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GERMAN TACTICS IN THE "MICHAEL" OFFENSIVE MARCH 1918

A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements for the degree

MASTER OF MILITARY ART AND SCIENCE

by

PATRICK T. STACKPOLE, MAJ, USA
B.S., United States Military Academy, West Point, NY, 1981

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This study investigates the German "MICHAEL" offensive of 1918 to determine how the Germans achieved tactical success, yet failed to reach their strategic objective. The study covers the development of new German infantry tactics during limited offensive operations and conduct of the "elastic defense" on the western front. It investigates the development of artillery tactics on the eastern front, and the incorporation of these artillery and infantry tactics into larger scale offensives at Caporetto. The study describes the preparation of both the infantry and artillery units for the "Michael" offensive. The relationship between the infantry and artillery tactics combined with the British defense is the key to determine the causes for success and failure.

The German tactical system used in "Operation Michael" was a brilliant adaptation to the lethality of the World War I battlefield. The German techniques were superb tools for conducting a breakthrough of a defensive zone. However, the lack of German mobility following the breakthrough foiled the German strategic goal to envelop the British Army.

German techniques and lessons learned in this offensive have direct application to U.S. Army infiltration doctrine.

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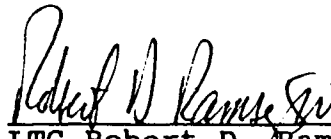
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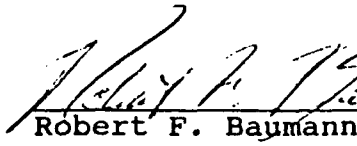
, Member
Robert F. Baumann, Ph.D.

Accepted this 4th day of June 1993 by:


, Director, Graduate Degree Programs
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ABSTRACT

GERMAN TACTICS IN THE "MICHAEL" OFFENSIVE: MARCH 1918 by MAJ Patrick T. Stackpole, USA, 126 pages.

This study investigates the German spring offensive of 1918 to determine how the Germans achieved tactical success, yet failed to reach their strategic objective. The study covers the development of new German infantry tactics during limited offensive operations and conduct of the "elastic defense" on the western front It investigates the development of artillery tactics on the eastern front, and the incorporation of these artillery and infantry tactics into larger scale offensives at Caporetto. The study describes the preparation of both the infantry and artillery units for the "Michael" offensive. The relationship between the infantry and artillery tactics combined with the British defense is the key to determine the causes for success and failure.

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CHAPTER 1

INTRODUCTION

In the early morning hours of 21 March 1918, the British trenches erupted with a preparation fire of unprecedented violence and efficiency. German guns bombarded British artillery batteries with a combination of high explosive and chemical rounds that made it practically impossible to man their guns. Throughout the depth of the British defense, the Germans pounded the trenches with heavy artillery fire. Despite a lack of registration, which would have telegraphed an assault, the fire was highly accurate. Columns of "Stormtroopers" armed with flame weapons and grenades assaulted immediately behind the rolling barrage. The "Stormtroopers" by-passed resistance and penetrated deeply to the rear of the British lines. By nightfall, the German lead elements had advanced nearly 10 miles on terrain near the Somme battlefield where the Germans stymied a British advance but two years before.[1]

How did the German infantry manage such success when the British had met such failure two years prior? How did they execute such a comprehensive fire support plan that stunned the defenders with its ferocity and accuracy without

registration? What methods did the Germans use to support the attack and maintain momentum?

The new German tactical doctrine, or "infiltration tactics," answers these questions. These tactics emphasized the squad as the maneuver unit.[2] Squads were to by-pass resistance and to continue to attack deep to the rear of the enemy positions.[3] The Germans organized the fire support plans to capitalize on surprise and shock effect. Extremely violent but short preparation fires culminated in a rolling barrage to protect the infantry advance.[4] Regular infantry formations followed the infiltration units to reduce by-passed strongpoints and to keep the spearheads supplied. The result of these innovations was a radical doctrinal change in tactics which came very close to breaking through the western front defense after years of stalemate.[5]

This doctrinal change did not occur quickly, nor did it have one inventor. Rather it was the combination of small unit tactics learned during the trench warfare on the western front, with techniques learned during the more open warfare of the eastern and Italian fronts. The new tactics convinced the German High Command (OHL) that a tactical change could provide the breakthrough they sought.

The genesis of the "infiltration tactics" can be shown through an examination of the attacks with "limited objectives" in the west, artillery tactics from the eastern and Italian fronts, and Ludendorff's influence. Combat on

the western front led to changes in infantry organizations and training of the individual "stormtrooper." The battles of Riga and Caporetto on the Eastern and Italian fronts demonstrated the effectiveness of these tactics on a larger scale. Ludendorff's contribution was to see the possibility of a strategic decision in the west, through an application of the new tactics.

German experience on the western front demonstrated the inability of linear formations of riflemen to overcome machine-guns and artillery simply through mass. At first, German units modified their skirmish line formations into squad columns simply to survive. The efficiency of the squad as a fighting unit was evident, and the Germans designated the squad as the basic fighting unit.[6] The Germans experimented with different infantry organizations to increase the firepower and mobility of the unit. Captain Rohr equipped his "stormtroop" units with heavy weapons and trained them in new tactics. Rohr's assault units were effective during the "limited objective" assaults in the west. OHL ordered stormtroop units formed in all armies on the western front.

The dominance of machine-guns and artillery on the Verdun and Somme battlefields quickly showed the Germans that tactics based upon mass formations of infantry were tantamount to murder. As the Allies deployed ever greater numbers of artillery batteries, the Germans found that even

holding deep defensive positions was inordinately expensive.[7]

Consequently, the Germans developed a defensive system which relied on depth, rather than stubbornly holding a forward trench. This system reduced casualties to artillery during bombardment, but demanded immediate counterattacks to regain lost ground.[8] The Germans formed counterattack units modeled after Rohr's assault units. The counterattack units worked well and were the cornerstone of the "elastic defense."[9] A major contribution was that the non-commissioned officers (NCO) received valuable leadership and tactical experience as they led the counterattack squads. The small unit techniques used during the "elastic defense" augmented the stormtrooper training. The combination was the basis for "infiltration" tactics and the organization of "stormtrooper" units in 1918.

At Riga and Caporetto, the Germans coupled the new infantry tactics with a comprehensive fire support plan and used them in larger scale operations, as opposed to trench raids. Mainly due to poor Russian fighting spirit, the battle of Riga did not validate many of the new infantry techniques developed in the trenches. It did reinforce the value of surprise, deep penetration of infantry, and attack of a weak spot.[10] The major contribution of the battle was the artillery tactics and the emergence of LTC Bruchmueller as an artillery commander. Bruchmueller's centralized fire

support plan was the key to success. He used a surprise, concentrated bombardment with massive use of gas, followed by a rolling barrage.[11] Control of the fires after the initial preparation was based on infantry speed. Bruchmueller designated signals to speed or slow the forward advance of the barrage.[12] The role of any specially trained assault units was minimal, but the theory of deep penetration unhinging the enemy defense was proven. Another contribution was the impression on Ludendorff, and OHL, that the new techniques were effective in large scale operations. Riga was a model for the success Ludendorff hoped to achieve in his March 1918 Offensive.[13]

Caporetto also demonstrated the use of the new artillery and infantry tactics in a large scale offensive. The German artillery pounded the Italians with a six-hour barrage hitting both the forward trenches and artillery positions.[14] The mixture of gas and high explosive was key to the overall suppressive effect.[15] Columns of assault troops followed by highly trained and fit mountain battalions penetrated the Italian lines in very rugged terrain. The result was a collapse of the Italian defenses and an end to the threat of the Austro-Hungarian armed forces. This battle proved to the German High Command the efficacy of "stormtroop" units when combined with the new artillery tactics.

Ludendorff realized in early 1917 that he must win victory in the west quickly or lose the war.[16] The American entrance into the war provided the Allies with a source of manpower and supplies that Germany could not match. The German High Command realized it could win the war only through the breakup of the alliance. The Germans' determined that attack of the French would not be decisive. As long as they still held British support, the French would retreat into the depth of their country and continue to fight. However, destruction of the British forces in France would lead to the decisive victory Ludendorff sought. Without British support, the French would collapse as well.[17] Through the new tactics and the poor British defensive posture, Ludendorff saw an opportunity to defeat the British in one stroke with a March 1918 offensive--"Plan Michael."[18] To execute this offensive and break the stalemate, Ludendorff had to retrain and reorganize his armies to use the new tactics and exploit weakness in the Allied defense.

The Germans responded to the need for units trained in infiltration tactics by forming special "attack divisions" from the ground up. In these units, every soldier was trained in "stormtrooper" tactics. The Germans held large scale rehearsals on objectives built to model British positions. The Germans gave the best food and equipment available to these special units. The OHL

withdrew all "attack divisions" from the Western front to rest and train for the spring offensive. The main problem was that large numbers of young, energetic volunteers were unavailable at this point in the war. The lack of manpower forced the Germans to man many of the divisions with older, more war-weary men. These men were not up to the standards found in the assault battalions formed earlier in the war. Nevertheless, Ludendorff believed that the divisions were skilled enough to spearhead his "Michael" Offensive.[19]

Drastic changes to the standard operating procedures of the artillery were necessary to prepare for the offensive. Artillery commanders still relied on long preparation fires and were very reluctant to give the infantry control of the rolling barrage. The idea of fire without registration was simply abhorrent.[20] The new techniques taught by LTC Bruchmueller demanded a short but violent preparation fire preceded by utmost secrecy. This meant that there would be no registration to give away the offensive. The Germans developed new techniques to identify the peculiarities of each gun, and combine them with current meteorological data to produce accurate fire without registration.[21] The Germans emphasized close coordination with the infantry, and designated signals to control the rate of the rolling barrage. Massive use of chemical shells, in concert with high explosive, enhanced the suppressive effects of the barrage.[22] Additionally, light

guns and mortars accompanied the assault units to attack machine guns or strongpoints beyond the range of the artillery. Bruchmueller and his staff taught these techniques to all artillery commanders. Although Ludendorff personally supported the new techniques, many artillery commanders did not fully support them due to ignorance and jealousy.[23]

The British defense was also a contributing factor in the success of the initial assault. The British had recently taken over large sections of French trenchline. Many of the French trenches were in disrepair.[24] Additionally, the British attempted to copy the German "elastic defense." According to this new doctrine, the defending unit should thinly man the front trenches, and hold counterattack forces in reserve. However, the British adopted the German defensive doctrine in name only. The British manned the front trenches with large forces, and held few counterattack units in reserve. The British did not designate new positions to accommodate the new defensive techniques. In most cases they British simply occupied old French positions, and many units were ill positioned to fire effectively. Another problem was that the German system called for initiative at the lowest level to facilitate immediate counterattack of any penetration. This was anathema to the British system of centralized control. The result was counterattacks that came too late or not at

all.[25] In the final analysis, the British copied the German techniques on the surface, but did not fully understand them.[26] Consequently, the British defense was not prepared for the onslaught that ensued on 21 March 1918.

The Germans initiated the "Michael" Offensive on 21 March 1918, with three armies: the 17th Army in the north, the 2d Army in the center, and the 18th Army in the south.[27] The zone of attack was a wide front between Cambrai and St. Quentin, near the Somme battlefield which witnessed the great British offensive of 1916. The first day's infantry objective was to penetrate 8000 meters and secure the British artillery positions.[28] The advance was to continue to penetrate deeply to cut lines of communication, rupture the British defense, and ultimately cut off their retreat to the coast.

The initial phase of the fire support plan went well. The Germans moved thousands of artillery pieces under conditions of utmost secrecy.[29] The artillery crews moved heavy guns to within a few hundred meters of the front to support suppressive fires in depth, and to support the advance without displacement. The German artillery fired without registration, which proved key to the surprise of the offensive.[30] The mixture of high explosive and chemical rounds was very effective in the overall suppressive nature of the fire support plan. In addition, the chemical rounds did not degrade trafficability nearly as much as high

explosive. After exactly five hours of preparation fire, the infantry advanced under the cover of a rolling barrage.

The rolling barrage began to outdistance the forward assault elements due to the fog and missed signals.[31] The advance soon outdistanced the ability of the artillery to displace batteries forward and supply them with ammunition. Although the fire support was initially successful, the artillery commanders could not provide responsive fires to maintain the momentum of the attack.

Due to British resistance and fire support problems, only units in the southern part of the zone (Hutier's 18th Army) reached their objectives on the first day. This gave the British time to move reserves and bolster the broken front line units. The terrain, with its many small villages, hedges, and streams, gave the defenders ready-made obstacles and defensive positions. The trench mortars and batteries that accompanied the infantry could not provide the fires needed to destroy these strongpoints quickly. The lack of fire support forced the infantry to mount an assault on each position which ultimately cost the Germans many casualties, and their momentum.[32] Despite the difficulties, the Germans pushed a salient 40 miles deep in the British lines by the time the offensive ended on 5 April 1918.[33]

The "Michael" attack was strategically unsuccessful mainly due to a lack of mobility to sustain the momentum of the attack. The Germans simply could not move infantry and

artillery units forward fast enough to exploit the breakthrough. However, the new infantry and artillery tactics were successful, and produced a penetration unprecedented on the western front. The key to the German tactical success lay in the synergistic effect of the infantry and artillery tactics, combined with a weak British line. As the attack moved forward, the artillery support could not keep up, the infantry tired, and British reserves bolstered their defense.[34] The infiltration tactics were a superb weapon for the breakthrough, but the Germans needed a new solution for the exploitation force.

The experience of the Germans during the "Michael" Offensive has application to current U.S. Army doctrine. According to U.S. Army doctrine, in an infiltration attack the assaulting unit relies on stealth rather than fire to make the penetration through enemy lines.[35] The infiltrating unit maintains radio listening silence and uses indirect fires sparingly (usually only as a deception). The unit does not maintain its lines of communication, and often suspends supply and casualty evacuation until mission completion. This method assumes significant risk as the commander releases his squads and hopes he will link up with them at the objective.

The German experience suggests that much of the U.S. Army's infiltration doctrine is not feasible, especially regarding stealth, the depth of the infiltration, and the

selection of soldiers. A modified doctrine to incorporate some of the German lessons would result in a more effective infiltration attack.

Endnotes

[1]Bruce I. Gudmundsson, Stormtroop Tactics, Innovation in the German Army, 1914-1918 (New York: Praeger Publishers, 1989), 165.

[2]Timothy T. Lupfer, The Dynamics of Doctrine: The Changes in German Tactical Doctrine During the First World War, (Fort Leavenworth: Combat Studies Institute, 1981), 43.

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[5]Martin Samuels, Doctrine and Dogma: German and British Infantry Tactics in the First World War, (New York: Greenwood Press, 1992), 2.

[6]Lupfer, 43.

[7]Ibid., 7.

[8]Samuels, 72-75.

[9]Lupfer, 43.

[10]Gudmundsson, 121.

[11]Ibid., 117.

[12]Ibid., 115.

[13]Ibid., 121.

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[15]Ibid.

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[20]Samuels, 1.

[21]Gudmundsson, 161-162.

[22]David T. Zabecki, "Colonel Georg Bruchmueller and the Evolution of Offensive Fire Support Tactics, 1991(?)" TMs [photocopy], p.97 Combat Studies Institute, Fort Leavenworth, KS.

[23]Zabecki, 95-96.

[24]Samuels, 113-114.

[25]Ibid., 128-129.

[26]Ibid., 135-136.

[27]Gudmundsson, 163.

[28]Ibid., 162.

[29]Zabecki, 95.

[30]Ibid., 95-96.

[31]Gudmundsson, 164.

[32]Ibid., 167.

[33]B. H. Liddell Hart, The Real War 1914-1918 (Boston: Little, Brown and Company, 1930), 398.

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CHAPTER 2

EARLY TACTICAL DEVELOPMENT

The genesis of the new German tactics can be shown through an examination of unique combined arms formations (Stormtroops) designed for counterattacks and raids during defensive operations in the west, and in the conduct of the German defense in depth. The battle of Riga was the proving ground for the artillery organization and techniques that would form the perfect compliment to the new infantry tactics. The battle of Caporetto was the debut of specialized infantry formations used to spearhead deep penetrations, and demonstrated the efficacy of the new tactical doctrine in large scale operations. Based on his personal interest in the "Stormtrooper" units on the Western front, and success at Riga and Caporetto, Ludendorff saw the possibility of a strategic decision in the west through the application of the new tactics to achieve a strategic breakthrough.

The German Army began the world war with a tactical doctrine which emphasized the offensive. The Germans were not alone in this approach, as both the British and the French had similar doctrines.[1] The Germans, although not not as insistent as the French that a soldier's offensive

spirit would prevail despite the defensive fire, did not fully realize the impact of massed artillery and machine-guns on linear infantry formations.[2] The Germans forgot or ignored the harsh lessons of the Franco-Prussian and Russo-Japanese wars which demonstrated the folly of closely packed ranks of soldiers pitted against modern firepower.[3] However, the Germans were forced by heavy casualties to learn that the psychological and moral strength gained by offensive action does not negate the effects of machine-gun fire and shell splinters.[4] The Germans needed a tactical solution to overcome the impact of modern firepower.

The German infantry formation used in 1914, according to The Drill Regulations of 1888, was a linear formation with the company commander out front and NCO's in the rear (to push any stragglers forward). This formation maximized infantry rifle firepower and enabled control of the formation by the officers.[5]

This infantry doctrine lasted until the 1st Battle of Ypres where British machine-guns and sharpshooters mowed down the German lines. On November 11, 1914 the Division Winckler attacked the Ypres salient with the following result:

> ...the Guard regiments deployed in their old-fashioned skirmish lines with the sergeants behind the tightly packed rows of guardsmen "to encourage those who might otherwise stay back" and began to move forward. British artillery, rifle fire, and, in a few places machinegun fire, tore gaps in the advancing ranks....One hundred meters from the

> British trenches the attack started to fall apart. At 50 meters, the thick skirmish lines had been reduced to groups of 20 or 30 men following whatever officer remained alive.[6]

The modern rifle and machine-gun rendered the Drill Regulations of 1888 obsolete. The Germans were forced to look for a new solution to the tactical advantage of the defense.

One possible solution was to use massive amounts of indirect fire to obliterate the enemy position prior to infantry occupation. However, in a war of material (i.e., mass quantities of shells and guns), the Germans were at a significant disadvantage due to Allied industrial power and the British naval blockade.[7]

It was obvious that linear formations were suicidal when opposed by modern weapons. As the infantry broke into smaller groups, firepower was severely degraded. A solution was needed that would decrease the vulnerability of the infantry unit, while simultaneously increasing its firepower. Accordingly, the Germans fielded new weapons, developed new infantry tactics, and emphasized coordination with supporting arms. The final results of these changes were "Stormtrooper" units with distinct organizations, weapons, tactics, and training.

Stormtroops

On March 2, 1915, the OHL ordered the formation of a special assault detachment in the 8th Army Corps for the

purpose of developing tactics for crossing "no mans land," and opening a gap in the enemy trench. The detachment consisted of a headquarters, two Pioneer (engineer) companies, and a battery of lightweight cannon (37 mm). The detachment, commanded by a Pioneer officer, Major Calsow, experimented with techniques to use the lightweight cannon to neutralize enemy positions and machine-gun nests.[8] Support and security for the cannon were provided by pioneers moving moving with the guns and protected by experimental armored shields. After an initial preparatory fire, the cannon would be manhandled across "no man's land" through lanes cleared by the armor protected pioneers. The unit would then attempt to penetrate the Allied position firing the cannon as necessary on positions which held up their advance. The cannon battery and pioneers were followed by infantry who provided cover fire and cleared the enemy positions.[9]

This technique was never combat tested, primarily because the unit was never employed as a combined unit. However, sections of pioneers with their individual cannon were employed in support of other units. This experience brought out deficiencies in both concept and equipment.[10] The slow moving guns were highly vulnerable to all forms of fire. Once fired, the large muzzle flash drew the attention of the enemy artillery, much to the chagrin of the supporting pioneers.[11] The armored shields drastically

slowed individual movement, and provided little protection from enemy fire.[12] The unit did not have the speed and shock effect envisioned by the original concept.

The greatest criticisms of the pioneer, "Storm Detachment," were leveled at its commander. Major Calsow either did not have faith in the concept, or did not properly understand the new tactical system enough to make it work.[13] In October of 1915, he was replaced with Captain Rohr, an infantry officer from a Guards Rifle Battalion.

Captain Rohr had experience with Guards and Jager battalions. As a rule, these units were more heavily armed than standard rifle battalions.[14] Rohr was comfortable with the integration of cannon, machine-guns, and other special weapons into infantry units. There is evidence to suggest that he was already commanding an ad hoc "assault company" in his Guards battalion at the time of his assignment.[15]

Under Rohr, the assault company enjoyed combat success spearheading assaults for line infantry regiments. After successful service at Verdun, the OHL was convinced of the effectiveness of the new unit and increased it to battalion size on 1 April 1916.[16] The basic unit organization was as follows:

One Headquarters consisting of 10 officers and 68 men (later reduced to 10 officers and 32 men as the war progressed and replacements became scarce).

One to five Stormtrooper companies fielding 5 officers and 263 men (also reduced later in the war).

One or two Machine-gun companies which consisted of between six and twelve guns. They were manned with 4 officers and 85 men (increased up to 135 depending on the number of guns in the company).

One flamethrower platoon attached from a supporting engineer battalion consisting of between four and eight man-packs.[17]

One infantry gun battery with between four and six specially mounted guns and a compliment of 80 men.

One mortar company of eight mortars manned by 2 officers and 108 men.[18]

The Storm Battalion consisted of approximately 1400 men, and fielded weapons which would normally be found in supporting units. This combined arms approach to organization was unusual at the time.[19] However, it was this approach of mutually supporting weapons which provided fire support to the Stormtroop Battalions after they moved beyond the range of supporting artillery.

The infantry gun battery gave the attacking forces the ability to destroy enemy field guns and machine-guns which were missed by the artillery preparation The original 37mm gun, too light for the task, was replaced with mountain howitzers or captured Russian 76.2 mm guns (later replaced with the German 77mm Feldkannone '16).[20] The carriages of

the guns were modified to lighten the carriages, and the resultant weapon gave the Germans the firepower to overcome hardened positions deep in the Allied defense. A major remaining problem was that the guns still had to expose themselves to use direct fire, thus becoming targets themselves.[21] The solution was to support them with mortars to provide suppressive fire.

The standard German mortar, a 76mm weapon, fired a 10 lb projectile 1,312m.[22] The relatively light weight of the weapon made it easy to transport. Its high angle fire allowed its employment from covered positions. With its great splinter effect and the efficiency of high angle fire against dug in positions, the mortar covered the infantry guns as they fired.

Within the stormtrooper companies themselves, additional fire support was supplied with another pair of complementary weapons, the grenade firer and the machine-gun. Grenade firers were two-man portable devices which could throw a 4 lb grenade to 300m with excellent accuracy. The Germans fielded several machine-guns, constantly reducing the weight of the weapon to increase its portability. The Bergmann gun (25 lbs, belt fed, 400m effective range) was also produced as a lightweight automatic weapon suited for section level use.[23]

At the lowest level, the assault squads modified their personal weapons to meet their unique situation. The

squads made excellent use of the hand grenade as a close quarters weapon. Many different hand grenade designs were produced (i.e., concussion, fragmentation, impact and delay fusing).[24] As the standard infantry rifle was too unwieldy in the trench assault, a shortened carbine model was produced. This carbine, in concert with various handguns and knives, became the Stormtrooper's personal weapon.[25]

The infantry guns supported by the mortar gave the storm battalion the capability to provide its own fire support following the penetration of an Allied position. At a lower level, the grenade firer and the machine-gun provided the close in firepower needed to close with the enemy position. The Stormtrooper's individual weapons gave him the maneuverable close combat tools necessary to clear trenches quickly, with minimal individual exposure. The organization and equipment of the storm battalions were designed to support the infantry advance beyond the fan of supporting artillery fire. The new weapons in the infantry formations replaced much of the firepower lost when they abandoned the linear formation.

Rohr experimented with tactics to maximize the effectiveness of the new weapons and organization. The attack technique that Rohr developed consisted of four major parts: initial bombardment, reconnaissance patrols, assault by stormtroop squads, and exploitation by following line infantry (Figure #1).

The initial bombardment was not designed to destroy all enemy resistance. Its main goal was suppression and isolation of enemy positions from reinforcement.[26] The infantry guns and the mortars might join in the preparatory fire, or be saved for later use during the assault. The preparatory fire was concentrated and short. Its main goal was to suppress the enemy positions until the stormtroopers could get close enough to destroy them with their own organic weapons.

Following the bombardment, reconnaissance patrols (one nine man patrol per company sized unit) would be dispatched to probe for gaps or weakly held enemy positions. Their mission was not to fight but rather to provide information to the advancing stormtrooper squads. These reconnaissance patrols were often manned with soldiers from regular rifle companies following the stormtroopers.[27]

The assault squad, which followed the reconnaissance patrol by 200 to 250 meters, consisted of nine men from the stormtrooper company, supported by a light machine gun team and a grenade firer crew. Often a two-man flamethrower team would augment the squad along with a few extra infantrymen to carry additional ammunition and grenades. The assault squad, primarily armed with grenades, would attack the weak positions reported by the reconnaissance patrol, reduce the position, and continue to the designated limit of advance.[28]

The supported line infantry company and the heavy weapons would follow the assault squads by 150m. They would exploit the gaps in the line created by the assault squads and guard the flanks of the penetration from counterattack. Eventually, the pockets of resistance would be eliminated by envelopment and assault from the flank and rear.[29]

Rohr conducted live-fire training exercises using the new tactics. Pioneers constructed training objectives behind the lines to the dimensions of Allied trenches. The assault squad conducted extensive rehearsals with live-fire, to include supporting artillery, prior to any attack.[30] Squad independent movement was demanded, and the NCO in charge of the squad was empowered to made battlefield decisions.[31]

This harsh, exacting training took a toll on the soldiers, and many could not meet the physical requirements.[32] Nevertheless, it was such training which gave the assault squad the confidence in their supporting artillery and individual weapons. Most importantly, it gave NCO's the confidence to become battlefield leaders. The tactics were totally dependent on initiative at the squad level. Without a confident NCO leading the assault squad, the new tactics were doomed to failure.

Rohr tested his new tactics in battle on January 10, 1916. The objective was a ridge in the Vosages mountains named the Hartmannsweilerkopf. French forces on the ridge

had successfully defended against elite Jager troops since Christmas 1914. Rohr's detachment led two regiments into the enemy positions and cleared the objective with minor casualties. Rohr's organization, weapons and tactics had proven themselves.[33]

To inculcate the rest of the German Army with these new concepts, Rohr had been running training courses for other units since December of 1915.[34] After Ludendorff assumed de facto control of the German army in August 1916, he visited Rohr's unit and observed a demonstration of the new tactics. Based upon that experience, Ludendorff demanded that Rohr's tactics be adopted through the German Army.[35] On 23 October 1916, Ludendorff ordered a Storm battalion formed in every army on the Western front.[36]

Another major factor in the development of the new tactics was a result of the German adoption of the "elastic defense." in 1917. Many of the same offensive techniques developed by Rohr were necessary to support the immediate counterattacks required by the new defensive system.

Following the Somme campaign, the Germans realized that they could not maintain the casualty rates suffered fighting from their current defensive posture. In that single battle, the Germans lost 465,000 against the combined allied losses of 623,000.[37] German reluctance to yield any ground made their forward trenches a graveyard under the tremendous impact of Allied artillery fire. The Germans did

not have the industrial power to respond in kind.[38] They needed a new defensive system which would neutralize the allied firepower advantage.

Elastic Defense

On 1 December 1916, Ludendorff issued his new defensive guidance in a textbook called Conduct of the Defensive Battle. The booklet was essentially the product of two General Staff officers, Colonel Bauer and Captain Geyer.[39] The text introduced the new German defensive doctrine, or "elastic defense" (Figure #2).[40]

The "elastic defense" called for an outpost zone, with a depth of 2000 meters or more (depending on terrain), 500-100 meters in front of a main defensive zone. The outpost zone, thinly held, mainly served to slow the enemy advance and provide early warning. The main line of resistance was positioned on a reverse slope, if possible, to hide it from enemy view. The main line was organized around squad strongpoints in great depth rather than successive trenchlines.[41] The system was designed to induce the main enemy barrage to fall on the largely undefended outpost zone. The enemy would easily penetrate the outpost zone thinking that it had been destroyed by artillery. The enemy would then be surprised by the main defensive zone firing from reverse slope positions. At this point the

enemy would be beyond its own artillery fan and would be destroyed by German artillery fire and counterattacks.[42]

The key to the defense was the counterattack. The most suitable units to perform that mission were the stormtroop detachments and battalions; they often became designated counterattack units.[43] However, it was not just the stormtroop units that conducted counterattacks. Leaders at all levels were empowered with the authority to counterattack immediately, or to fall back as necessary. The squad sized element was the key to the defense and the NCO in charge had the authority and was expected to make battlefield decisions.[44] The defensive system did provide valuable leadership training and offensive experience for a vast number of NCO's. That experience would be vital when large numbers of stormtroopers would be needed for the March 1918 offensive.

By 1917, the only use of the new tactics in the west had been on "attacks with limited objectives" and counterattacks. While successful, such attacks were relatively small; not the scale required to breakthrough and bring victory in the west. However, the eastern and Italian fronts offered opportunities for a war of maneuver. The new infantry tactics were coupled with new artillery tactics developed on the eastern front, and incorporated into large offensives. The battles of Riga and Caporetto demonstrated the new infantry and artillery tactics in large offensives,

and provided a rehearsal and proving ground for the concepts used in the "Michael" attack in 1918.

Riga

The Germans needed to secure Riga to protect the supply lines to the 8th Army. Riga was a small Baltic port city which guarded the bridgehead across the Dvina River. The river flowed east to west and marked the Russian front line. This sector was the extreme north of the Russian line. The bridgehead was close to the main road and rail networks which supplied the German 8th Army. In an attempt to reduce the threat to their supply lines, the Germans had placed continuous pressure on the bridgehead since 1915, with little change in the situation (Figure #3).[45]

The dispositions in September 1917, were: the Russian Twelfth Army under General Vladislav N. Klembovsky held both the city and the line of the Dvina to Jakobstadt with ten and one half divisions. The Germans held the south bank of the river with seven and one half divisions of the German 8th Army, commanded by General Oscar von Hutier. The 8th Army was spread over 130 km to the city of Friedrichstadt. For the offensive, an additional eight infantry and two cavalry divisions were placed at Hutier's disposal.[46]

Hutier had two major options for the attack. He could assault the bridgehead directly at Riga (where the

only permanent bridges lay), or he could attempt a river crossing at a less defended point upriver on the Dvina, and then envelop the city and its defenders. Hutier made the later choice, and began to rehearse the use of small boats and pontoon bridges in preparation for the river crossing.[47]

The attack began on 1 September 1917, with three of Hutier's divisions crossing the Dvina on a two and one half kilometer front. The river crossing was relatively easy. At this point in the war, the Russians were at their breaking point with extremely low morale. Most of the Russian defenders fled or surrendered to the German infantry. Six German divisions were across the river by nightfall and had broken through the Russian defenses. Upon realizing the threat of envelopment, the Russian commander ordered the evacuation of Riga on 1-2 September. By the third day of the attack, German soldiers entered Riga. Although most of the Twelfth Army escaped the German envelopment, the operation was a success. The German's caused 25,000 Russian casualties at cost of only 4,200 of their own and effectively removed Russia from the war.[48]

The attack on Riga did not fully demonstrate the ability of the stormtrooper tactics. Few units with the specialized training were present, and the feeble Russian resistance permitted German movement in large formations. However, it did produce many of the operational lessons learned which were subsequently used in the "Michael"

Offensive. The battle also provided a rehearsal for the artillery techniques which were a key to Stormtrooper success.

The poor Russian fighting spirit, and consequent lackluster tactical performance, allowed German maneuver in large formations with little risk. Despite little use of new infantry tactics, the use of pre-1915 skirmish lines was the norm, there were many lessons learned from the battle. Strict operations security, attacking at a weak point, and penetration followed by envelopment were all key to Riga's success. The major contribution was that Riga provided a rehearsal for the artillery organization and techniques which were key to stormtrooper success.

In preparation for the operation, Hutier conducted regimental-level, detailed rehearsals of every facet of the assault. Special attention was paid to training in the use of small boats for the river crossing. All rehearsals were conducted well behind the German lines to hide their intentions from the Russians. After the rehearsals, movement forward to the attack positions was done under the cover of dense forests. Every effort was made to prevent the enemy from observing the preparations.[49]

Key to the battle's success was Hutier's decision to avoid the main Russian defense, penetrate at a weak point, and envelop the enemy from the flank and rear. This offensive technique was a central part of German pre-war

doctrine, and Hutier's use of it was not in itself revolutionary. However, combat in the west, due to the extensive fortifications and fire support, had made such operational maneuver extremely costly, if not impossible. The western front had degenerated into a war of material and attrition. The successful use of a penetration and envelopment gave the German High Command confidence that such a technique might be possible on the western front to bring back a war a movement instead of attrition.[50]

Perhaps the greatest lessons learned from Riga were the organization and application of artillery to support the advance. The German artillery commander was LTC Georg Bruchmueller, a retired foot artillery officer who was recalled to active duty and placed in charge of a division artillery on the eastern front.[51] He pioneered many of the artillery techniques that were key to the success at Riga and standard for German forces in later offensives. Bruchmueller's techniques demanded the utmost security measures, the extensive use of chemical agents, short yet extremely violent preparatory fires, and coordination with the infantry.

To support the assault at Riga, every gun on the eastern front, except for the minimum necessary to hold the other sectors, was concentrated for the assault. A total of 615 guns and 544 mortars were placed in the 9 kilometer wide zone of attack (a density of 68 guns and 60 mortars per

kilometer).[52] Despite the large number of guns, security was paramount. Each gun was moved with painstaking effort to avoid enemy observation. Once in position, the guns were not registered. Only after the preparation fire began did the guns quickly register on pre-designated firing points. Although not as accurate as formally registered fire, the quick registration was sufficient, considering the great volume of fire, and element of surprise. Many of the defenders were caught off guard and hit before they could enter dugouts. A lack of formal registration was quite radical for 1917, when elaborate registration fires proceeded any assault and gave advance warning to the defender.

One of the reasons that the Germans could accept a lower level of accuracy in the early stages of the preparatory fire was the extensive use of gas. In the initial stage of the preparation fire, the German guns and mortars fired a total of 20,650 gas shells (75% gas verses 25% high explosive).[53] The targets were mostly artillery positions and reserve dugouts with the objective of suppressing the artillery and isolating the battlefield from reserves. Gassing was simply a very efficient means of keeping enemy batteries from counter-battery fire and hampering the movement of reserves forward. Compared to high explosive, it took far fewer gas shells to achieve suppression. This was especially valid for positions in the

rear of the enemy defense which could not be directly observed. Overall, 27% of the total shell fired at Riga were chemical rounds.[54] A high percentage of gas shells became the German standard technique in future offensives.

The preparation fire for Riga lasted but five hours. Yet, in that short time, the Germans hit the Russian Twelfth Army with 560,000 rounds.[55] The preparation was planned to hit the Russian artillery first, then shift some guns and mortars to the front trenches while still suppressing the artillery. Finally, the Germans massed all guns on the forward positions as the assault troops began their advance. Each phase of the preparation was designed to achieve a specific effect in concert with the overall scheme of maneuver. Bruchmueller centrally controlled the fire to create the desired effect, which was to allow the infantry to penetrate rather than obliterate the enemy forces.

Bruchmueller paid close attention to coordination with the infantry advance. The rolling barrage at Riga was organized in six phases. At the end of each phase, the barrage would become a standing barrage until the infantry signaled with a green flare.[56] This allowed the infantry to set the pace of the attack, not the artillery. Bruchmueller took great pains to coordinate his fire with the infantry by delivering personal briefings, down to platoon commanders, on the artillery plan prior to any attack. These briefings and demonstrated results gained him the confidence of the

attacking forces. This close coordination with the infantry was another innovation which would become German standard doctrine.

The Riga operation did not showcase the Stormtrooper tactics developed on the western front. The Russian resistance was so feeble that company formations could move with relative safety. However, the artillery tactics were quite innovative, and the combination of surprise, concentration, and cooperation with the infantry was to become the blueprint for the preparation in March 1918.

The two major contributions of Riga were confidence in the ability to conduct a war and movement, and the artillery organization and techniques to support Stormtrooper tactics. The concept of penetration followed by encirclement returned to the forefront of German planning. Bruce I. Gudmundsson writes in his book Stormtroop Tactics:

> ...the operational, rather than the tactical level, that the Battle of Riga was to serve as a model for later German offensives. Riga proved the value of the attainment of surprise, the concentration of superior forces against the weak spots in the enemy disposition, and the deep penetration of that weak spot to encircle a portion of the enemy force.[57]

These same operational characteristics would be sought during the "Michael" Offensive. Riga's value was in its operational lessons and in the artillery organization and tactics which were necessary to support the stormtroops.

The victory at Riga allowed several units to be returned to the western front in preparation for future offensives. Three infantry divisions and the Alpine Corps were sent south to join the German 14th Army in preparation for an offensive in Italy designed to bolster the Austro-Hungarians the Battle of Caporetto.[58]

Caporetto

The Italian front held little interest for the OHL, except that it limited the number of Austro-Hungarian divisions available for employment on the eastern front. By the summer of 1917, Italian offensives had brought the Austro-Hungarian's to the verge of collapse. The Germans had little choice but to send help to their beleaguered ally.[59]

The German 14th Army, six German and eight Austro-Hungarian divisions, was commanded by General Otto Von Below, a German General Staff officer with extensive Corps commander experience on the eastern front. Three of the German divisions had recently arrived from the western front where they had undergone stormtrooper training and had participated in "attacks with limited objectives."[60] The divisions had been issued the new light machine-gun, the Maxim 08/15.[61] Although they had not been trained by Rohr, the Alpine Corps battalions received stormtrooper tactical training from courses run by Assault Battalions on the

western front. Their organization included additional machine-guns and mortars. Due to their training, conditioning and equipment, they were considered the functional equivalent of stormtroopers.[62]

Arrayed against the 14th Army were ten Italian divisions of which only three were in the front line.[63] The faulty Italian dispositions left many gaps in their line. Although a form of the elastic defense was ordered by the Italian commander, front line units were reluctant to give up any ground.[64] By far, the most damaging aspect of the Italian defense was their dismal morale. The Italians were war-weary. Many of the front line units were on the verge of collapse.[65]

The action began at 0200 on 24 October 1917 with a tremendous gas barrage. Six hours later the infantry advanced under the cover of a rolling barrage. Assault units punched holes in the thin Italian lines, and the infantry poured through and cut off or encircled the stunned defenders. By nightfall, the Germans had advanced 10 to 12 miles, and had routed the Italian front line units (Figure 4).

The Italians retreated under heavy pressure until they were able to make a stand on the Piave river almost an month after the attack began. French and British units bolstered the Italians and they were able to stop the German advance. However by the end of the operation, the Germans had caused 800,000 Italian casualties, captured 3000 guns,

1700 mortars, and 3000 machine guns.[66] Collapse of the Austrian-Hungarians was averted, and the Germans could concentrate on preparations for the western front.

Caporetto is significant because it marks the first use of stormtrooper units in a large scale offensive. The fire support plan practiced many of the techniques used in later offensives. The battle provided another test of the tactics which would prove successful on the western front in 1918.

The maneuver units involved in the operations made extensive use of stormtroop techniques. Both the small unit techniques used to reduce strongpoints, and deep penetrations without flank security were evident. Following closely behind the initial bombardment, assault squads found gaps in the defenses and broke through. The objective was to move swiftly to the rear and to allow following units to clear any resistance. As the Italian defense degenerated into individual strongpoints, stormtrooper squads used their light machine-guns to pin down the defenders until they could be destroyed with grenades.[67] Throughout the depth of the defense, assault squads were able to find weak points punch through the line, and exploit with follow-on regular infantry.

After major gaps were formed, units would penetrate deep to the rear of the Italian positions without regard for their flank security. The German 12th division, totally

disregarding the established mountain fighting doctrine of seizing the hills along the route of march, tore down the Isonzo valley at a rate of three to four kilometers per hour. By bypassing the Italian units, which still held the mountains on their flanks, the 12th division was able to secure the town of Caporetto by nightfall of the first day.[68] With the town secured to their rear, the Italian defense disintegrated.

The fire support plan at Caporetto was key to the overall success of the operation. The concentration of guns, heavy use of gas, and coordination with the infantry would form a blueprint for future offensives. The lack of surprise, due to formal artillery registration, was an error that needed to be corrected. The Germans massed 1550 guns and 420 medium and heavy trench mortars for the six-hour preparatory fire. The first two hours of the preparation concentrated on the enemy artillery with gas shells. Targets were hit in depth throughout the Italian positions due to excellent German reconnaissance. By the final two hours, every German tube was firing on the Italian trenchlines with high explosive. The terrific concentration of shells broke the back of the already low Italian morale.[69]

The gas bombardment was joined with 1000 gas projectors of the 35th Pioneer Battalion.[70] The gassing continued intermittently to maintain the cloud over the

Italian artillery and reserve positions. The gas had great effect since the majority of the Italian gas masks were inadequate.[71] The most significant gas effect was the almost total slaughter of the Italian draft animals. With no way to move ammunition, the Italian batteries soon stopped firing altogether.[72]

Coordination with the advancing infantry was evident. The assault squads moved closely behind the rolling barrage, and used signal flares to adjust its speed. Once the infantry outdistanced the range of the field guns, they relied on their trench mortars for fire support, and continued to advance. This close cooperation with supporting fires suppressed the Italian positions until the infantry could close and destroy them with grenades and small arms.

The only major error in the support at Caporetto was the five day registration.[73] This contributed to the excellent accuracy of the German guns, but it surely could have tipped of the Italian commander as to the time and location of the attack. Accurate fire without registration was a problem the Germans attempted to solve prior to the offensives in the west.

The main German benefit of the victory at Caporetto was the security of the Italian front and, as a result, the ability to transfer German divisions to the west. In the actual conduct of the attack, the stormtrooper tactics

worked brilliantly in concert with the new fire support techniques. The deep penetrations caused by the rapidly advancing units caused the total breakdown of Italian command and control, and led to their disintegration as effective forces. This concept is what the OHL hoped to employ in the west. As such, Caporetto formed a blueprint, or at least validated concepts for future offensives.[74]

Conclusion

No single person or unit discovered the new tactical doctrine that was so successful in the "Michael" Offensive of 1918. Rather it was a combination of individual genius (Rohr and Bruchmueller), operational success (Riga and Caporetto), and institutional flexibility on the part of the OHL.

The stormtrooper techniques were developed by trial and error in the western front trenches. These techniques provided the key to crossing "no man's land." The incorporation of mortars and machine-guns into single units, combined with the empowerment of the NCO were radical idea's at the time.

The new fire support techniques demonstrated at Riga and Caporetto were key to the sustainment of the infantry momentum. For the first time in the war, artillery was used to facilitate maneuver rather than try to replace it (i.e., artillery destroys-infantry occupies). Riga and Caporetto

showed Ludendorff that large scale maneuver was still possible using the new tactics.

By 1917, Ludendorff knew he must achieve decisive victory in the west before the influx of American troops tipped the scales against Germany. Based upon his confidence in the new tactics, and the German superiority in a war of movement (supported by victories at Riga and Caporetto), Ludendorff decided to retrain his army. Attack divisions would be formed in which every soldier would learn stormtrooper tactics. All the artillery would be schooled in Bruchmueller's techniques. A gap in the Allied defense on the western front would be found, and then he would strike with the offensive that Ludendorff hoped would end the war.

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CHAPTER 3

PREPARATION FOR THE OFFENSIVE

The OHL faced a dilemma during the winter of 1917-1918. It must decide either to attack, or to continue its defensive posture on the western front during 1918. Either option was risky; the decision would determine the ultimate outcome of the war.

The Germans emerged from 1917 with the advantage on the western front. The French army, exhausted, would not attack. The British armies threw themselves on the "elastic defense" at Passchendaele. They suffered massive casualties with little success.[1] Even the British attack at Cambrai, forged with massed tanks, was erased by German counterattacks.[2] By the end of 1917, the allies, no longer with the strength to continue the offensive, resolved to assume a defense to await the arrival of American troops.

Despite these developments, the Germans were in poor condition. Unlimited submarine warfare, which promised to choke the Allied supply lines, had not produced the expected results.[3] The German allies, Austria-Hungary, Bulgaria, and Turkey, were all on the verge of military and economic collapse.[4] The German army suffered from the lack of basic necessities and losses of experienced soldiers. The army

and the German people were at the limit of their endurance, and it was doubtful they could continue the war much longer.[5]

Despite many hardships, there were positive aspects to the German situation. The collapse of Russia and the victory at Caporetto relieved pressure from those fronts. Although the Treaty of Brest-Litovsk was signed on March 3, 1918, the Russians posed little threat since Riga.[6] Caporetto secured the Italian front and forced the deployment of British and French divisions to Italy. Russia's collapse, combined with the victory at Caporetto, allowed the Germans to deploy additional divisions to the western front. These divisions gave Germany an offensive capability on the western front.[7]

The Germans had a tactical as well as numerical advantage. The stormtroop tactics, honed through constant use on the western front and at Caporetto, achieved success in reducing the penetration at Cambrai in December of 1917.[8] New artillery techniques, pioneered by Bruchmueller, were the necessary accompaniment to the infantry tactics. These infantry and artillery tactics gave Ludendorff a tactical, as well as numerical superiority.

Ludendorff realized the advantage was transitory. American troops would soon be pouring into France; the submarines appeared powerless to stop the flow. Germany's only hope for victory lay in an offensive in the west.

Consequently, Ludendorff decided to attack early in 1918.[9] With the decision to attack, Ludendorff reorganized and retrained his infantry and artillery. OHL was confident that the new methods of attack would break through the trenches in the west, allowing a return to maneuver warfare.[10]

OHL decided to attack in the British sector for strategic and tactical reasons. The Germans determined that the British would continue to fight even if the French were defeated. However, without British support, the Germans believed the French would capitulate.[11] On the tactical side, the Germans believed the British to be tactically inferior to the French. Based upon previous Allied offensives in the west, Ludendorff knew that tactical considerations must be addressed before the strategic:

> I favored the center attack [British sector]; but I was influenced by the time factor and by tactical considerations, first among them being the weakness of the enemy....A strategic plan which ignores the tactical factor is foredoomed to failure. Of these the Entente's attacks during the first three years of the war afford numerous examples.[12]

Ludendorff was convinced that the offensive's success demanded an attack on a weak spot. Consequently, the British were selected as the target for the offensive. The March 1918 offensive, code named "Michael," would hit the British line between Arras and St. Quentin, near the juncture with the French army.[13]

German Infantry Training

The infantry force to create the penetration Ludendorff envisioned did not exist in the fall of 1917. Years of trench warfare in the west had dulled the ability of many German divisions to conduct the movement needed to support "Operation Michael." A massive training program was necessary to produce the required number of trained divisions for the breakthrough. OHL dedicated the winter of 1917-1918 to training such a force.[14]

Ludendorff published his second edition of the Training Manual for Foot Troops in War on 1 January 1918. In that document, he prescribed that every German soldier be trained as a stormtrooper. The manual also described training exercises that proved successful in the training of assault units.[15] Ludendorff envisioned an entire army of stormtroops for the decisive 1918 battle. Through an emphasis on fundamental soldier skills, combined arms training, detailed rehearsals, and the formation of "attack divisions," the German army strove to achieve Ludendorff's goal.

The German army of 1918, much different from the professional force of 1914, was sorely in need of fundamental training. In the words of LTG Herman von Kuhl, "...the troops first had to unlearn a number of things with a view to preparing themselves for the offensive and the war of movement."[16] Close order drill was emphasized to enhance

cohesiveness and instill discipline.[17] Rifle marksmanship was emphasized. Years of trench warfare, where the hand grenade was the preferred weapon, had dulled the marksmanship of soldiers. Marching long distances, up to 60 kilometers per day, was common. Marching not only increased the physical conditioning necessary to exploit the penetration, but also allowed the practice of deployment into battle formations while fatigued.[18] Because of the incorporation of the the light machine-gun and mortar into infantry units, many soldiers were cross-trained in their use.[19] Even the artillerymen, who accompanied the infantry with their assault guns, were trained in individual stormtroop skills.[20] The German infantry went back to the basics in preparation for the spring of 1918. Prior to learning the stormtrooper tactics, the German army made sure the individual soldier was prepared in basic soldier skills, discipline, and physical conditioning.

After individual skills were mastered, training progressed to higher echelons. Squad battle drills were practiced, especially reduction of machine gun positions.[21] The Germans practiced various movement formations, as well as transition from one formation to another. The objective was to maximize speed. The squad was the basic tactical unit, and the stormtroopers usually moved as a squad during combat operations. However, if the stormtroops were faced with light resistance, platoons and companies would move as

a unit to speed the advance. If units encountered heavier resistance, they would again break into assault squads to attack the position.[22] The goal was to produce small units that would quickly reduce the enemy positions, and to advance aggressively through the enemy zone, regardless of obstacles.[23]

Rehearsals were conducted against objectives modeled after British trenchlines. All exercises included live-fire and coordination with the artillery. Engineers constructed dummy trenches in rear areas replicating the exact specifications of British positions (based upon aerial photography). Stormtroop units conducted full scale assaults of these positions with live fire. Rifles, machine-guns, flame-throwers, and half-charge hand grenades were all used by both the attacking unit and the opposing force! Shots were aimed to miss, however, there were casualties.[24] The Germans placed special emphasis on coordination with the artillery, especially the rate of the creeping barrage. They conducted tests to adjust the barrage speed to keep it from running away from the infantry. Pyrotechnic signals were tested to signal the artillery to move the barrage faster. However, none were set to retard its advance because of the artillery's parochial fear of giving the infantry too much control over fire support. The infantry practiced under live artillery fire to get as close as possible to the barrage. Many units

suffered casualties, but the soldiers learned that the closer they stayed to the barrage, the closer they could get to the enemy line before receiving fire.[25] Realistic, live-fire rehearsals were key to retraining the German army.

The increased level of training of the German army could not be achieved by every soldier. This led to the formation of "attack" and "trench" divisions. Stormtroop units, prior to the winter of 1917-1918, were made up of young, unmarried, and physically fit soldiers. Ludendorff wanted entire stormtroop divisions. The huge casualties suffered and the relatively small population base of Germany made finding the required number of young men difficult. To compensate for the shortfall, the OHL designated approximately one quarter of the German divisions as "attack" divisions. These divisions were withdrawn from the line, issued the best draft animals and equipment, and subjected to intensive training. The best food for man and beast was issued, much to the chagrin of the rest of the army. The remaining three quarters of the German army served in "trench" or "sector" divisions manning the defensive zone. They were still subject to daily shelling, yet got none of the largess of the "attack" divisions. This double standard caused morale problems, but Ludendorff could do little to remedy the situation with limited resources.[26]

Ludendorff realized that he needed a new army to conduct the breakthrough envisioned for the "Michael"

attack. Trench warfare had dulled many of the individual and collective techniques required by a war of movement. Ludendorff began with basic training, progressed to stormtrooper techniques, and culminated his training with realistic live-fire rehearsals. The best of German manpower, supplies, and transportation assets were given to the designated assault units. By the spring of 1918, 56 "attack" divisions were trained in stormtroop tactics, fully mobilized with vehicles and draft animals, and modernized with new weapons. These divisions were prepared to spearhead the assault.[27]

German Artillery Preparation

The change from defense to offense demanded a total retraining and reorganization of the artillery units on the western front. German artillerymen without experience in the east were unaware of Bruchmueller's advances in offensive fire support. From his eastern front experiences, Ludendorff was familiar with Bruchmueller. After the successful employment of his techniques at Riga, Bruchmueller was sent to the western front in November. As part of Hutier's staff in the newly formed 18th Army, he would prepare the fire support plan for the 1918 offensives.[28] By 8 February, 1918, Bruchmueller's techniques were formally adopted by OHL and tactical instructions were issued.[29] Bruchmueller's system formed

the basis for the fire support plan to break through the trenches on the western front.

Bruchmueller developed a fire support system designed to facilitate the forward movement of infantry, rather than destruction of the enemy force. Bruchmueller surmised early in the war that it was impossible to achieve destruction. He advocated that techniques were needed to assist the infantry fight, instead of attempting to defeat the enemy with artillery alone. Bruchmueller's fire support system can be broken down into six major categories: neutralization, organization for combat, preparation of the battlefield, combined arms coordination, security and surprise, and fire planning.[30]

Bruchmueller was convinced that the goal of the artillery should be neutralization. He changed the length of preparation fires, the mix of gas to high explosive shells, and reduced the mobility problems caused by the artillery's destructive effects on terrain. Most of the lethal effects of a preparation fire occurred within the first few hours. A preparation fire that lasted days had little additional value. The enemy took deep cover in dugouts, and, barring a direct hit, little additional physical or psychological damage was caused. Realizing this, Bruchmueller advocated a short (typically 5 hours), highly concentrated preparatory fire with constantly shifting targets to take full advantage of shock and

surprise. This short preparation would stun the enemy and allow the infantry to reach the enemy positions to destroy them with close combat.[31]

The typical Allied week-long preparation fire completely tore up the battlefield. Although this slowed the infantry, it practically stopped the supporting arms, especially artillery, from displacing forward without engineer support. To counter this problem, Bruchmueller shortened the preparation fire and increased the proportion of gas to high explosive shells. Gas shells were less disruptive on the terrain, yet neutralized the defender.[32]

Bruchmueller found that gas shells were not only more conducive to future mobility, but that gas was more efficient than high explosive. By 1918, the Germans developed a wide selection of gas shells. Blue cross shells were non-persistent, nonlethal vomiting agents; green cross shells were non-persistent, lethal choking agents; and yellow cross were persistent, lethal blistering agents. Bruchmueller developed combinations of these agents to achieve a synergistic effect. He would employ mixes of blue and green cross shells directly in front of attacking infantry because the non-persistent gas would dissipate quickly. Blue cross gas clogged gas masks, forcing their removal and subsequent exposure to the lethal green cross gas. Since it was persistent, yellow cross gas would be used on enemy artillery batteries and the attacking unit's

flanks to contaminate artillery pieces and slow counterattacks. Gas shells were efficient. Compared to high explosive, it required significantly fewer gas shells to maintain a gas cloud over an area and achieve the same suppressive effect. Additionally, the greater radius of effects that gas shells produced meant that they did not need to be as accurate as high explosive. This reduced the registration requirement and compensated for less accurate intelligence. Bruchmueller realized these advantages and steadily increased the number of gas shells used in his preparation fires. In the 1918 offensives, gas shells comprised 33% of the total preparation fire. By the end of the war, gas shells comprised 50% of the German artillery battery basic load.[33]

Bruchmueller changed the artillery organization to centralize command and control and synchronize the fight. In the west, German artillery control had become decentralized to support defensive operations. As a result, the corps artillery had few assigned units. Even heavy guns were attached down to division level. Conversely, on the eastern front, Bruchmueller found that only centralization could achieve the proper amount of fire at the necessary time and place. As the infantry tactics became more decentralized, the artillery needed to become even more centralized to take advantage of the rapidly changing situation (i.e., mass all the heavy guns to support a gap

found in the enemy line). Another reason for centralization was the level of technical experience of lower echelon artillery officers. Casualties reduced the ranks of experienced artillerymen. Many of the replacements did not have the necessary technical skill. With central command and control, inexperienced officers only had to concentrate on command of the actual firing batteries. Only through centralized command and control could Bruchmueller orchestrate his brief, but incredibly violent, preparation fires.[34]

Bruchmueller integrated all types of fire support means into his overall plan. He mixed guns, howitzers, and mortars together to maximize the effects from each weapon. Much to the dismay of artillery officers, Bruchmueller task organized all the weapons at his disposal to accomplish the mission.[35]

Prior to Bruchmueller's arrival, division artillery commanders fought both the deep and the close battle. Under Bruchmueller's system, division artillery fought the close battle, corps artillery fought the deep battle, and the army artillery commander synchronized the two. Specific fire support assets were allocated to each echelon based upon its mission. For example, more howitzers might be allocated to the division artillery for their high rate of fire, and more heavy guns to the corps artillery to take advantage of their

longer range. The army commander shifted assets between the two as the situation dictated.[36]

Bruchmueller prepared the battlefield through reconnaissance and detailed, systematic preparation of artillery positions prior to occupation. Reconnaissance, communications support, and initial survey were all accomplished prior to the arrival of the first gun. Detailed reconnaissance of all battery locations was done with particular attention to camouflage and routes into the position. In addition, sound and flash ranging units located enemy batteries for counter battery fire. Every facet of artillery movement and occupation of positions was planned in detail. Engineers repaired roads to ensure a flawless movement into position under the cover of darkness. Special attention was paid to locating ammunition storage areas and resupply routes. Communications wire was laid to all positions. The battery hooked up and was ready to fire immediately upon occupation. Topographical units surveyed the positions. Firing charts to support the desired fire fan were completed prior to the movement forward. Bruchmueller developed a detailed procedure for occupation of positions that supported both his security and command and control requirements.

Bruchmueller ensured coordination between artillery and infantry through forward observers and briefings to both infantry and artillery units. Bruchmueller employed three

types of forward observers. Class I observers were deployed one per battery. Their mission was to control the preparation fire and they would not move forward with the infantry. Class II observers were deployed one per group of direct support batteries. They would move forward with the infantry and communicate by phone with the batteries. Artillery liaison officers were assigned to each leading echelon battalion. His job was to keep the artillery appraised of the tactical situation, but could fill in for the Class II observer as needed. This system of forward observers gave the artillery the ability to respond to the changing tactical situation.[37]

Bruchmueller placed emphasis on briefing infantry units to platoon level. If the infantry observed a target that had not yet been hit with artillery, they would initiate a call-for-fire. If the target was already in the plan, that call would just clog the fire support system unnecessarily. To avoid such unnecessary calls, and foster mutual confidence, Bruchmueller briefed infantry leaders on the following items: artillery organization, firing unit and artillery command post locations, gas mix, effects, and expected duration, timing and duration of preparation, rate of creeping barrage, and follow on support. With a thorough knowledge of the artillery fire plan, the infantry had more confidence that the artillery would support their maneuver,

and the fire control system would not be slowed by requests that were already included in the fire plan.[38]

Artillery units would be briefed to a greater level of technical detail. Emphasis was placed on the infantry maneuver and the artillery's supporting role. Bruchmueller answered all questions, actually wanting to hear from NCO's. This was quite an innovation at the time, as officers did not usually ask for ideas from subordinates--especially enlisted men.[39] Overall the infantry and artillery briefings created a sense of cooperation, mutual confidence, and trust between the two arms.

Security and surprise were emphasized throughout Bruchmueller's tactical system. Battery positions were prepared in advance and camouflaged completely. Batteries moved at night, strictly observing light and noise discipline. For example, if the Allies observed any batteries moving into position, they would return to their start point--no matter what the distance. Batteries were trained in special security measures, such as padding horses hooves with cloth to muffle the sound. Every effort was made to conceal the battery locations prior to the initiation of the preparation fire.[40]

To compliment security measures, Bruchmueller used deception whenever possible. Dummy positions, fake artillery tubes, and fake ammunition wagons were constructed in enemy view. Batteries never fired from the positions to

be used during the actual preparation. However, to avoid a lull in fire that might tip off the enemy to the impending attack, roving batteries continued to fire throughout the sector. These batteries fired at a volume consistent with the normal level for that sector. Although it was impossible to totally conceal all activity, Bruchmueller integrated deception throughout his planning and preparations to conceal his intentions.[41]

Without a doubt, the clearest harbinger of an impending attack was the artillery registration. Bruchmueller reduced registration by using gas shells, but he did not find the answer to the problem until he met Captain Erich Pulkowski. Pulkowski, an artillery instructor at the Foot Artillery School in Maubeuge, developed a method of fire without registration. He did this through compensation for factors he called the "daily" and "special" influences on the guns. "Daily" influences included the effects on fire caused by weather, barometric pressure, and temperature. "Special" influences were developed by test firing each gun to determine its individual characteristics (where that tube shot compared to where it was aimed). These characteristics became more pronounced as the guns wore out. Care was taken to use particular lots of ammunition to determine the "special" influences of a gun. Once determined, that particular lot of ammunition was stockpiled with that artillery tube for the preparation

fire. Through measurements of "daily" and "special" influences, Pulkowski developed a system which enabled accurate fire without registration.[42] This method became central to Bruchmueller's tactics.

There were three parts to a typical Bruchmueller fire plan: prior to the attack; during attack; and following the attack. Prior to the attack, the preparation was fired in three phases. The first phase, 30 minutes, concentrated on command and control nodes, troop concentrations and communication centers. Artillery was deliberately not targeted to entice the gunners to man their artillery pieces. This phase was fired primarily with gas shells (9 blue cross to 2 HE). Phase II, 2.5 hours, concentrated on the artillery with a 4:1 ratio of German batteries massed against each identified Allied battery. It was designed to kill the Allied gunners who manned their guns during Phase I. Deep targets, command and control and reserve units, would also be hit. The phase would be primarily fired with gas shells (mix of blue and green cross). The final phase, 2 hours, was shifted back to the infantry targets with only a 1:1 battery ratio left to fire on the artillery. Infantry targets were hit with a 20% gas to 80% high explosive mix, while artillery targets were hit with a 75% gas to 25% high explosive ratio. Ten minutes prior to the assault, all guns would shift to the front line positions for a final

bombardment. With several sub-phases and variations, Bruchmueller used this generic fire plan throughout 1918.[43]

During the attack, Bruchmueller used the creeping barrage. He made great efforts to adjust the rate of barrage's advance to coincide with the advance of the infantry. The main problem with the creeping barrage was that it could not be slowed by the infantry. The infantry could speed it up through pyrotechnic devices (such as a green flare fired by the battalion commander). However, if a hardened position survived the preparation, the time required for an assault could separate the infantry from its barrage. At Riga, Bruchmueller experimented with a more positive control approach. He ordered the creeping barrage stop at designated lines and become a standing barrage until the infantry signaled for its advance. This precluded the separation of the barrage from the infantry. However, he could not convince the OHL to adopt this innovation prior to 1918.[44]

The final part of the Bruchmueller fire planning system was the fire after the assault. As the infantry advanced, the command and control structure began to decentralize. Mortars went back to the divisions. The supporting artillery batteries prepared for displacement as the advance exceeded their range. The Germans attempted to move supporting artillery was up as close and as quickly as possible. However, utmost care was taken to move only those

units which could be supplied with ammunition. If a battery moved forward, but could not get ammunition, it just clogged the road network. Many artillery units were left behind so that additional ammunition wagons could move forward. Communications were an additional problem once the artillery groups moved. Wire communications were lost, and it was difficult to order batteries to displace, much less call for fire. The Germans tried flares, carrier pigeons and lanterns with no great success. Movement and communications, as the batteries displaced forward to support the advance, were problems Bruchmueller addressed but never solved.[45] Without technical solutions, such as mechanization and radio communications, the movement forward was the weakest link in Bruchmueller's program.

The winter of 1917-1918 was spent training the artillery units in the west with these tactics. The educational process met with varying degrees of success. Some artillery commanders were skeptical of techniques dreamed up by a mere Foot Artillery Reservist Lieutenant Colonel. They objected to his lack of registration, use of non-persistent gas in close proximity to German infantry, and taking the division artillery out of the deep attack. However, on 8 February 1918, OHL issued instructions supporting Bruchmueller and Pulkowski's techniques. With Ludendorff's support, the German army entered into its

greatest offensive supported by Bruchmueller's artillery tactics.

The British Defense

The OHL considered the British tactically weaker than the French, and considered breakthrough more likely in the British sector. There were two main reasons for the poor British defense. First, due to continuous offensive action, the British had not updated their defensive doctrine.[46] The British casualties at Passchendaele convinced them of the efficiency of the German "elastic defense." Consequently, the British adopted a facsimile of the German defense in 1917, but misunderstood several key components of the German system. This would prove disastrous in 1918. Secondly, the overall British readiness was diminished by instability in force structure, training, and overextension of their lines.

Although the British attempted to copy the German defensive framework, they did so in name only. The British did not clearly understand the purposes behind the three defensive zones, the essential role of the immediate counterattack, and the overall philosophy of the defense. The resultant defense resembled the German "elastic defense" on paper. Yet, due to flawed interpretation, in practice the British copy functioned quite differently than the German original.

The German "forward zone" was designed to provide early warning and delay an attacking force. To accomplish this, the zone needed to be positioned at a sufficient distance to keep the "battle zone" beyond observation and artillery range.[47] The British apparently gave little consideration to terrain or observation. Often, the forward zone was based upon existing trenchlines or the capricious judgement of a staff officer's pencil, rather than carefully sited by the ground commander. The British did not consider the forward zone an integral part of the defense. They viewed it as a luxury, not an essential part of the overall system.[48]

The British also differed from the Germans in the manning of the "forward zone" trenches, number of counterattack units, and delegation of authority to withdraw. Within the forward zone, the British, much like the Germans, defended from three successive trenches . However, the British more strongly defended the front trench with 50 percent of their forces, verses 15 percent for the Germans. Additionally, the British only employed half as many designated counterattack companies as the Germans. In the execution of a counterattack, the British employed the company as a whole, compared to the German swarm of "storm squads." The result was an attempt to mount a decisive counter-stroke, rather than the delaying actions which the Germans envisioned for the "forward zone." Finally, the

British were reluctant to give ground under pressure. Local commanders could not retreat on their own. Brigade, and often division, commanders had to be consulted prior to falling back. Consequently, many units were captured prior to receiving such permission.[49] The end result was a British mutation of the "forward zone" to the point where it functioned as a heavily defended trenchline, as opposed to a flexible defensive zone designed only to slow the enemy, and provide early warning.

The British also misinterpreted the function of the "battle zone." The German "battle zone" was two to three kilometers behind their "forward zone," and concealed from enemy observation. Ground reconnaissance to determine the exact location of the zone was essential. In practice, the British defense suggests that their "battle zone" was laid out by British High Command (GHQ), rather than the commander of that sector. Little attention was paid to the terrain, and the "battle zone" was often sited within a few hundred meters of the "forward zone." As with the "forward zone," the British specified a much smaller percentage of their forces as designated counterattack units. Only 25 percent of British troops in the "battle zone" were counterattack forces, compared to 80 percent for the Germans. A German commander was given wide latitude to give ground within this zone, as long as he mounted a counterattack to regain the lost terrain. British flexibility was almost non-existent.

Local British commanders were supposed to hold all positions regardless of the enemy pressure.[50] In practice, the British "battle zone" did not have the inherent flexibility to give ground when needed, nor the initiative to counterattack that made the German system so effective. Without these key features, the "battle zone" became merely a second defensive trench.

The "rearward zone" was the final line of defense. The Germans used the "rearward zone" as an area that could be readily converted to a new "battle zone" if necessary. It was located several kilometers behind the "battle zone," and was extensively prepared. The British "rearward zone" was often only a few thousand meters behind the "battle zone" and was poorly prepared in most cases. Confusion about its function reigned within GHQ, so the "rearward zone" was given little command attention or engineer effort. Without a "rearward zone" the British had no prepared positions to fall back on if the "battle zone" was breached.[51]

Despite the adoption of German defensive doctrine, the British defense had little resemblance to the German model. The three defensive zones were not sited or manned to produce the desired flexibility and depth. The British misinterpretation of the German battlefield framework left them with stoutly defended trenches with little flexibility. Instead of the deep zones to contain the enemy and destroy

him with counterattacks, the British had a thin linear defense, vulnerable to penetration.

The value of the immediate counterattack was also misinterpreted by the British. The cornerstone of the German "elastic defense" was the immediate counterattack.[52] Within the defensive zone itself, the British did not specify half as many units as counterattack forces as did the Germans. In the German system, reserve divisions were kept close enough to beat the attacker to the "battle zone." The British kept their reserve divisions at least ten miles behind the "battle zone." Consequently, the reserves arrived too late to be of any use. Finally, the Germans considered an immediate counterattack to be within one or two hours, and gave great latitude to the subordinate commanders. Conversely, the British classified an "immediate" counterattack as within 24 hours, and demanded detailed planning.[53] This excessive control of the counterattack abrogated the spirit of the "elastic" defense and severely undermined its effectiveness.

The British seemed to miss the basic philosophy behind the "elastic" defense:

> ...the Germans viewed a defensive system primarily in terms of the men and weapons deployed in the zone, allowing reorganization to be rapid and easy, the British appear to have thought of the defensive system more in terms of the physical defended positions, such as earthworks and wire. To reorganize such a system required enormous amounts of labour and was a slow process.[54]

The difference in philosophy is basically between a mobile and terrain oriented defense. The Germans had learned through hard experience that a defense which held ground tenaciously was destroyed with massed artillery. Only through dispersion, depth, and mobility in counterattack could terrain be held in the face of modern artillery. The British also missed the point that the "elastic" defense was designed to defeat the allied offensive techniques. The British failed to study the German actions at Riga, Caporetto and Cambrai to determine if the "elastic defense" was still a valid concept faced with the new German infantry and artillery tactics.[55] The British hoped to copy the German success, but failed to grasp the essence of the German defensive system. This compromised many of its essential elements. Consequently, the British began their 1918 defense in the west with a fatally flawed doctrine.

The British defense was weak due to a lack of training, reorganization of divisions to fill manpower shortages, and displacement to occupy French positions. The British Army conducted practically continuous offensive operations since 1914, and had failed to train in many unique defensive skills. Lack of manpower forced a massive reorganization of the British Expeditionary Force (BEF). Even after the reorganization, the BEF remained under authorized strength, with the additional problem of lower morale. Finally the British lines had to stretch to the

south to take over miles of dismally maintained French trenchline. All these factors combined to present a weak spot to the OHL.

British forces in 1918 had considerable combat experience, yet very few units had fought from a deliberate defense. The men who saw action in the defensive battles of 1914-1915 were mostly gone. Specific defensive techniques, such as long range rifle fire and the construction and maintenance of defensive positions, are all perishable skills. The training needed to teach soldiers the individual skills, combined with the effort needed to learn a new defensive doctrine, was a monumental task. Considering rest periods and the enormous amount of physical labor necessary to construct defensive positions, the British had little time to spare, and did not efficiently use the time that was available.[56]

The British needed 615,000 new replacements to maintain strength at the 1917 levels. The British government offered only 100,000 due to higher priority requirements; the navy and certain defense industries.[57] To make-up this shortage, the BEF was ordered to reorganize its divisions from 12 infantry battalions to 9. The BEF argued that a division is comprised of less than 50 percent infantry, so reorganization would still result in shorthanded units. The argument did not dissuade the British Government and the BEF began its reorganization on 29

January 1918. In all, 47 divisions were reorganized, involving considerable travel and consternation among units which had served beside each other for years. The final units were reorganized on 4 March 1918.[58] The turmoil, although difficult to quantify, obviously slowed the the ability to conduct well rehearsed counterattacks. Also diminished was the trust between units that is essential if bypassed units are expected to continue to fight. Without full confidence that their comrades will break through and rescue them, few units will resist once surrounded. The efficient counterattack and the ability of units to continue to fight after bypass, are essential to the conduct of a mobile defense.

The lengthening of the British line to assume French positions was perhaps the most damaging problem for the BEF. The French wanted the British to extend their line to the south. This would relieve several French divisions which would be used to build up a general Allied reserve. Over the protest of Haig, the BEF commander, the British agreed to extend their lines to the east bank of the Oise river (Figure 5). This extension of over 30 miles was carried out from 10 to 30 January 1918. The French trenches, in complete disrepair, were of the old type without the three defensive zones.[59] The result was shorthanded divisions spread over a broad front, with a tremendous amount of work necessary to establish a modern defensive framework.

The lack of training, internal reorganization, and extension of the British lines left the BEF in a state of turmoil. Any one of these problems entailed considerable effort to solve, but the combination exacerbated the effects of each. How could training be conducted as units reorganized and moved from one command to another? How could defensive positions be constructed with under strength units taking over miles of poorly maintained trenchline? Despite these problems, the British were confident that they could defeat a German spring offensive. If the British had studied the battles of Riga and Caporetto, they might have been a little less confident.

Ludendorff clearly saw the British as the easiest tactical opponent. The extended British line at their junction with the French was clearly the most weakly held area. In addition, the terrain in that sector offered good drainage and would be trafficable early in 1918. With the tactical weakness identified, Ludendorff decided to attack on a 60 mile front between Arras and the Oise river(Figure 6).[60]

Conclusion

Ludendorff saw a brief window of opportunity in 1918. The threat from the eastern and Italian fronts had vanished. The Allies were exhausted from their continuous offensives, and were content to remain on the defense. However, this

German advantage would erode quickly as American divisions arrived. To defeat the Allies prior to facing large numbers of Americans, Ludendorff knew he must seek decision in the west early in 1918.

The German infantry improved its tactics continuously since the war of movement ended in 1914. The stormtroop tactics learned in the trenches, combined with the lessons learned at Riga and Caporetto, provided methods to break through the trenches and return to open warfare. Through his massive training program in the winter of 1917-1918, Ludendorff believed he had the instrument which would defeat the British and lead to decisive victory in the west.[61]

Although Ludendorff had great confidence in his new stormtroop tactics, in no way did he think that the infantry would make the breakthrough alone. He knew that the artillery component was critically important to get the infantry across "no mans land," and into the enemy trenches. Equally important was the strength of the defense in the attack sector. The Germans had demonstrated in 1917 the lethal efficiency of their "elastic" defense. Ludendorff had no intention of battering his army against a strong defender, and would seek a soft spot in the Allied line.

Ludendorff found the British defense weak. The Germans had little respect for the British technical fighting ability, especially on the defense. The British extension southward to occupy former French trenches left

many units overextended, and in weak defensive positions. Bruchmueller's artillery tactics were proven effective in large scale offensive warfare in the east. Finally, he trained entire divisions in the Stormtroop tactics. In his preparation for the offensive, Ludendorff addressed these three facets of the tactical problem and by spring 1918, he was ready to launch the decisive offensive.

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CHAPTER 4

ANALYSIS OF THE OFFENSIVE

Ludendorff hoped that the attack on 21 March 1918, "Operation Michael," would be the battle to end the war. He had new,combat tested, infantry tactics and 56 "attack divisions" trained for the offensive. Likewise, the German artillery was trained in Bruchmueller's artillery tactics which were combat tested at Riga. Ludendorff's plan maximized the effectiveness of the new tactics and exploited weakness in the Allied line. He was sure that he possessed the instrument to achieve victory in the west. With luck, it would be Ludendorff's last great offensive.

German Plan and Task Organization

The overall strategic objective for "Operation Michael" was simple. The Germans were to punch through the British defense between Arras and the Oise river, then wheel north and envelop the British line. The Germans wanted to push the British army against the channel ports and destroy it.[1] To accomplish this objective, the Germans attacked with three armies: the 17th Army in the north under Gen von Below; the 2d Army in the center under Gen von Marwitz; and the 18th Army in the south under Gen von Hutier. The 17th

and 2d Army were under Crown Price Rupprecht's Army Group, and the 18th was under Crown Prince Wilhelm's (the Kaiser's son) Army Group.

The initial German objectives were designed to rupture the British lines (Figure 7). Prince Rupprecht's Army Group made the main effort, while Prince Wilhelm's secured the southern flank from French counterattack.[2] Prince Rupprecht's Army Group, with the 17th and 2d Armies, was to cut off the British in the Cambrai Salient and penetrate to the line Croisilles-Baupaume-Peronne-mouth of the Omignon. Upon reaching that line, the army group was to wheel north against Arras to envelop the British line. Prince Wilhelm's Army Group was to gain the line of the Somme river, cross it and extend its line to the Crozat canal. The 18th Army had to be prepared to extend its right wing to Peronne as the 2d Army attacked to the north. OHL retained only three divisions as a reserve.[3]

To support this operation, the Germans mounted several feints and demonstrations to draw both British and French reserves away from the German zone of attack. Feints were planned at Ypres, the Argonne, Verdun, and between Saarburg and Lorraine.[4] The Germans wanted to mount secondary attacks, but did not have the required artillery to support more than one offensive.[5]

In Ludendorff's words, this plan was "exceeding the ordinary bounds."[6] To penetrate the British line to the

depth of their artillery in one day was ambitious. The 17th Army, in particular, had a difficult mission: initially attack to the southwest, then turn and attack to the northwest. This was an extremely complicated maneuver, especially considering the strong British defense vicinity Arras (the 17th Army's right flank). The 2d and 18th Armies had easier missions, but still had ambitious objectives to reach in 24 hours. With no German supporting attacks, the British were free to move reserves as needed. Once the Allies discerned the feints from the mair. effort, they could move reserves, attack the German flank, and cut off their advance. Another odd facet of the plan was the separation of the attacking armies into two army groups. Ludendorff wanted the greatest possible influence on the battle. The German style of command gave maximum latitude to the field commander. The Germans would consider it inappropriate for Ludendorff to direct the action with only one army group involved. By splitting the offensive between two army groups, Ludendorff could fight the battle without aggravating his subordinate commanders.[7] Another possible reason was a desire for the Kaiser's son to be part of the "last" great offensive on the western front.[8] The addition of another layer into the chain of command was awkward, and added the factor of competition and jealousy between the two princes.

The German task organization was numerically superior to the British defenders. The German 17th Army, with 19 divisions, attacked the center of the British 3d Army, under Gen Byng, which consisted of 6 divisions. The German 2d Army, with 20 divisions, and the German 18th Army, with 24 divisions, attacked Gen Gough's 14 divisions of the British 5th Army.[910]

On the surface it would appear that the Germans achieved a 3:1 ratio in the zone of attack. However, the main effort (17th and 2d Armies) seems short divisions compared to the supporting effort (18th Army). The disparity is significant when the missions are taken into consideration. The 17th Army hit the strongest part of the British line and the 18th the weakest. The 17th Army had to make a complicated turning movement while simultaneously protecting its flank from the strong British position near Arras. The 18th Army had only to attack straight ahead. Since the 18th Army's flank lie on the juncture of the British and French lines, any threat would be slow to materialize. Finally, the mission of the 17th was to attack and envelop the British lines, whereas the 18th needed only to secure the southern flank.[11] One reason behind this disparity of assets can be traced to Crown Prince Wilhelm, who augmented the 18th Army with units from his southern sector. Since he was the Kaiser's son, Ludendorff had difficulty refusing him.[12] Consequently, considerable

combat power was spent on a secondary effort at the expense of the main effort.

To defeat the British, "Operation Michael" needed to breach the British lines quickly, and envelop the British Army before it could counterattack. To achieve this goal, the German main effort had to make a 90 degree shift in its direction while simultaneously attacking the strongest portion of the British line. Ludendorff had great confidence the new tactics would produce victory, but the operation's task organization did not support the main effort.[13]

The Bombardment

The preparation fire to support the "Michael" offensive was the most concentrated barrage to date in the war. The Germans employed 6,608 guns in support of the operation against 2,598 British guns (2.5:1 ratio). The fire-plan for the offensive was directed by Bruchmueller, even though he was only the Artillery Chief of the 18th Army. Despite the superiority in numbers and the apparent unified fire-plan, there were problems in the preparation fire which ultimately slowed the advance.

The preparation began at 0440 hours on 21 March 1918. The preparation lasted five hours and had seven main phases as follows:

The first phase, 120 minutes, was a surprise time-on-target fired by all guns with a mix of high explosive and gas. The main targets were command bunkers and artillery positions. A 10 minute sub-phase followed with a quick shift to the first and second line infantry targets.

Phases two, three, and four, each 10 minutes, continued hitting the phase one targets. The close support guns, mainly howitzers which constituted 70% of available artillery, shifted to known positions to verify firing data. Phase two verified data in the British rearward zone. Phase three verified data in the British forward zone. Phase four verified data in the British battle zone.

In the fifth phase, 70 minutes, the long range and heavy guns continued to fire on artillery batteries, command and control, and reserves. The close support guns shifted to fire on the British trenches. Phase five was followed with three sub-phases. Phase 5a, 15 minutes, shifted the close support howitzers to fire between the trench-lines in the British forward zone to hit any soldiers who abandoned the trenches. Phase 5b, 10 minutes, shifted close support howitzers onto defensive strong points. Phase 5c, 10 minutes, shifted the close support field guns to fire between the the British forward zone and the battle zone.

Phase six, 75 minutes, repeated the fire of phase five, including all sub-phases, with variations in the targets. This was immediately followed with phase seven, 5

minutes, which massed all artillery and trench mortars in a saturation fire on the most forward British positions.[14]

During the first day of the attack, 3.2 million rounds were fired, one third gas.[15] The British lines took a terrible beating.

> The sense of isolation really got me now. We were trapped in a stinking mud hole filled with a gas-laden fog, no adequate fire-step and no protecting wire. All we could do was crouch there in the mud and wait, stunned by noise and concussion. As time dragged on without any let-up in the bombardment, fear was replaced with weary exasperation. I recall thinking "For Christ's sake, pack it up, Jerry. Come over and fight, you bastards." At the same time I was sane enough to realize that while all those shells were falling we were safe from infantry attack. (Private T. C. H. Jacobs, 15th Londons).[16]

The preparation fire was extremely effective. Gas alone caused 15,000 British casualties. British soldiers were disoriented and exhausted after five hours of constant shelling. The barrage wrecked fortifications and cut protective wire. At 0940 hours, the creeping barrage began, and the German infantry advanced.[17]

Overall, the preparation was effective. However, the degree of effectiveness varied between Armies. First, Bruchmueller's techniques were not accepted equally in all three armies. Second, the main attack was not more heavily weighted with artillery than the supporting attack.

As a retired reserve Lieutenant Colonel, especially one with little western front experience, Bruchmueller did not have the rank or credibility to convince the artillery

chiefs of the other armies to follow his guidelines. Ludendorff, fully convinced as to the validity of Bruchmueller's concepts, ordered the 2d and 17th Armies to use Bruchmueller's fire-plan as their model.[18] Despite Ludendorff's order, the 17th Army did not comply with Bruchmueller's fire-plan.

The artillery chief of the 17th Army was Lieutenant General Richard von Berendt. He was the artillery chief at Caporetto, and was considered an artillery pioneer himself. Jealous of Bruchmueller's standing with Ludendorff, he did not take orders from a junior officer very well. The 17th Army's fire-plan did not follow Bruchmueller's guidance in many respects. Perhaps most damaging was that the 17th Army advocated registration prior to the attack. Thus, surprise in the 17th Army sector was compromised.[19]

The second problem with the fire-plan was the failure to weight the main effort with artillery. The 17th Army was supported with 2,236 artillery tubes and 1226 trench mortars (173 guns and mortars per mile of front); the 2d Army by 1,789 artillery tubes and 1,080 mortars(169 guns and mortars per mile of front). The 18th Army, in the supporting role, had 2,448 artillery tubes and 1226 mortars (184 guns and mortars per mile of front). The 17th and 2d Armies faced the toughest part of the British defense, and had the main effort mission. The 18th Army attacked the sector with the weakest defense, and only had to guard the southern flank.

A possible reason for the disparity can be traced to Crown Prince Wilhelm's desire for glory. As with infantry units, he was willing to move artillery from his southern sector to augment the offensive. Nevertheless, despite the political implications, OHL should have evaluated the artillery plan, and stripped guns from the 18th army to weight the main effort in the north.[20]

Although the "Michael" operation's preparation fire was the greatest bombardment to date, its effectiveness was not uniform across the front. Due to internal friction between the artillery chiefs, the fire-plan in the 17th Army did not follow Bruchmueller's guidelines as prescribed by OHL. The weighting of the artillery did not support the main effort. Instead, too many guns were dedicated to a flank security mission. The result was that the armies in the north, with the most complicated mission and the strongest enemy defenses, were supported by a weaker preparation fire than the 18th Army in the south.

The Advance

As dawn broke over the battlefield on 21 March, the area was covered by a dense fog. The fog, combined with the smoke and gas from the constant shelling, made it difficult to see more than a few meters--perfect conditions for the stormtroops.[21]

At 0940, the infantry advanced under cover of its creeping barrage and quickly penetrated the British "forward zone." The stormtroops advanced along the low ground where the fog was thickest, and bypassed any strongly defended areas. Often, the first Germans the British defenders saw were already behind their positions.[22] Once into the battle zone, the British put up stubborn resistance; especially in the northern sector against the 17th and 2d Armies. The creeping barrage was lost during the fight for the forward zone, as the fog kept the gunners from seeing the colored rockets that were supposed to control its movement. The infantry had to push through the British "battle zone" supported solely by organic weapons. The stormtroop units were well equipped and trained to handle these positions. However, the assault of individual strongpoints took time which upset the German timetable.[23]

Only in Hutier's 18th Army zone was the advance according to schedule. The 18th Army penetrated the "battle zone" and captured British artillery. Gough's 5th Army had no reserves to stem the German advance. The French were concerned that the attack might be a feint, subsequent to an attack at Verdun. The British GHQ was worried about an attack in Flanders against the channel ports. Gough was on his own. His army fell back fast.[24]

By nightfall, 21 March, the Germans stopped short of their goal for the first day (Figure 8). The 17th and the

2d Armies were still fighting in the British "battle zone." Surprisingly, the 18th army had great success and penetrated to the line of the Crozat canal. They met only scattered resistance as the British 5th Army retreated.

The second day of the offensive was marked by continued heavy fighting in the north, with little German progress. The Germans were beyond the range of the majority of their guns. To aggravate the stormtrooper's problems, they were moving into the range of British guns that were positioned deep enough to escape the initial bombardment. The British organized local counterattacks - some supported with tanks. The 17th and 2d Armies stopped all counterattacks and continued to advance slowly while taking heavy casualties.[25] Meanwhile, the 18th Army continued its furious advance.

Gough delegated to his corps commanders the authority to retire to the Somme canal, if enemy pressure made that necessary. The British 13th Corps commander took that authorization as an order to retire, while the 3d Corps commander remained in position. The result was a major gap in the British 5th Army center, which opened the door for Hutier.[26] The German 18th Army pushed through the British line and was on the banks of the Somme by the evening of 22 March (Figure 9).

The third day of the offensive presented the German OHL with a dilemma. Should it continue to push through the

strong resistance in the north, or should it exploit the gains of the 18th Army? Ludendorff decided to reinforce success. He changed the strategic objective of the offensive from defeating the British to separating the British from the French forces. To accomplish this, the 18th Army was required to attack west, in the direction of Amiens, to cut the lines of communication between the Allies. The 2d Army advanced to the west as well, with the 17th Army swinging northwest to attack the British line around Arras. OHL planned a supporting attack north of Arras, with the assistance of the German 6th Army (Operation Mars), to alleviate pressure on the 17th Army.[27]

Between 23 and 26 March, the Germans continued to make progress in the 2d and 18th Army zones. The British voluntarily retired from the Cambrai salient, thus freeing the 2d German Army to pursue the retreating troops. Gen Haig decided to prevent the envelopment of his army by augmenting his 3d Army with reserves. Haig left the 5th Army to its own devices. Gough could only look to the French for support. Consequently, the 5th Army was practically destroyed. Haig's moves added to the woes of the German 17th Army, while permitting even greater advances by the 18th Army.

In a desperate effort to stem the German advance in the south, Haig met with Gen Foch, the French Commander, on 26 March. Haig offered to place the entire BEF under French

command. Unity of command had been missing from the Allied command structure since the beginning of the war, and it took this state of emergency finally to achieve it. With Foch as supreme commander and his honor on the line, French reserves were released and rushed north to cut off the German advance on Amiens (Figure 10).[28]

Although the Germans made rapid advances, they were not without cost. The stormtroopers, extremely tired, were distracted by captured stores of British food and liquor. The "open warfare," which Ludendorff sought, was actually fought over the old Somme battlefield with its old trenches and obstacles ready to be turned into strongpoints. The stormtroopers had to attack multiple hasty positions, often without artillery. The new tactics, which relied on highly motivated, rested men with close artillery support and detailed rehearsal, was coming apart from fatigue and casualties.[29]

On 28 March, the Germans launched their supporting attack, "Operation Mars," to seize Arras and to break the 17th Army free for continued advance to the north. This attack, executed without the careful rehearsal and detailed fire-plan of "Operation Michael," miscarried. The British were prepared for the assault; it was thrown back with severe German losses. After the "Mars" attack, the 17th Army only had the strength to hold the British in place.[30]

By 30 March, the German advance stalled across the front with the 18th Army still 10 miles short of Amiens. On 5 April, Ludendorff called off the offensive to prepare for future operations in Flanders. "Operation Michael" failed to meet the OHL's strategic goals, yet it clearly was a tactical success. The Germans had penetrated 40 miles and seized over 1,000 square miles of territory in a sector where month-long battles had gained but a few hundred yards. The Germans had caused over 240,000 allied casualties including 90,000 prisoners. The German price was also high, 250,000 German casualties, including a high proportion of highly trained stormtroops that the OHL could not replace.[31]

German Tactical Success and Strategic Failure

The spring offensive of 1918 demonstrated the evolutionary change in German in tactical doctrine during the war. The Germans found a way to break through the trenches which had stopped the Allies for four years. However, it was not just the new infantry tactics or artillery organization which led to this success. It was a combination of infantry tactics, artillery tactics, and a poor British defense which led to spectacular success. The relationship between these three factors can be established through an analysis of the different rates of advance between the 17th and 18th German Armies.

The 17th Army was part of the Army Group with the main effort mission. It was led by Gen von Below, the commander at Caporetto, who was familiar with the new tactics. Why then did the 18th Army, with the supporting mission, gain so much more ground? The differences in success between the 17th and 18th Armies can be traced to fundamental differences in the infantry mission, artillery support, and the defense each faced.

Both armies, manned with Ludendorff's "attack divisions," had the entire winter to reorganize, field new equipment, and train for the attack. Below and Hutier both experienced fighting with the new tactics at Caporetto and Riga respectively. There is little evidence of any difference in the technical abilities between the infantry of the two armies. However, the 17th Army attacked with 19 divisions to the 18th Army's 24. The 17th Army had the more complicated maneuver to perform, by wheeling almost 90 degrees from its initial direction of attack to hit its subsequent objectives. The difficulty of the maneuver was exacerbated since it was done by individual squads navigating on their own--command and control was a nightmare. To hit its objectives, the 18th Army but to order its squads to keep marching east. The 17th Army was at a distinct disadvantage due to fewer divisions and a more complicated maneuver plan.

The 17th Army was also at a disadvantage in artillery support. The 17th Army, the main effort, was supported with fewer artillery units than the 18th Army in a secondary role. More importantly, the 17th did not follow Bruchmueller's fire-plan. LTG von Berendt, through jealousy or professional disagreement, followed his own precepts for the 17th Army's preparation fire. The major problem was registering guns prior to the attack, thus compromising the offensive. The 18th Army, following Bruchmueller's fire-plan to the letter, had no registration. The 17th Army suffered from weaker fire support than the 18th Army.

The defense faced by the 17th Army was considerably stronger than that hit by the 18th Army. The 17th Army hit a section of the line which had been occupied by the British for many months. In addition, Arras was heavily fortified and a constant threat to the 17th Army's flank as it advanced. It also faced an enemy closer to the channel ports, thus more critical to GHQ and closer to reserve forces. The 18th Army hit the British in a sector assumed from the French only weeks prior to the attack. The trenches were in disrepair due to French neglect. Also, the distance was much greater from the GHQ's reserve divisions. Consequently, the 17th Army was forced to hit a stronger position with closer reserves than the 18th Army.

Clearly, the 18th Army made the most progress because it had the most divisions, the best fire support and it hit

the weaker defense. This analysis clearly shows the inter-relationship between the infantry, artillery support and the strength of the defense. The tactical success depended upon putting all three facets of the operation together. If, as it would seem, the 18th Army, did so, why were they stopped short of their strategic goal? Another way of looking at the problem is to examine why the advance failed in the 18th Army sector after its initial success.

The reason that the 18th Army was stopped was that the relative efficiency of its infantry and artillery was degraded in proportion to the distance they advanced. The British and French forces, because they retreated on defensible terrain onto their own lines of communication, did not lose as much effectiveness.

Key to the new German infantry tactics was reliance on superb technical execution of infantry tactics. Stormtroop units spent long hours in rehearsal on realistic mock objectives. Timing and coordination with the supporting arms was practiced constantly. The men selected to join these units were highly fit, skilled, and even more importantly, highly motivated. As the stormtroops pushed through the defense, all these strengths began to fade. New obstacles, trench-lines, and units appeared which the stormtroops did not anticipate. The stormtroop unit, with its increased firepower and artillery augmentation, was built to retain flexibility and defeat such obstacles.

However, time and casualties were lost against these new positions. As the stormtroops advanced deeper, fewer artillery guns followed, so they were forced to rely on organic weapons. Finally, fatigue and horrendous casualties dulled the martial ardor of the most hardened stormtrooper. The deeper the Germans pushed, the less effective the infantry became.

In the same way, the artillery became less effective in proportion to the depth of the penetration. Bruchmueller's techniques were superb for the initial bombardment, but they were not as effective supporting a deep advance. Bruchmueller relied on surprise and massed firepower to achieve his objectives. It is difficult to achieve that level of surprise during a major offensive. Massing guns was very difficult. It took a tremendous logistical effort to move guns and shells forward over a shell-holed battlefield. The dismal road conditions forced the Germans to leave the heavier guns behind. Light guns possessed sufficient power and range to destroy a bunker, but heavy guns were needed to conduct counter battery missions. Thus, the Allied artillery took increasingly greater tolls of the German infantry as the advance progressed. Overall, the artillery support grew steadily weaker as the advance progressed.

Once the British lines were breached, the defenders were forced to fight from improvised defenses rather than

formal trenches. However, the area behind the front in "Operation Michael" was not the open fields of Russia. It was the old Somme battlefield, an area destroyed by the Germans as they retreated to the Hindenburg Line. This area was covered with old trenches, shell-holes, and debris which the Allies could turn into defensive positions. The Allies could also move reserves by rail much faster than the Germans could advance. The resultant defense might not be as strong as an "elastic defense" system, but it was not an open field either. The improvised Allied defense was a strong obstacle to the weakened stormtroopers.

The German tactical success in the "Michael" attack had three crucial parts. Without superior infantry skill, one Allied machine-gun could stop a battalion's advance. The artillery support covered the infantry until it closed with the defender and suppressed the British artillery. If the British were prepared in a strong defense, the new tactics showed little progress. The combination of new infantry and artillery tactics plus a weak defense was necessary for success.

Conclusion

The Germans suffered enormous losses in the spring offensive. Many were highly trained stormtroopers--irreplaceable for Germany at that point in the war. It was a great tactical victory, but the enormous casualties

started Germany on a decline from which she would never recover.

The new tactics worked brilliantly on the western front in "attacks with limited objectives" and counterattacks. In both cases there was time for troop rest and preparation, rehearsal, detailed intelligence, and coordination with supporting arms. The weak spot could be identified, or in the case of a counterattack, an exposed flank could be hit. Units could be rested, specially trained, and held in reserve for just the proper employment. In these situations, all the strengths of the new tactics were exploited.

Riga and Caporetto convinced Ludendorff that the same tactics could be used on a larger scale. I think he missed the point. At both those battles, the enemy fought with little skill or spirit. The Russians and the Italians basically stopped fighting after the initial penetration. In 1918, the British and the French did not oblige the Germans with a total collapse.

The Germans solved the tactical problem of penetrating a defensive zone. The combination of infantry and artillery tactics applied against a weak spot in the British line worked brilliantly in March 1918. The Germans paid close attention to every detail of the assault. Detailed preparation and rehearsal were key to German success. These characteristics, which made the tactics so

effective in breakthrough, made them vulnerable in maneuver warfare.

After the breakthrough, there was no time for additional reconnaissance to the detail which the stormtroops and artillery were accustomed. The artillery could not move forward, nor could it hit British guns with its light pieces. In the fluid situation, weak spots were more difficult to find and to exploit. As a result, tired stormtroopers without artillery support hit strong Allied positions. The outcome was predictable--Germans were slaughtered and the advance stalled.

The German tactics did not achieve Ludendorff's goal, yet they were not a failure. They were superb tactics to the depth of available reconnaissance, artillery support, and stormtrooper endurance. Ludendorff did not see these limitations; he missed the preordained strategic failure.

The only way to maintain the momentum of the attack was constantly to send new stormtroops forward and to move artillery up at the same speed. The Germans simply did not have the personnel nor the logistical capability. The brilliant tactics that broke through the trenches could not be sustained in open warfare.

Endnotes

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CHAPTER 5

CONCLUSION

World War I German "infiltration" tactics do have application to current U.S. Army tactical doctrine. The U.S. Army fields light infantry divisions, units with no heavy armor and few vehicles. Light divisions rely on superb soldier skills and individual conditioning to give them maneuverability in rough terrain where mechanized movement is difficult. To take advantage of their unique capabilities, infiltration is a preferred form of maneuver.

My experience with infiltration stems from two years with the 1st Battalion, 75th Infantry (RANGER), and five years with the 10th Mountain Division (Light Infantry). During that period I participated in or observed many infiltration attacks during training exercises. Some attacks were more successful than others; some units were better than others. However, the missions were always complex. They were seldom accomplished successfully without significant casualties. Some units would cease to exist as infiltrating squads were captured, killed, or simply became lost.

These dismal results caused me to question the idea of infiltration as a practical form of maneuver. Commanders

were asking young sergeants, with but a few years experience, to lead squads on a penetration deep behind enemy lines without detection. Completing that task, they would link up with their company prepared to fight. I felt that was tough mission for a young NCO.

To support my premise, or to find new techniques which would improve the U.S. Army's tactical doctrine, I sought a historical model which closely replicated current infiltration doctrine. The German tactics during the 1918 offensive were a logical choice. In my study of the German tactics, I found the German concept of infiltration significantly different than the U.S. Army. Whereas the U.S. Army doctrine relies on stealth, the Germans emphasized firepower. To support the clandestine nature of infiltration, the U.S. Army uses little indirect fire. Germans made artillery an integral part of the operation.

U.S. Army FM 100-5 Operations describes infiltration as:

> ...the covert movement of all or part of the attacking force through enemy lines to a favorable positions in their rear. Successful infiltration requires above all the avoidance of detection and engagement.[1]

U.S. Army infiltration doctrine is further explained in ARTEP 7-8 MTP Mission Training Plan for the Infantry Platoon and Squad. This manual stipulates the individual and collective tasks necess ry for a successful infiltration.

The unit must avoid all enemy contact and maintain radio listening silence throughout the infiltration. This makes it difficult to report enemy contact or to call for fire. The manual does not mention use of indirect fire to either suppress enemy positions or to create gaps in the enemy line.[2] This method assumes significant risk. The commander basically sends his squads off on their own, with the hope they will link up later. The commander provides them little fire support, no communications, and little chance of help if they make contact. In any but the most benign environments, this technique is a recipe for disaster.

Application of the lessons learned from the German experience in March 1918 provides insights into the limitations of infiltration attacks. Stealth versus firepower, the appropriate depth of an attack, and the type of soldier needed to perform these missions can all be derived from German experience during the 1918 "Michael" attack.

The Germans made little use of stealth during infiltration attacks. In fact, there is little evidence that they even considered the possibility that a large movement of troops through a defended area was possible by stealth alone. The Germans emphasized firepower to make their penetration. Stormtroopers sought gaps in the line, but expected to fight through enemy positions. If difficult in 1918, penetration by stealth alone is significantly more

questionable today with battlefield sensors. The possibility of large numbers of soldiers slipping through a defended area undetected is remote. The U.S. Army should modify its doctrine based upon the German experience. Infiltrating units will make contact, despite their best efforts at clandestine movement. Efforts must be made to incorporate additional fire support assets, including rotary and fixed wing aircraft, to aid in the penetration. Instead of radio silence, the U.S. Army should develop radio security measures, like directional antennas or portable satellite communications. This would enable the units to report weak areas, to call for fire, and to permit casualty evacuation. Of course, these modifications would present a larger danger of enemy detection. However, using the German experience as a model, stealth infiltration through an organized defense is a remote possibility. Perhaps a single squad could penetrate an enemy defense by stealth alone; a brigade or division slipping through enemy lines undetected is practically impossible. It risks destruction of the force piecemeal, one squad at a time.

Even if the U.S. Army adopts German techniques, infiltration attacks are risky ventures. Specifically, the depth of the penetration and the selection of soldiers are key parts of the equation for success.

The depth of an infiltration attack is limited by reconnaissance, fire support, and physical endurance. The

Germans found as they penetrated beyond their reconnaissance, outran artillery support, and became fatigued, the advance stalled. A U.S. Army light infantry squad is armed with practically the same weapons as a German stormtrooper. It relies on light machine-guns, grenade launchers, and individual weapons. The squad must hit the softest point in the enemy defense to have any hope of making it through. The depth of the objective should be no deeper than the accurate limits of friendly intelligence assets.

Fire support is critical to the squad, since it is so lightly armed. Without armor protection, the infiltrating units are especially vulnerable to enemy artillery. Commander's must pay special attention to the counterfire range for his available fire support. Aviation assets could lift artillery forward to support the advance. Attack aviation and fixed wing aircraft can extend the range of fire support, but adverse weather degrades the effectiveness of these assets. In any event, the depth of the objective should be limited to the effective range of friendly counterfire systems to keep the enemy artillery neutralized.

Finally, there are limits to human endurance which are magnified by the fear and tension of combat. Completion of a hundred mile road march in training does not translate into a soldier's operational limit in combat. Fear, constant combat, and casualties will take a toll on the

soldier psychologically and physically. The initial condition of the soldiers, the expected level of contact, and the terrain will all affect the limit for penetration. Light infantry soldiers must rely on superior skills to survive. If fatigue dulls individual skills, soldiers will be of little use when they finally get to their objective. The commander must determine the depth of the infiltration based upon the limits of friendly intelligence, fire support, and the soldier's endurance.

The U.S. Army cannot expect every soldier to perform the mission of infiltration. The Germans selected only young, unmarried men who were at their peak of physical vigor. Above all, they chose men with a high level of aggressiveness and devotion to duty. Once these men crossed the first trench, they were on their own. From my experience, U.S. Army light infantrymen are of above average physical conditioning and intelligence. They are highly motivated and learn quickly, yet I would not classify them all as the type individual that could be counted on in a deep infiltration. Many were married and several, especially NCO's, were well over thirty years old. The German experience clearly showed that aggressiveness and physical conditioning were essential stormtrooper skills. As the quality of German soldier went down, so did the effectiveness of their new tactics. In the same way, U.S. soldiers who are older and have families would find it more

difficult to handle the emotional and physical demands of an infiltration attack. Of course, since the U.S. Army has not conducted an infiltration attack in recent history, its would be difficult to prove this premise. However, the German stormtroop units did use criteria such as marital status and age. As casualties and high demand for stormtroop units forced the German to accept older men, the efficiency of the units decreased. The German experience suggests that the U.S. Army should at least consider these factors when fielding specialized units to conduct infiltration.

Infiltration by foot behind enemy lines taxes the soldier to his physical and emotional limit. To accomplish the mission, the U.S. Army should follow the German criteria for stormtroop units. A screening process must weed out all physically unfit. We must take a hard look at marital status and age limits for these units. The brutal fact is that these men are to go behind enemy lines with only their squad members for support. This mission demands aggressiveness and courage beyond normal limits. There is little chance for success without men possessing a high level of courage and duty concept.

I began this project in search of a key to solve the problem of stealth infiltration. Instead, I found the German model quite different from U.S. Army infiltration doctrine. The Germans spent little effort in stealth,

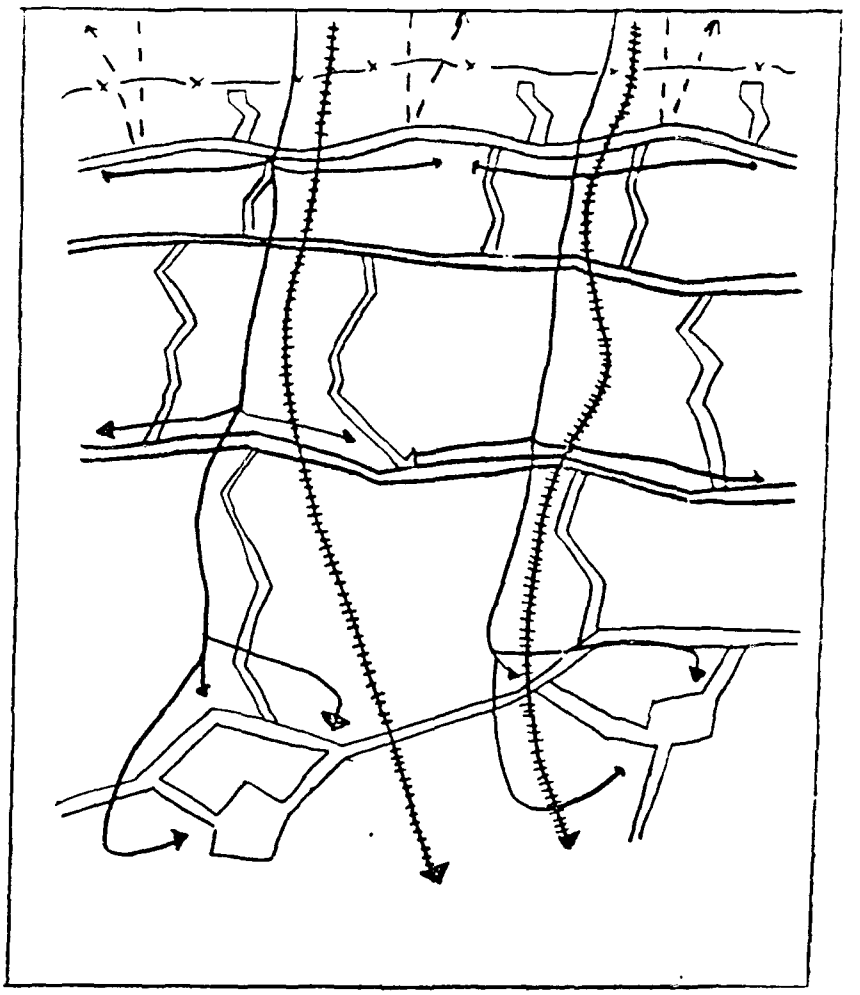
concentrating on close combat techniques and fire support coordination. German infantry depended on fire support to aid in the infiltration. The U.S. Army doctrine concentrates mainly on the infantry penetrating due to its own skill. The German tactics are more similar to U.S. Army mechanized tactics, rather than light infantry tactics. A U.S. Army armor battalion would not think of conducting a penetration without artillery support, and without searching for weak points. Yet, the U.S. Army professes to send light infantry, with a fraction of an armor unit's firepower and protection, behind enemy lines without fire support. The German experience in the spring of 1918 demonstrates the folly of that idea. Despite the dissimilarities between U.S. and German infiltration doctrine, tactical lessons learned by the Germans in 1918 have direct application to U.S. Army light infantry tactics.

Endnotes

[1]Department of the Army, FM 100-5 OPERATIONS, (Washington, D.C., Department of the Army), 1986), 103.

[2]Department of the Army, ARTEP 7-8 MTP Mission Training Plan for the Infantry Platoon and Squad, (Washington, D.C.: Department of the Army, 1988), 5-91.

FIGURES



Reconnaissance elements — — — →

Stormtroops infiltrate and bypass ++++++++++→

Regular infantry follows and attacks centers of resistance ——————→

Figure 1: Infiltration Tactics

Source: Bruce I. Gudmundsson, Stormtroop Tactics, Innovation in the German Army, 1914-1918 (New York: Praeger Publishers,1989), 85.

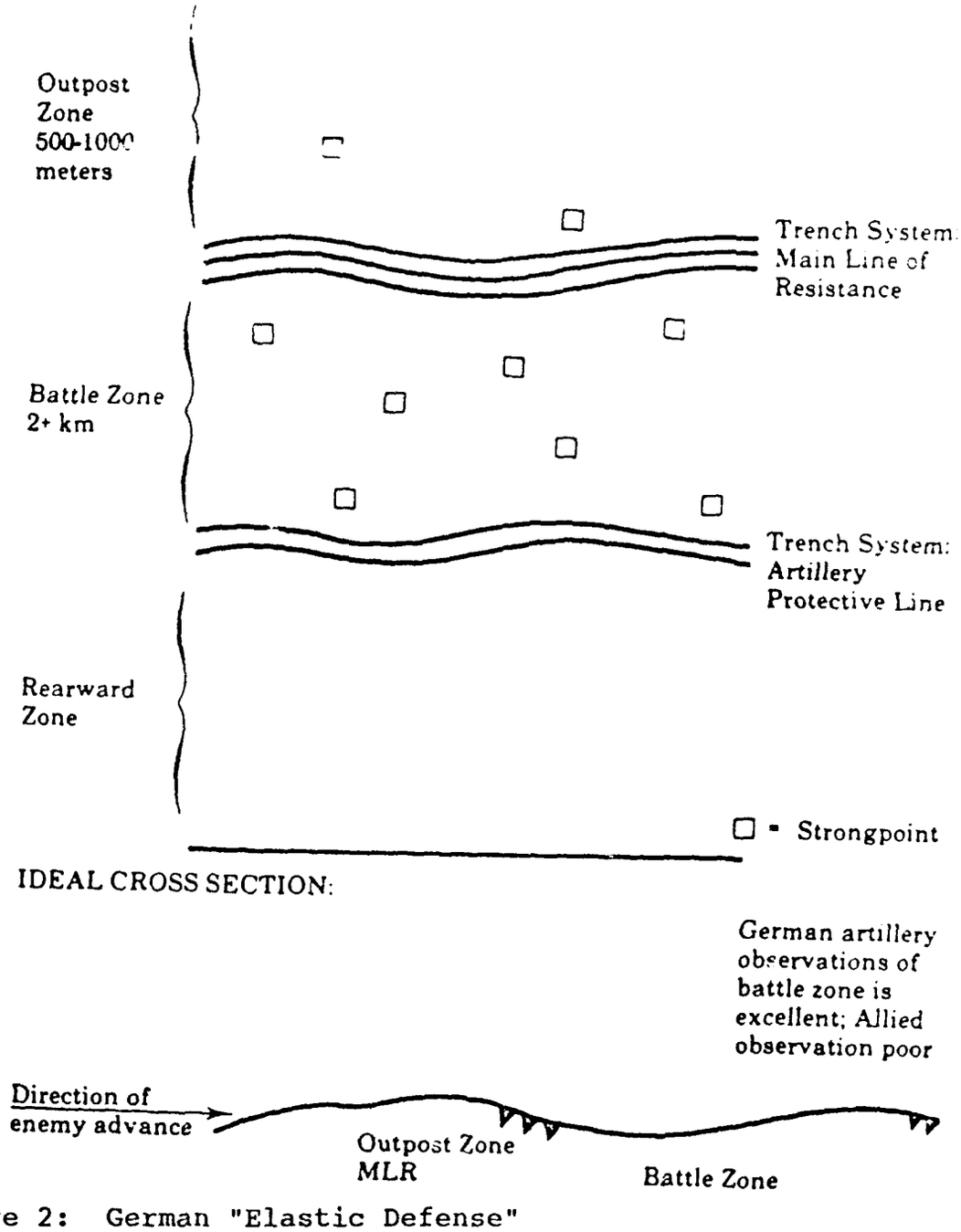


Figure 2: German "Elastic Defense"

Source: Timothy T. Lupfer, The Dynamics of Doctrine: The Changes in German Tactical Doctrine During the First World War (Fort Leavenworth: Combat Studies Institute, 1981), 14.

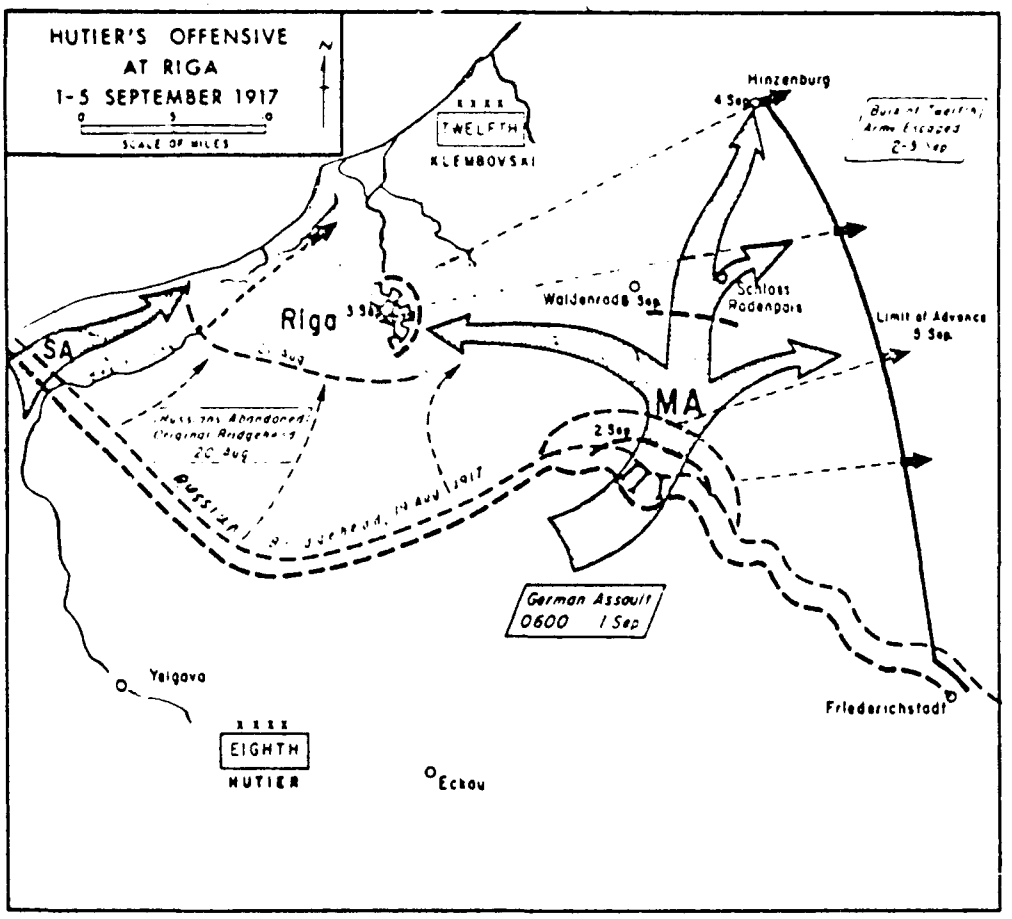


Figure 3: Riga

Source: Thomas E. Griess, Atlas for The Great War (Wayne, New Jersey: Avery Publishing Group Inc., 1986), 40.

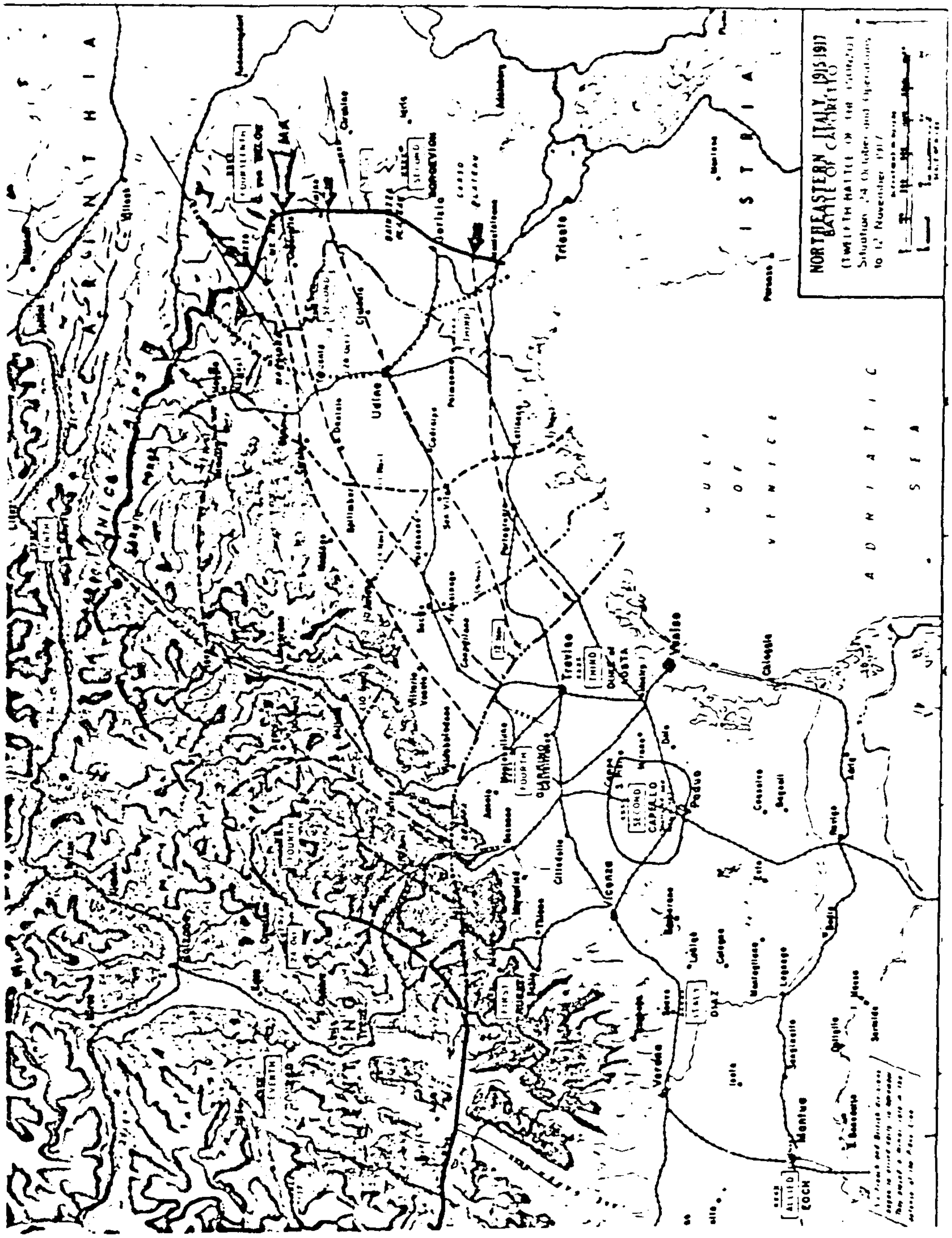


Figure 4: Caporetto

Source: Thomas E. Griess, Atlas for The Great War (Wayne, New Jersey: Avery Publishing Group Inc., 1986), 15.

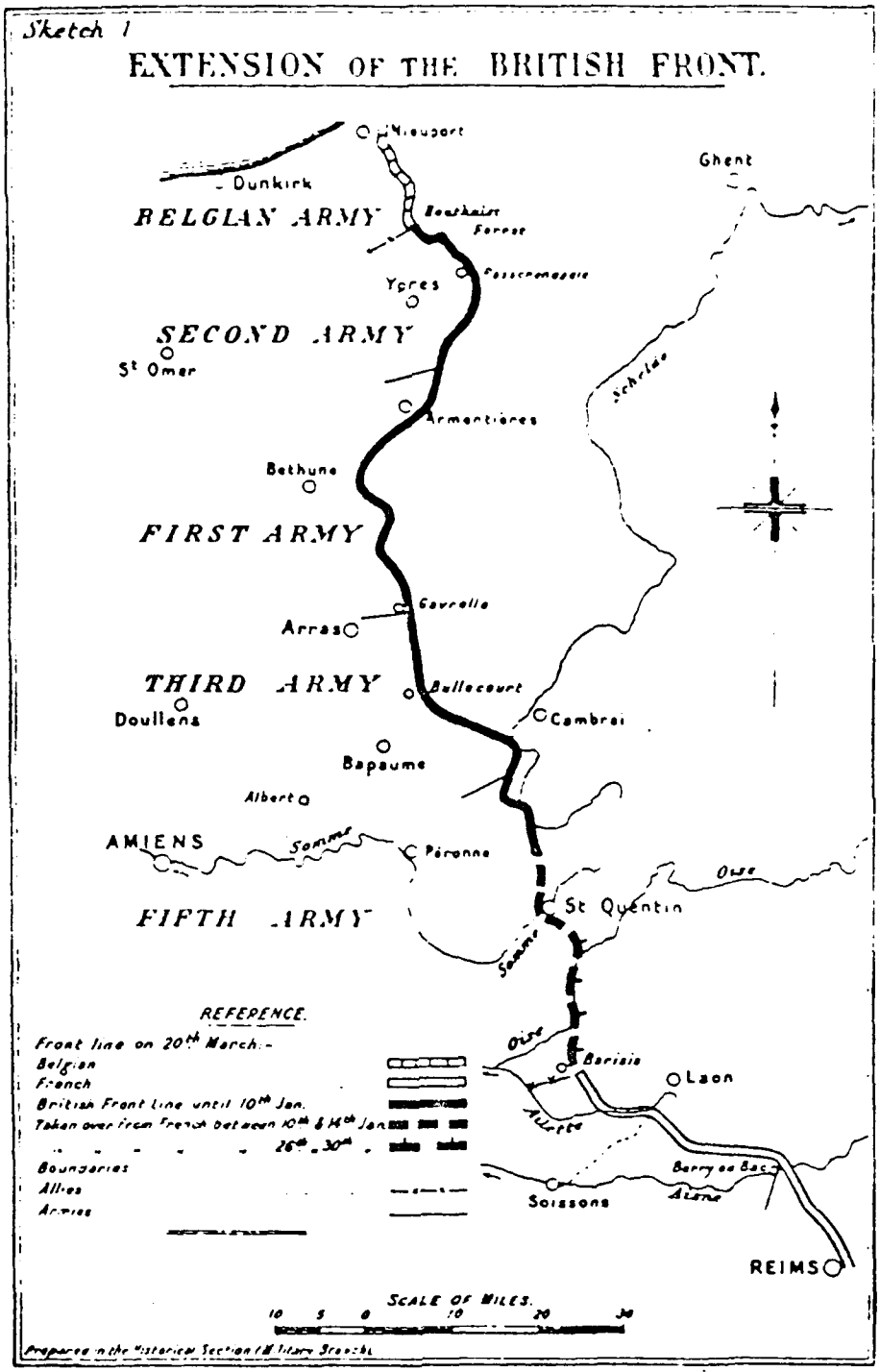


Figure 5: Extension of the British Front

Source: James E. Edmonds, ed., Military Operations, France and Belgium, 1918, vol 1 (London: MacMillan and Co., Limited, 1935), inside cover.

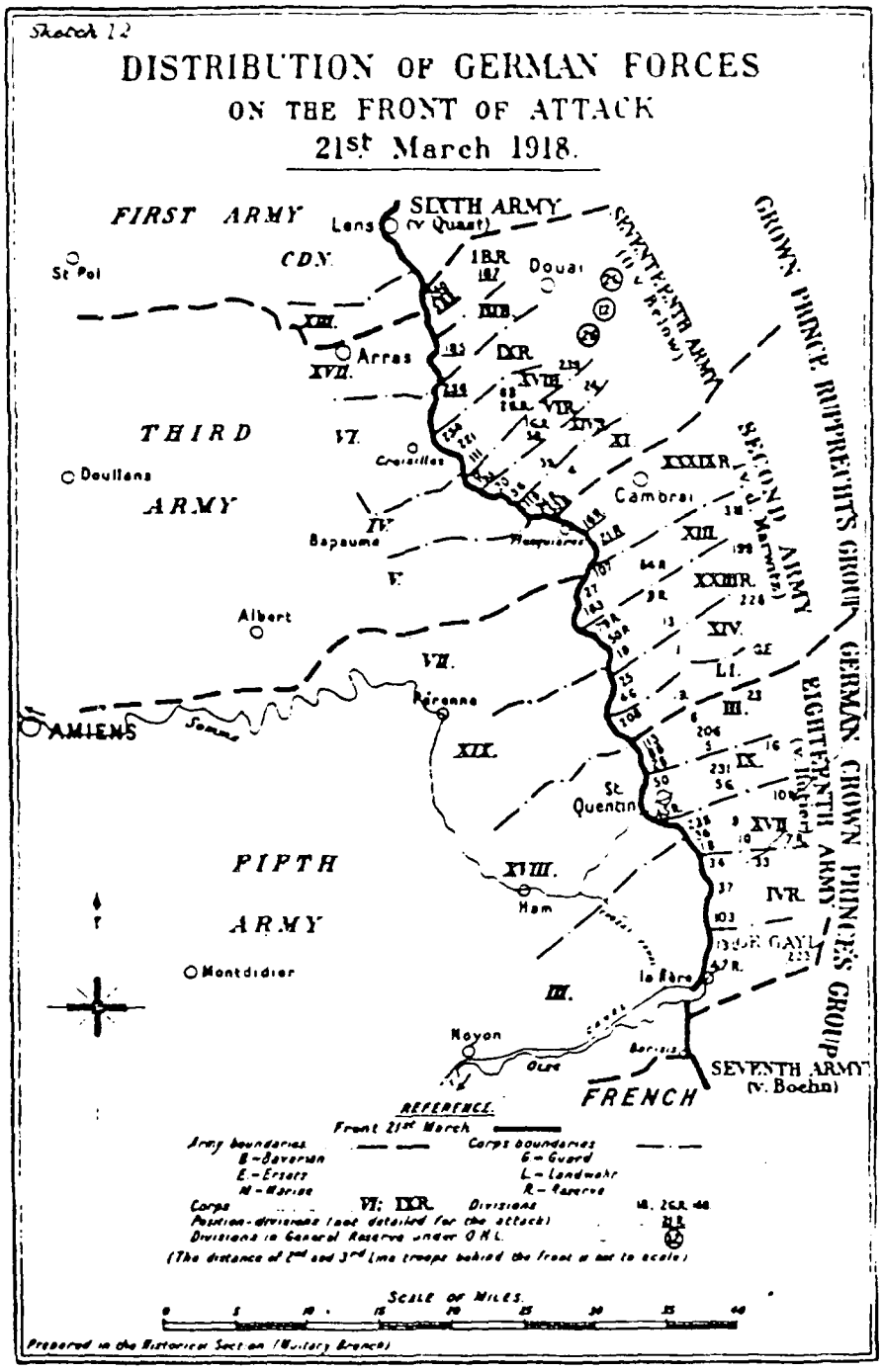


Figure 6: Distribution of German Forces on the Front of Attach 21 March 1918

Source: James E. Edmonds, ed., Military Operations, France and Belgium, 1918, vol 1 (London: MacMillan and Co., Limited, 1935), 150.

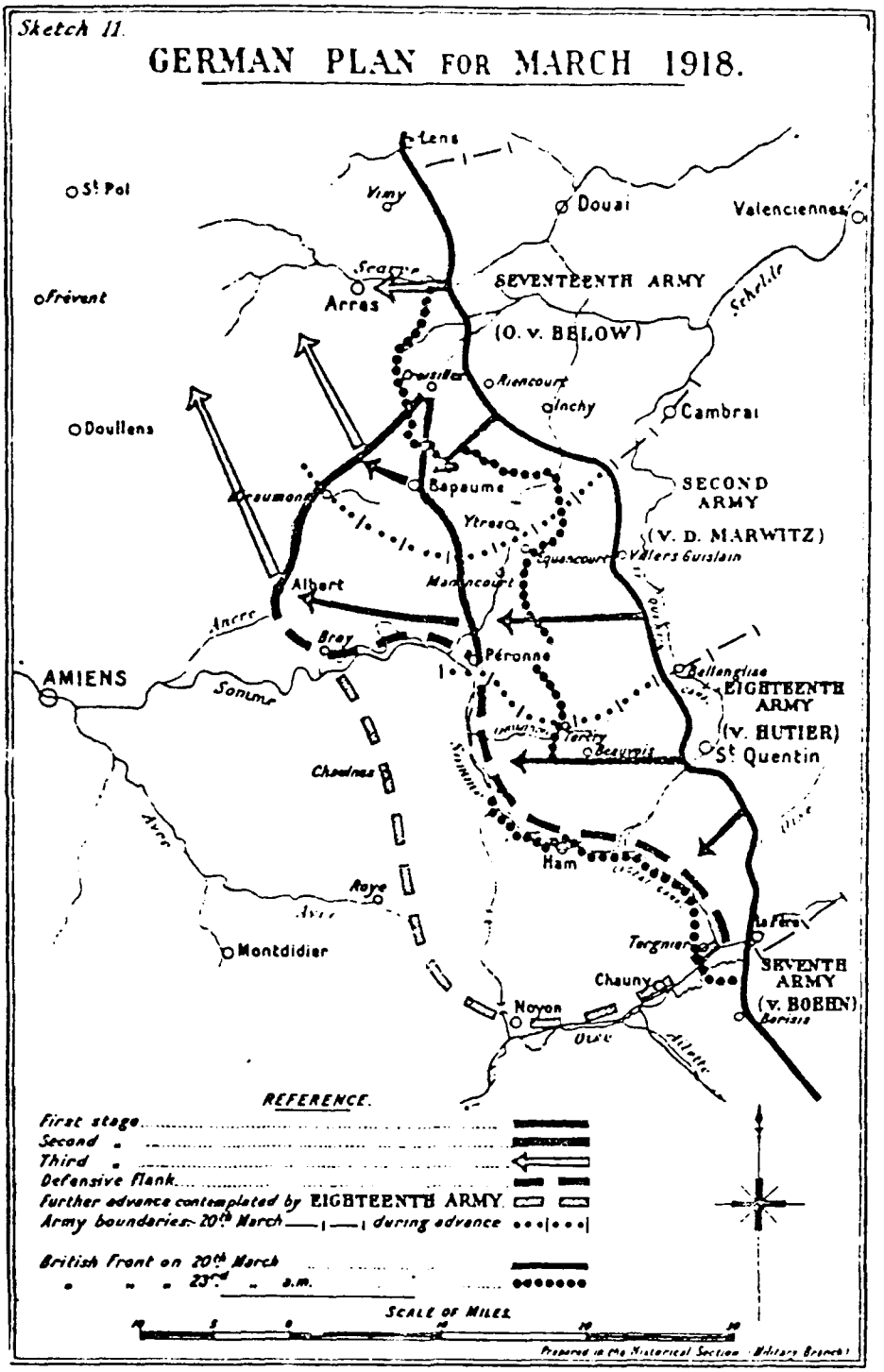


Figure 7: German Plan for March 1918

Source: James E. Edmonds, ed., Military Operations, France and Belgium, 1918, vol 1 (London: MacMillan and Co., Limited, 1935), 142.

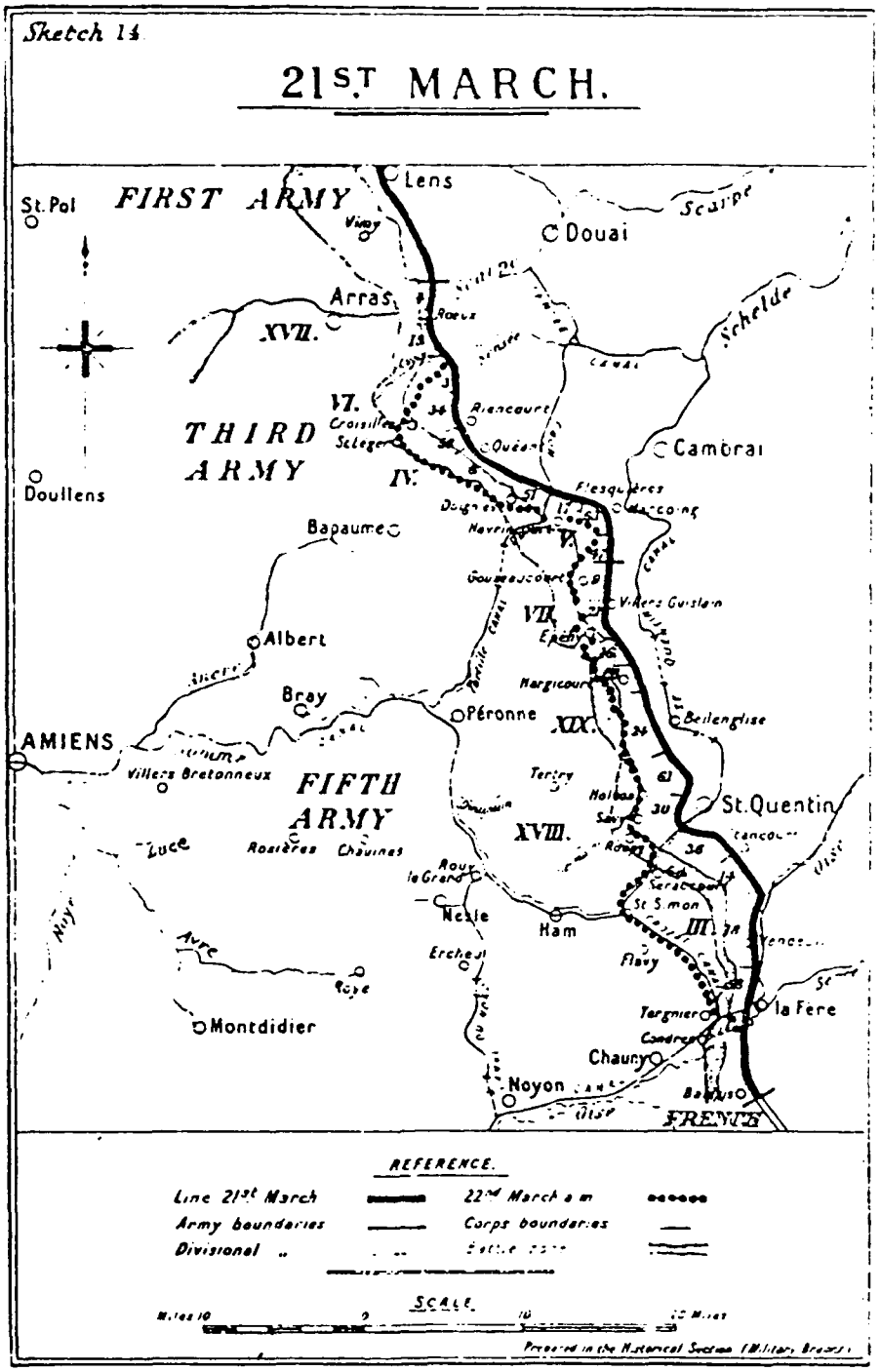


Figure 8: Battle Map of 21 March

Source: James E. Edmonds, ed., Military Operations, France and Belgium, 1918, vol 1 (London: MacMillan and Co., Limited, 1935), 160.

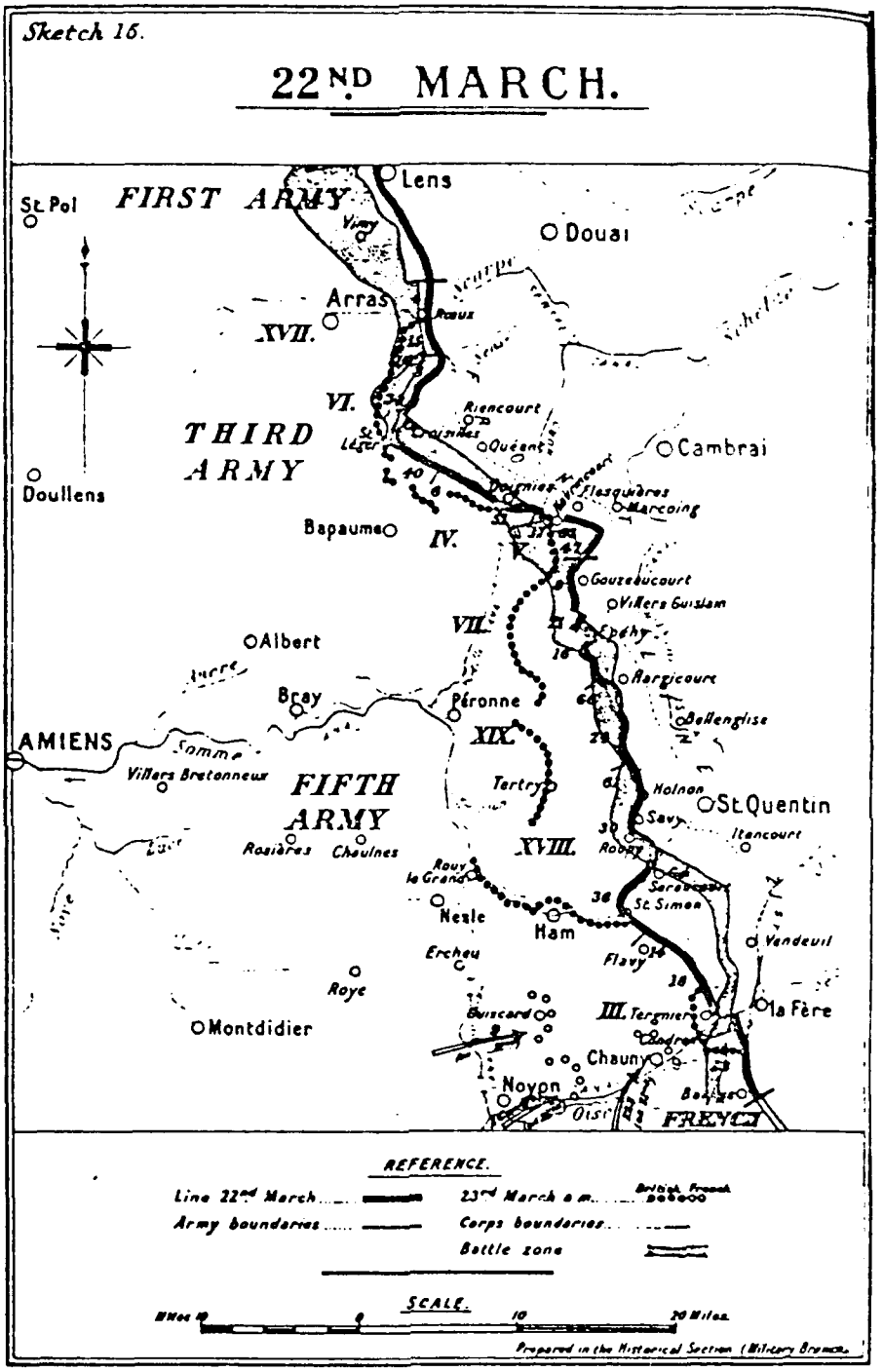


Figure 9: Battle Map of 22 March

Source: James E. Edmonds, ed., Military Operations, France and Belgium, 1918, vol 1 (London: MacMillan and Co., Limited, 1935), 264.

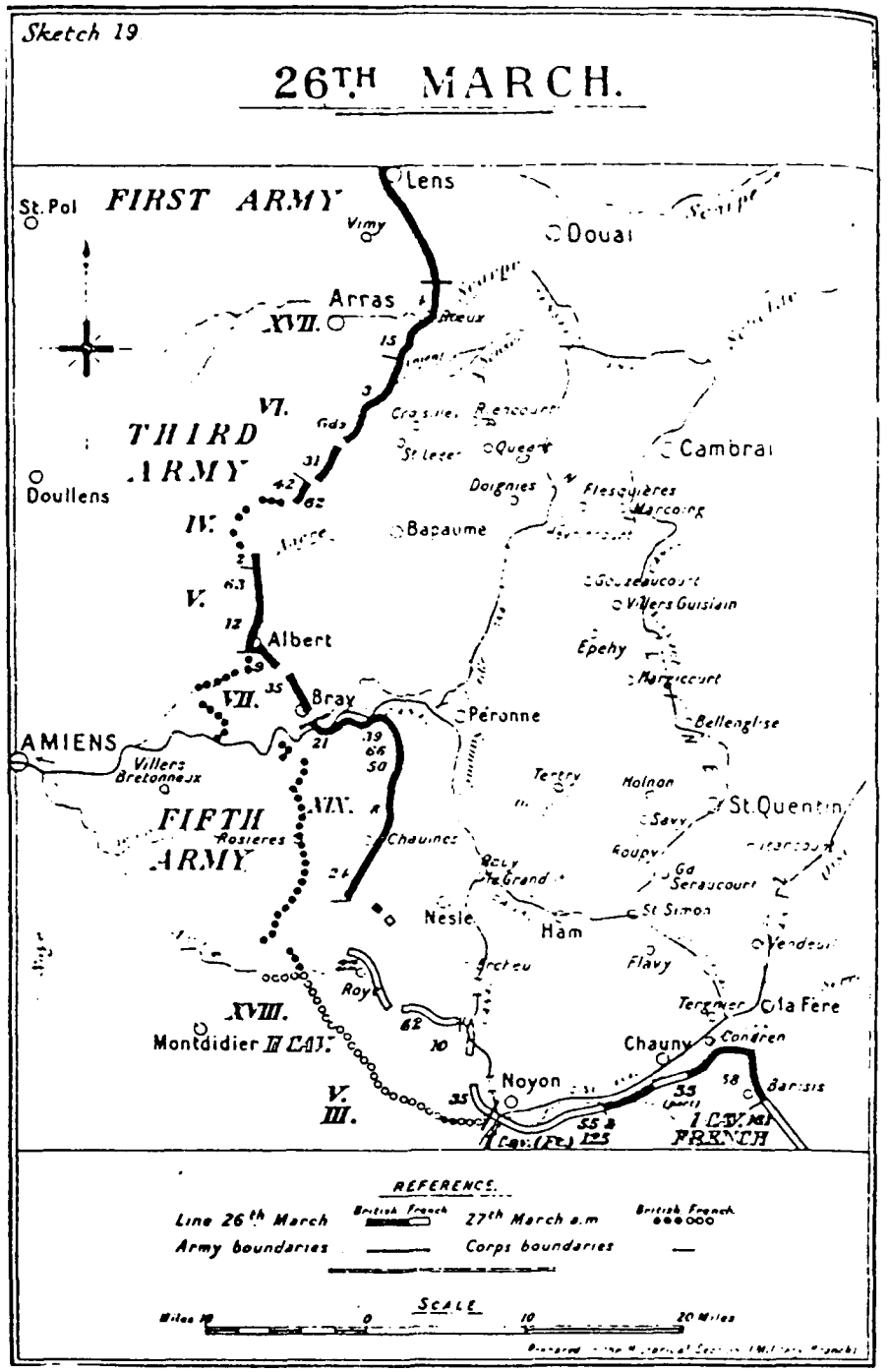


Figure 10: Battle Map of 26 March

Source: James E. Edmonds, ed., Military Operations, France and Belgium, 1918, vol 1 (London: MacMillan and Co., Limited, (1935), 496.

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