henri Guisan,* 240.

35. Gautschi, *General Henri Guisan,* 241.

36. Colonel Labhart was replaced by Colonel Huber as the Chief of the General Staff at the beginning of 1940. Gautschi, *General Henri Guisan,* 245.

37. Gautschi, *General Henri Guisan,* 266.

38. Gautschi, *General Henri Guisan,* 247, 263.

39. Kaufmann and Jurga, *Fortress Europe,* 156.

40. Kaufmann and Jurga, *Fortress Europe,* 157–158.

41. Kaufmann and Jurga, *Fortress Europe,* 153. 157.

42. Kaufmann and Jurga, *Fortress Europe,* 153. 158.

43. Kaufmann and Jurga, *Fortress Europe,* 153.

44. Kaufmann and Jurga, *Fortress Europe,* 153.

45. Gautschi, *General Henri Guisan,* 267.

46. Gautschi, *General Henri Guisan,* 267.

47. Fuhrer, *Réduit I,* 51.

48. Gautschi, *General Henri Guisan,* 266.

49. Gautschi, *General Henri Guisan,* 266.

50. Senn, "The Swiss Army Was Ready," 64.

51. A cloche is a permanent, non-movable armored cupola similar to a turret. The key difference between a cloche and a turret is a cloche cannot rotate or move. Kaufmann and Jurga, *Fortress Europe,* 158, 425.

52. Kaufmann and Jurga, *Fortress Europe,* 158.

53. Gautschi, *General Henri Guisan,* 267.

54. Kaufmann and Jurga, *Fortress Europe,* 158, 160.

55. Kaufmann and Jurga, *Fortress Europe,* 159.

56. Kaufmann and Jurga, *Fortress Europe,* 158.

57. Gautschi, *General Henri Guisan,* 44.

58. Gautschi, *General Henri Guisan,* 260.

59. Keller, *Operations of the Swiss Army,* 54.

60. Keller, *Operations of the Swiss Army,* 54–55.

61. Keller, *Operations of the Swiss Army,* 53.

62. Keller, *Operations of the Swiss Army,* 54.

63. *Bericht der eidg. Kriegsmaterielverwaltung über den Aktivdienst, 1939-1945* [Federal Report War Materiel Management via Active Service, 1939-1945], E5676A#2008/117#5*, Swiss Federal Archives, Bern.

64. *Federal Report War Materiel Management Via Active Service, 1939-1945,* E5676A#2008/117#5.

65. *Active Service Report, 1939-1945,* E5676A#2008/117#5.

66. *Active Service Report, 1939-1945,* E5676A#2008/117#5.

67. Fuhrer, *Réduit I,* 17.

68. Keller, *Operations of the Swiss Army,* 55–56.

69. Fuhrer, *Réduit I,* 17.

70. Keller, *Operations of the Swiss Army,* 55.

71. Senn, "Defending Switzerland," 11.

72. Halbrook, *Target Switzerland,* 149.

73. Gautschi, *General Henri Guisan,* 266.

74. Gautschi, *General Henri Guisan,* 264.

75. Gautschi, *General Henri Guisan,* 264.

76. Weinberg, *A World at Arms,* 122–126.

77. *Report from the Chief of the Army General Staff to the Commander-in-Chief of the Army on Active Service 1939-1945,* E27#1000/721#15062.

78. "Eisenbahnkarte der Schweiz für den Kriegsbetrieb [Railway Map of Switzerland for Wartime Operations]," 1941, E27#1000/721#14299*, Swiss Federal Archives, Bern.

79. *Federal Report War Materiel Management Via Active Service, 1939-1945,* E5676A#2008/117#5.

80. *Munitionsnachschubdienst Quartalsbericht No. 2* [*Ammunition Supply Service Quarterly Report No. 2*], 8 July 1941, E27#1000/721#14889*, Swiss Federal Archives, Bern; "Liste des Mag. & Mun. et á explosifs du S.R.M [List of Mags. & Mun. and explosives of the S.R.M]," E27#1000/721#14889*, Swiss Federal Archives, Bern.

81. *Report from the Chief of the Army General Staff to the Commander-in-Chief of the Army on Active Service 1939-1945,* E27#1000/721#15062.

82. Gautschi, *General Henri Guisan,* 263.

83. "Switzerland Combat Estimate," Record Group 165, Folder 003206-004-0550.

84. For detailed information on trade negotiations between the Swiss, Axis, and Allies during World War II, see Heinz Meier, "Between Hammer and Anvil: Neutrality and the Necessities of Trade," in *Switzerland under Siege, 1939-1945,* ed. Leo Schelbert (Rockport, ME: Picton Press, 2000), 131–152.

85. Percival Knauth, "Oasis of Democracy: Switzerland, Ringed by Warring Nations, Keeps Its Way of Life but Has Paid a Price for Peace," *New York Times,* 25 January 1942, ProQuest.

86. Meier, "Between Hammer and Anvil," 133.

87. Meier, "Between Hammer and Anvil," 133.

88. Knauth, "Oasis of Democracy."

89. Swiss economic trade and cooperation with Germany has been the subject of significant debate and criticism. For more information see: Marc Perrenoud, "Foreign Trade and Swiss Politics, 1939-1945," in *Switzerland and the Second World War,* ed. Georg Kreis (New York, NY: Frank Cass Publishers, 2000), 26–41, Jakob Tanner, "Switzerland's International Financial Relations, 1931-1950," in *Switzerland and the Second World War,* ed. Georg Kreis (New York, NY: Frank Cass, 2000), 42–68; Heinz, "Between Hammer and Anvil," 131–152.

90. Gautschi, *General Henri Guisan,* 561.

91. Gautschi, *General Henri Guisan,* 267.

92. Gautschi, *General Henri Guisan,* 267.

93. Gautschi, *General Henri Guisan,* 267.

94. Halbrook, *Target Switzerland,* 138.

95. *Report from the Chief of the Army General Staff to the Commander-in-Chief of the Army on Active Service 1939-1945,* E27#1000/721#15062.

96. Gautschi, *General Henri Guisan,* 272.

97. Gautschi, *General Henri Guisan,* 272.

98. Kurz, "The Menace of Military Aggression against Switzerland during the Second World War," 19–20.

99. Senn, "Defending Switzerland," 11.

100. Halbrook, *Target Switzerland,* 166.

101. Halbrook, *The Swiss and the Nazis,* 85.

102. Senn, "Defending Switzerland," 13.

103. Senn, "Defending Switzerland," 13.

104. Senn, "Defending Switzerland," 13.

105. Keller, *Operations of the Swiss Army,* 66–67.

106. Keller, *Operations of the Swiss Army,* 70.

107. Senn, "Defending Switzerland," 14–15.

108. Gautschi, *General Henri Guisan,* 271.

109. Senn, "Defending Switzerland," 12.

110. Halbrook, *Target Switzerland,* 214.

111. Halbrook, *Target Switzerland,* 226.

112. Halbrook, *Target Switzerland,* 226.

113. Halbrook, *Target Switzerland,* 226.

Chapter 5
Switzerland was Prepared

> Of all the neutrals Switzerland has the greatest right to distinction. She has been the sole international force linking the hideously-sundered nations and ourselves. What does it matter whether she has been able to give us the commercial advantages we desire or has given too many to Germany, to keep herself alive? She has been a democratic state, standing for freedom in self-defense among her mountains, and in thought, in spite of race, largely on our side.
>
> —Winston Churchill, quoted in Willi Gautschi, *General Henri Guisan*

Mobilization

To protect its sovereignty Switzerland mobilized all of the resources of their nation for its defense. The Swiss spent billions of Swiss Francs before the war and spent another seven billion Swiss Francs during the war. Seven billion Swiss Francs in 1945 represents a financial commitment of greater than 38 billion in today's dollars.[1] At the height of mobilization in May of 1940, the Swiss mobilized more than 800,000 people, or 20% of the population, among the highest percentage of its population of any country during World War II. The Swiss Army leveraged every form of mobilization toward its war effort. They mobilized all categories of militia to fill the ranks of their field army including the *Auszug, Landwehr,* and *Landsturm* and they used large numbers of auxiliaries or *Hilfsdienst* in support of non-combat roles. The Swiss also later organized its youngest and oldest cohorts into the *Ortswehren* to further supplement and reinforce the field Army and auxiliaries. At their peaks, the *Ortswehren* and *Hilfsdienst* brought enormous amounts of manpower to bear for the Swiss: the *Ortswehren* numbered over 120,00 people in 1941 and in May of 1945 the *Hilfsdienst* numbered 270,000. In both categories, especially the *Ortswehren,* many were volunteers.

The speed and efficiency of Swiss mobilization efforts, set in place by policies developed from 1933 through 1941, also improved. During the first full-scale mobilization in September of 1939, mobilization of the entire Army required approximately one month. In the second full-scale mobilization of 1940, the entire army was mobilized and in position in a little more than four days. By 1943 mobilization during exercises suggest-

ed that the Army could be mobilized and deployed into the Redoubt in less than three days, well ahead of benchmarks set by General Guisan to have the entire army positioned by the fourth day of a potential invasion.[2]

The Swiss Army did not limit their mobilization efforts to only personnel. They also mobilized the property of their citizens, commercial enterprises, and other public institutions including vehicles, infrastructure, and buildings. When war broke out, the Swiss Army took control of civilian communications and transportation networks, medical facilities, and regularly requisitioned facilities to house, billet, and sustain its forces. The Swiss Army also relied on requisitioned vehicles for its army with some 40% of all motor vehicles in Switzerland being made available for use in the war effort. One of the most remarkable aspects of Swiss requisitions was the broad support it enjoyed from the Swiss population. Seldom did a company quartermaster or supply officer in the Swiss Army need to brandish the requisition law to a Swiss citizen to compel compliance. Instead, the Swiss people willingly cooperated.

In all forms of mobilization and requisition, the Swiss military and government capitalized on the passions of the Swiss people including nationalism and anti-Nazi sentiment. The Swiss developed robust policies and procedures to ensure that no national resource was left untapped. They created policies and systems to rapidly absorb and integrate large number of mobilized people into the field army and into auxiliary components. In the case of the *Ortsweheren,* the Swiss improvised and rapidly organized and equipped an entire new category of mobilization, in essence creating a new component within the military structure.

The Germans understood that the Swiss population would be against a German attack and occupation and that certainly factored in their intentions to threaten Switzerland. The *Abwehr* and other German intelligence services stated in 1940 that: "The entire population is against us, there is no doubt about that" and "We have reports that the Swiss government has ordered the arming of the civilian population and the drafting of those not fit for military service into an auxiliary."[3] The Swiss spirit of national resistance and support for their government is not surprising given their position in the heart of the conflict as the Swiss had an unobstructed view of the events unfolding around them in Europe. The Swiss people thoroughly understood the alternative to a lack of preparation and willingness to contribute—one of domination and devastation by the Nazis. Consequently, they fervently supported their government's war efforts. Small nations today seeking to resist or deter the invasion or occupation of their nation by an outside power should account for a potential swell of popular support

for national resistance in the event of a conflict. The Baltic and Eastern European states in the backdrop of the 2022 Russo-Ukraine conflict come to mind as a relevant example. Many Eastern Europeans are witnessing similar devastation to what the Swiss observed during World War II being wrought upon their Ukrainian neighbors in the news and from the many Ukrainian refugees that have fled west.[4] Contingency policies for leveraging national will and incorporating all of the resources of a state into a nation's war effort in a fair and just manner should be deliberated, planned in advance, codified into law, and exercised.

Many commercial and industrial operations have overlap with military logistics operations, especially at the strategic level, therefore the facilities and equipment of a nation's economy such as trucks, construction equipment, and hotels for lodging have potential utility for the military during wartime. These types of capabilities, which are often readily available in the commercial sector at scale can address many shortfalls in military capacity, freeing up military assets for direct combat logistics and other more dangerous operations. Rear area operations, where risk is minimized, such as transporting supplies is an especially relevant capability where mobilized auxiliaries or contractors can make important contributions to a nation's war effort.

Force Structure

The second area where Swiss logistical preparation factored into Switzerland's success was in the Swiss Army's logistics force structure. The Swiss Army's reorganization from 1936 to 1938 during the *Truppenordnung* developed a highly diversified, specialized, and robust logistics enterprise that could meet the needs of its militia army and complimented their unique environment and the various strategies that Switzerland adopted.

The Swiss Army achieved this by accepting trade-offs with their combat forces. First, the Swiss Army's logistics capability experienced a greater proportional growth than the combat units highlighting the emphasis they placed on logistics and its importance in their operational designs.

The second trade-off they made involved motorization. The Swiss Army did not have the resources, even after mass requisition of civilian vehicles, to motorize a critical mass of its combat elements to fight mobile warfare and thus elected to optimize its logistics elements through motorization. The Swiss Army was expected to fight in fixed defensive positions in mountainous terrain which is better suited for light infantry so mass motorization of combat units was unnecessary. Therefore, large numbers of

vehicles were available for support and logistics roles. To maximize their support to an infantry-based army, the Swiss high command established a versatile and centralized logistics structure and placed most logistics elements in a general support relationship with its field army. The Swiss Army could flexibly allocate its logistics assets to the greatest point of need during a crisis. By not tying its logistics assets to the division level and retaining them at the army level, the Swiss could also maximize the utilization of its logistics assets for peace-time preparation, such as transporting supplies to the Redoubt, without significant staff friction.

The Swiss decisions for robust, centralized, and motorized logistics were also uniquely tailored to their mobilization system. While the light-infantry focus of the Swiss Army meant combat elements did not need many vehicles, the Swiss mobilization system needed them to provide massive lift capability. The Swiss Army persistently had large upfront requirements to move equipment and personnel during mobilization, de-mobilization, and re-mobilization. Here, motorized logistics elements played an important role and excellently augmented and complimented rail during mobilization, especially as the Swiss Army moved into the Redoubt. Using its transportation elements the Swiss Army could quickly move mobilized militia units from their mobilization points to their assigned areas.

What resulted was a Swiss logistics system that rivaled that of the successful contemporary armies of the time. For example, the German *Wehrmacht* only fielded three dedicated transportation regiments for strategic logistics and transportation.[5] The amount of motor vehicle transportation assets assigned at the Swiss strategic level was proportionally higher than that of the German Army despite the Swiss having a fraction of the national resources available and after Germany scavenged additional motor-vehicles from the highly industrialized European nations it conquered.

The Swiss experience during World War II offers lessons on force design and prioritization. The Swiss skillfully built an army that was tailored to its circumstances which minimized its weaknesses and amplified its strengths. Small nations today should look for areas where they can similarly spend their limited resources to gain asymmetric advantages. This can only be done by taking a detached and impartial view of the operational environment. Many of the emerging ideas regarding Tawain and implementing high-tech and "distributed, survivable, and affordable" posture that focus on countering airborne and amphibious assaults appear to be supported by the concepts in the Switzerland case.[6] As the Swiss did not attempt to compete in the realm of mechanized and armored warfare, so

too should other small states not compete in areas that do not make sense for its own bespoke national military strategy and unique circumstances. The Swiss model cannot be duplicated exactly with any expectation of success as the operational environment is not the same, however, nations like Taiwan should likewise examine its national strengths, including its technology industry and its island geography, to develop their force structure to support their unique defensive strategy as Switzerland developed its custom force structure that accounted for its national strengths.

Rearmament

Swiss rearmament was one of the most impressive accomplishments of Switzerland's preparation for World War II, especially given its small size and industrial base, limited resources, and political and geographic isolation. When World War II began, the Swiss arsenal was dismal, although better off than many other neutral nations, the only armament of note for the Swiss Army in 1939 was 80 105-mm modern artillery pieces and approximately 800 mortars and 800 field guns. Due to the reforms and rearmament efforts established from 1933 through 1941, the Swiss equipment and ammunition situation continued to improve in the second half of the war. By 1945, the Swiss had tripled the number of mortars they had and fielded 1,317 artillery pieces of 75-mm caliber and higher, including fortress guns and mountain artillery, almost doubling their field artillery capability from the beginning of the war.[7] Much of the growth in their artillery was in more modern pieces. The number of 105-mm cannons grew by 450% as the Swiss now had 360 of these pieces in their inventory. The most notable growth was in anti-aircraft and anti-tank capability. In 1939 the Swiss had virtually no anti-aircraft weapons and in 1945 they had almost 3,000.[8] The number of anti-tank weapons also grew substantially, increasing by a factor of six.[9] The inventory of small arms weapons also saw dramatic growth. In the period leading up to the war and during the conflict, they doubled the amount of machine guns from 15,000 to 30,000 and boasted another 27,000 automatic rifles and 2,000 flamethrowers.[10]

Magazine depth also enjoyed the same tremendous growth. By 1943, the Swiss Army calculated they had between 11 and 15 days' worth of artillery and anti-aircraft ammunition.[11] The quantity of small arms ammunition in the inventory was even better, in 1944 the Chief of Staff quipped that "even if only one out of every 1,000 shots is on target—assuming that fewer shots on target would be a disgrace for a country with a long tradition of marksmanship like Switzerland—we can kill one million enemies with our rifles and light and heavy machine guns."[12] Healthy small arms

stocks and mobilization requirements meant that Swiss soldiers were permitted to take home and maintain their rifles and 48 rounds per person.[13] Finally, the Swiss Army also boasted 513 aircraft in 1945, an almost threefold increase in aircraft from 1939. However, a nation cannot fight a war with weapons and ordnance alone. Stockpiles of medical supplies, spare parts, uniforms, and other supplies were more than sufficient for the needs of any variation of the Swiss strategy by the end of the war.

The preparation of defensive positions and construction of fortifications should also be viewed as a form of rearmament and represented an important component of Swiss strategy and preparation. Like producing weapons and ammunition, fortress construction requires considerable capital, raw materials, and manpower, especially skilled labor. The Swiss committed 657 million Swiss Francs to the construction of permanent fortifications during the war.[14] The bunkers and forts of the border defenses and Limmat Line, as well as the hardier fortresses of the Redoubt, were expected to both protect the Swiss Army and enhance their lethality. Switzerland's fortification efforts also greatly impacted their potential adversary's perception of Switzerland's military capability. Nearly every war plan the Nazis made included assessments that assigned respect and appreciation to the combination of Switzerland's fortifications and terrain.

The Swiss Army's capacity to defend itself should not only be assessed by examining its stockpiles of ammunition, equipment, and supplies in a quantitative sense. The familiar, harsh, and easily defensible terrain combined with the extensive fortifications prepared by the Swiss certainly would have increased the effectiveness of Swiss ammunition and extended the life of Switzerland's supplies and equipment. The chokepoints, prepared positions, and excellent fields of fire provided by the Alps and the alpine fortifications would have amplified the potency and effectiveness of each round fired as rugged terrain and well-prepared defensive positions have throughout the history of warfare. A 1944 German Army High Command assessment highlights the interplay between the strong Swiss logistical situation, the rugged terrain, and Swiss fortification efforts:

> The Swiss Army has sufficient modern weapons and equipment. Its armored force is weak, but armor won't be a factor in this terrain. The Swiss plan of operation provides for a vigorous defense of the mass of the field army in the fortified high Alps (National Reduit). Originally, the fortifications along the country's border were designed to be held by weaker forces only until the assembly in the Reduit had been completed. According to newer plans, however, it appears we would have to expect vigorous

> resistance along the borders too. There are also some significant fortifications in the area between the border protection zone and the high Alps (the Baden-Zurich defensive line). The access to the high Alps are protected in the west by the fortifications of St. Maurice (where the Rhone flows into Lake Geneva), in the south by the St. Gotthard fortifications, in the east by the fortification at Sargans.[15]

The difficult terrain would have also placed the Swiss Army in a position were adaptability and substitution could be most effective. Emplaced obstacles and canalizing terrain would have enabled tactics, techniques, and procedures using other forms of ammunition to be effective against German armor outside of standard anti-tank weapons which the Swiss lacked. For example, the Swiss fully intended to use explosive traps against tanks and small arms ambushes, and against dismounted crews who were trying to navigate through prepared obstacles in the narrow valleys of the Alps.

The same terrain and fortifications that economized lethality would also have mitigated many of the destructive effects of the enemy and protected Switzerland's supplies and equipment. As previously discussed, most of the artillery, anti-aircraft, and anti-tank weapons in the Redoubt were jealously guarded and protected in casemates, turrets, and bunkers reinforced with concrete and steel. Supplies, especially ammunition, were also protected underground in tunnels and bunkers and hidden in the steep valleys. Therefore, attrition imposed by the enemy on Swiss supplies and equipment would have been mitigated. These circumstances highlight the close alignment between the Swiss strategy and the Swiss logistical situation. Switzerland's decisions to fight in the Alps, build fortifications, and the intensive logistical preparation to stockpile the Redoubt all complimented each other and resulted in a sum that was greater than its component parts.

In modern times, Poland serves as an excellent example of thoughtful and early rearmament. After the 2022 invasion of Ukraine by Russia, Poland has taken rearmament very seriously. It has placed large orders for tanks, infantry fighting vehicles, and more sophisticated weapons often buying from a variety of nations. For example, while Poland has purchased a substantial number of M1 Abrams tanks from the United States, it has also purchased large quantities of K2 tanks from South Korea because of faster production and delivery rates.[16] Poland has also coordinated to bring the necessary logistical infrastructure such as tank repair facilities to support this equipment within its borders.[17] While it already implements an innovative strategy to import weapons and equipment faster, as

the Swiss did with importing partially complete weapons which they later finished, the Polish should not discount the value of fortifications in rearmament efforts. Fortification of strategically significant areas and hardening their logistics infrastructure offers one possible area for improvement. One area for consideration regarding fortification is the Suwalki Gap, a key transit route, between Russia's partner, Belarus, and the Russian exclave of Kaliningrad. In many ways, the Suwalki Gap represents a strategically significant area much like the Simplon and Gotthard passes did for Switzerland. By fortifying these coveted areas as a part of a rearmament strategy it may have a similarly dissuasive effect against the Russian Federation that fortifying the alpine passes had with the Germans in that it adjusts the risk calculus for the aggressor. In addition to the obvious benefits of being a force multiplier while on the defense in areas where fighting is expected, fortification techniques can also be used to harden the logistics infrastructure and make the sustainment enterprise more resilient. Supply depots and maintenance facilities across Poland are excellent candidates for hardening against long-range fires.

Conclusion

Many factors contributed to Switzerland remaining neutral throughout the war including diplomatic, political, and economic factors, however, Switzerland's military and logistics preparation from 1933 through 1941 was equally, if not more, important to protecting Switzerland's sovereignty. The three central themes that emerged in Switzerland's logistical preparation that laid the foundation for its success in preparing for war were: (1) the Swiss mobilized and marshaled all the resources of their nation for their war effort; (2) they began rearmament early and sustained and adapted their rearmament efforts based on the resources available; and (3) they designed a logistics force structure that aligned with and complemented their army and its objectives.

These themes continue to remain important today. At the time of this writing, War on the Rocks released a podcast titled "Fortifications, Manpower, and Munitions in Ukraine's Daunting Year Ahead" with Michael Koffman and Ryan Evans about Ukraine's war effort which echo many of the topics and themes in this manuscript and highlight the gravity of aligning preparation and logistics policy with strategy in war.

Perspectives differ regarding when Switzerland was prepared for a potential war. Senn states: "In general, foreign observes accurately observed the gradual improvement of the Swiss instrument of defense. Yet it reached a level adequate to combat demands only in the last third of

the war when the threat to Switzerland's continued existence had already diminished."[18] However, from a logistics perspective, Switzerland's logistics preparation benchmarks were met much earlier. In fact, there is substantial evidence to suggest that Switzerland's logistics preparation was in large part complete by the end of 1941. From a rearmament standpoint: suitable substitute munitions and doctrinal adaptation were in place during the Limmat Strategy before 1941, the Swiss began decreasing ammunitions production in 1941, and multiple lines of defense, including the Redoubt and its formidable fortresses, were largely complete and stocked by early 1942. From a mobilization and force structure standpoint preparations were also complete; by the end of 1941 the entire Swiss Army and its supporting logistics enterprise had been retooled to support rapid mobilization and sustainment operations within the Redoubt.

German assessments also support this claim. Here SS General Herman Böhme's 1943 assessment in "Thoughts Concerning the Defense Situation in Switzerland in the Event of a German Armed Intervention" is important as it systematically analyzed the Swiss preparation from 1938 to 1943.[19] In this document Böhme acknowledges the success in innovation, adaptation, and resilience across Swiss rearmament, mobilization, and army reorganization.[20] While this document was written in late 1943, many of the specific assessments and references Böhme makes regarding Switzerland's logistical preparation were in place prior to 1941. However, both Senn and Böhme were critical of the Swiss in other areas such as training. While it may remain true that Switzerland was still not completely ready for an invasion until 1943 because of training shortfalls and a damaged spirit of national resistance that was only beginning to heal in 1941, logistics preparation was largely complete. The logistics enterprise had played its part in demonstrating to would-be aggressors that the Swiss Army was capable of long-term resistance, inflicting heavy losses, and damaging the prestige of any attacking army.

What is most striking regarding Switzerland's logistics preparation is how well the Swiss aligned these efforts to an effective military strategy. The Swiss strategy often drove logistics preparations; however, the Swiss leadership also wisely acknowledged logistical realities and adjusted the strategy to account for the logistical constraints and shortfalls when appropriate. Thus, the relationship between Swiss strategy, military planning, and all preparation efforts were integrated, coherent, and synergistic which maximized Switzerland's military readiness and ultimately contributed to the Swiss capacity to enforce their sovereignty. There were no less than five different Nazi war plans against Switzerland but none were ever ex-

ecuted, in large part because of Swiss military preparation. Through their preparation the Swiss did not allow a vacuum in military power to exist in their territory and did not present themselves as easy prey for would-be conquerors. Conversely, if Swiss preparation and logistics efforts during World War II had been lacking, the belligerent's calculus may have been different, and they may have attacked Switzerland. Ultimately, Switzerland's determination, preparation, and logistical foresight helped shape the historical outcome or "foregone conclusion" known today—no bomber's plied their trade over Swiss skies seeking Swiss targets, no battles raged on Swiss soil, no Axis occupiers brought the Holocaust to the Swiss people, and the Swiss retained their sovereignty and democracy.

Notes

1. “Consumer Prices – Indexation,” Swiss Federal Statistical Office, accessed 20 April 2024, https://www.bfs.admin.ch/bfs/en/home/statistics/prices/consumer-price-index/indexierung.html.

2. Keller, *Operations of the Swiss Army,* 72.

3. Halbrook, *The Swiss and the Nazis,* 110–111.

4. At the time of this writing, the UNHCR reports that over 6 million Ukrainian refugees are recorded in Europe with a substantial number of them having fled to eastern European nations. United Nations High Commission for Refugees (UNHCR), “Countries Featured in the Refugee Response Plan,” Operational Data Portal, accessed 30 March 2024, https://data.unhcr.org/en/situations/ukraine.

5. Van Creveld, *Supplying War,* 144.

6. James Timbie and James O. Ellis, “A Large Number of Small Things: A Porcupine Strategy for Taiwan,” *Texas National Security Review* 5, no. 1 (Winter 2022): 83–93, https://tnsr.org/2021/12/a-large-number-of-small-things-a-porcupine-strategy-for-taiwan/.

7. Gautschi, *General Henri Guisan*, 561; Senn, “Defending Switzerland,” 3.

8. Gautschi, *General Henri Guisan,* 551; Senn, “The Swiss Army Was Ready,” 63.

9. Senn, “The Swiss Army Was Ready,” 63.

10. Senn, “Defending Switzerland,” 3.

11. Gautschi, *General Henri Guisan,* 561.

12. Gautschi, *General Henri Guisan,* 561.

13. This practice has only recently been partially abolished. In 2007, Swiss policy changed and discontinued the practice of issuing 50 rounds of ammunition for storage at home, however, rifles are still issued and stored in private homes. “Soldiers Can Keep Guns at Home but Not Ammo,” SWI Swissinfo.ch; Gautschi, *General Henri Guisan,* 561.

14. Senn, “The Swiss Army Was Ready,” 63.

15. Halbrook, *The Swiss and the Nazis,* 253–254.

16. Brad Lendon, Yoonjung Seo, and Joseph Ataman, “Poland to Buy Hundreds of South Korean Tanks, Howitzers after Sending Arms to Ukraine,” CNN, 19 September 2022, https://www.cnn.com/2022/07/27/asia/south-korea-poland-tanks-howitzer-ukraine-intl-hnk-ml/index.html.

17. Nicholas Fiorenza, “Poland Receives First Company of M1A1 Abrams Tanks,” *Janes,* 3 June 2023, https://www.janes.com/defence-news/news-detail/poland-receives-first-company-of-m1a1-abrams-tanks.

18. Senn, “The Swiss Army Was Ready,” 64–65.

19. Halbrook, *Target Switzerland,* 194.

20. Halbrook, *Target Switzerland*, 196–197.

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