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Military Lessons of the First World War

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This article examines the lessons derived by the military organizations that participated in the First World War on land, at sea, and in the air. It demonstrates that while military and naval officers generally agreed that the human and economic costs of the war had been prohibitively high, they proposed a wide range of solutions to this problem. Moreover, the solution adopted by a particular army, navy, or air force depended on a variety of factors, including geography, ideology, and fiscal constraints.

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Introduction

In May of 1940, the German army invaded France and the Low Countries. Using tactics that relied on the initiative of officers leading mechanized units comprising tanks and motorized infantry supported by aircraft, the Germans quickly outmaneuvered French and British forces deployed to fight a static conflict like the First World War on the Western Front. By early June, Britain had initiated a desperate effort to evacuate its forces from the European continent, and by the end of the month the French government had surrendered. This campaign has long been cited as an example of the

importance of learning the correct lessons from a particular conflict. Williamson Murray has described this view of 1940 as follows:

> In sum, the traditional picture has explained the German success in the following fashion: the Germans, reacting to defeat in World War I, developed a *revolutionary* approach to war, one that emphasized maneuver and armored war as a means to escape the strategic and political consequences of their defeat in 1918. Their opponents, the stodgy, unimaginative officer corps of France and Britain, refused to learn the obvious lessons of the last war and went down to defeat in the great battles that occurred in May 1940 because the conceptions and approaches of the prior war had thoroughly muddled their thought processes.[1]

Given the decisive result of the 1940 campaign, it is certainly tempting to conclude that the German army drew the right lessons from the First World War while their adversaries drew the wrong ones. Such a judgment, however, glosses over prolonged and contentious debates that took place in all of the armed forces that participated in the First World War.

War on Land

The static character of the war on the First World War on the Western Front surprised European military planners. Previous conflicts had demonstrated the impact of modern firepower on the battlefield, but most professional soldiers did not believe that it would preclude successful offensive operations. The late summer and autumn of 1914, however, saw the failure of offensives by both sides, and the war degenerated into a prolonged stalemate. Over the next three years armies attempted to restore mobility to the battlefield by coordinating the forward movement of infantry with artillery barrages of varying duration and intensity. It was only in 1918, however, that they developed methods capable of breaking the deadlock, in the process offering glimpses of future land warfare. In March, the German army launched Operation Michael, an offensive that opened with a brief but intense artillery bombardment featuring shrapnel, high explosives, and poison gas, closely followed by the advance of small units of elite infantry known as storm troops. These units broke through British lines, bypassing strongpoints and creating havoc in rear areas. Despite making rapid initial gains, the offensive lost momentum. Subsequent German offensives using similar tactics produced diminishing returns as the most highly trained infantry became casualties.

In the summer of 1918, the Allies took the offensive against the depleted German army, employing tanks to spearhead the advance of the infantry. The Battle of Amiens, launched on 8 August, saw British and Commonwealth infantry supported by tanks and aircraft advance up to eight miles in a single day. The tanks of 1918, however, were quite susceptible to both mechanical breakdown and enemy anti-tank weapons. As a result, they were not available in sufficient numbers to produce a similar result before the armistice in November.[2] In addition, poor weather and German opposition limited the contribution of British aircraft to operations on the ground.[3] The Allies defeated the German army on the Western Front primarily through a series of “step-by-step” operations, in which infantry advanced under the cover of rapid, extremely heavy artillery bombardments, seizing limited

objectives and consolidating their gains while waiting for the artillery to arrive so that the process could be repeated.[4] This method incurred significant casualties, and did not produce spectacular breakthroughs. But it inflicted heavy losses on the enemy, weakening the German army and forcing it to concede territory.

There were significant variations in the tactics developed by different armies on the Western Front. By the end of the war, however, they all included poison gas in their artillery bombardments as a means of incapacitating defenders at the outset of offensive operations. The 1920s saw growing public revulsion toward the use of gas, and consequent attempts by the League of Nations to prohibit its use. These efforts, however, failed to stop the development of chemical weapons or their employment against non-Europeans. In the 1920s, the Spanish used gas to help put down the Rif Rebellion in Morocco, while in the 1930s, Italy used gas in its conquest of Ethiopia. Nor did international agreements stop states from developing plans to use chemical weapons against enemy civilians during the Second World War. In 1944, for example, the Anglo-American Combined Chiefs of Staff developed a plan for a massive bombardment of German cities using phosgene and mustard gas. Given the widespread recognition among military planners of the utility of poison gas, it is perhaps surprising that it was never actually used in military operations in Europe from 1939-1945. While Japan used chemical and even biological weapons during its invasion of China, it did not employ them against European or American forces. What seems to have restrained political leaders and military commanders from employing these weapons during the Second World War was a recognition of their potency. The awareness that the enemy could retaliate in kind to the use of chemical weapons, potentially targeting civilians or prisoners of war, acted as a powerful deterrent.[5]

This widespread recognition of the military value of poison gas, however, was the exception to the rule. The utility of other new weapons was subject to considerable discussion, with different armies drawing very different conclusions. Reflection on the lessons of the First World War began in the British army well before the conflict ended. The final year of the war saw debate between advocates of new technology such as tanks and proponents of more “traditional” tactics featuring infantry supported by artillery.[6] Allied victories in the fall of 1918 appeared to vindicate the traditionalists, but British society had suffered unprecedented losses in the conflict, and military and political leaders recognized that it would not tolerate casualties on a similar scale in the next war. Moreover, British officers worried about the collapse of morale in a conscript army, as had occurred in the French army in 1917. In the 1920s, prolific British advocates of mechanized warfare such as J.F.C. Fuller (1878-1966) and Basil *Liddell Hart* (1895-1970) proposed a less costly route to victory that emphasized shock rather than attrition. As Liddell Hart wrote in 1926:

> The real target in war is the mind of the enemy command, not the bodies of his troops. If we operate against his troops it is fundamentally for the effect that action will produce on the mind and will of the commander.[7]

The rapidly developing tank offered a means to achieve this shock effect. By 1923, the Vickers medium tank was capable of speeds of up to twenty miles per hour. Thus, under Sir George Milne

(1866-1948), Chief of the Imperial General Staff from 1926-33, the British army experimented with the concentration of armor and motorized units into formations in order to maximize their firepower and speed.[8] Ultimately, however, a combination of factors deterred the British from embracing the concept of massed armor. The principal purpose of the army in the interwar years was policing Britain's increasingly restive colonies, a task for which tank formations had limited utility. In addition, under the economic constraints of the 1930s, it became increasingly difficult to justify an expensive but unproven capability.

The experience of the First World War also discouraged British officers from giving tanks or motorized infantry an autonomous role on the battlefield. On the Western Front, British units had repeatedly suffered heavy casualties when they attempted to exploit their initial gains. British successes in 1918 had come largely as a result of careful coordination of units to achieve clearly defined objectives. Creating independent mechanized formations capable of advancing far more quickly than the rest of the army undermined the commander's ability to coordinate the forces under his control. Thus, while the British recognized the potential of mechanization, they ultimately concluded that tanks could most appropriately be used in coordination with other arms such as infantry and artillery. As David French has observed, while this approach reflected the historical experiences of the British in the First World War, it "promised to negate many of the advantages of mechanization."[9]

Although France was also on the winning side of the war, its experience differed from that of Britain in two important respects. First, the northeastern region of France, which produced three-quarters of the country's iron ore, was invaded and occupied by the German army for more than four years. Secondly, the French army had come much closer to collapse than its British counterpart, with widespread mutinies occurring after the disastrous Nivelle offensive in the spring of 1917. These experiences underlined for French military leaders the importance of defending the country's frontier with Germany, and the necessity of limiting the exposure of French soldiers to the devastating effects of enemy firepower.

French officers did not simply resign themselves to a defensive strategy in the next war. Nor were they oblivious to the potential implications of new technology. Like the British, the French army had employed tanks in 1918 and after the war French officers advocated the use of massed armor for offensive purposes. A 1919 study conducted by the army's general headquarters advocated the independent use of tanks, while an army manual published in 1920 decreed that tanks were most appropriately used on the offensive and "in mass".[10] In addition, while the army generally recognized the need for fortifications along the frontier, many senior officers including Marshals Ferdinand Foch (1851-1929) and Joseph Joffre (1852-1931) argued that fortified positions could facilitate offensive actions, limiting manpower required for the defensive and serving as launching points for offensives into Germany.[11]

As the 1920s progressed, French governments shortened conscripts' period of service in the army.

After 1928, soldiers served for only a year. Since before the First World War, French officers had been skeptical of the ability of inexperienced conscripts to execute offensive tactics under fire and the mutinies of 1917 had reinforced this belief. Thus, the shortened term of conscription dampened officers' enthusiasm for the offensive and lent weight to arguments in favor of defensive strategies and tactics. The concept that gained favor was the "methodical battle", which emphasized "tightly controlled operations, in which artillery would dominate both battlefield and forward movement."[12] This doctrine stifled the initiative of junior officers and rendered the offensive use of maneuver nearly impossible. As became evident in 1940, this doctrine also made it more difficult for French officers even to grasp the very different tactics employed by their enemy.

The armies that suffered defeat in the First World War were even more amenable to new but unproven concepts like massed armor. Russia exited the war in late 1917, seeking an armistice immediately following the Bolshevik Revolution. Until 1922, however, the country was engulfed in civil war between Bolshevik forces and a loose coalition of opposed factions, backed by contingents from more than half a dozen foreign powers. When the fighting finally subsided, the victorious Red Army therefore drew lessons from a longer and more diverse period of conflict than its western counterparts. The most obvious lesson, and one recognized by all of the continental belligerents, was the importance of social and economic mobilization in order to increase the state's ability to fight a prolonged war. Operations in Eastern Europe, however, were not characterized by the same high force-to-space ratios as those on the Western Front. Mobile operations therefore occurred throughout the First World War and the Red Army's first victories of the civil war had seen independent actions by cavalry utilizing maneuver.[13] Such victories were consistent with Russia's military history, which included centuries of mobile operations on the steppe.[14] Russia did not develop tanks in the First World War, but by the mid-1920s senior officers were recognizing the potential of mechanization to enable mobile operations. British experimentation with tanks in 1927-28 piqued Soviet interest. By the early 1930s, the works of Fuller and Liddell Hart had been translated into Russian and Red Army Field Service Regulations called for the use of tanks in independent groups to penetrate the enemy's defensive system.[15]

Soviet officers did not simply mimic British ideas. Theorists such as Viktor Triandafillov (1894-1931) and Mikhail Tukhachevsky (1893-1937) recognized that armor had the potential to achieve a shock effect through the use of maneuver, but they did not believe that this alone would be sufficient to achieve victory. Based on Russia's experience in the First World War, as well as Marxist-Leninist ideology, they argued that the next war would require the total mobilization of society and all of the state's resources. In such a conflict, victory could only be attained through the destruction of the enemy army, an objective too large to achieve in a single battle. In contrast to Fuller and Liddell Hart, Tukhachevsky argued that battle was

> the organized struggle of each of the armies for the destruction of the men and material of the other. Not the destruction of some hypothetical, abstract nervous system of the army, but destruction of the real organism—the troops and real nervous system of the opponent, the army's communications, must be the operational goal.[16]

This would require successive, combined-arms operations featuring the coordination of infantry, artillery, armor and airpower. Developed by Tukhachevsky in the early 1930s, the concept of "deep battle" envisioned the use of infantry, artillery, and armor to attack enemy defensive positions while aircraft targeted strong points, interdicted enemy reserves, and even dropped paratroops in the enemy's rear areas. Subsequent waves of armor and mechanized infantry would exploit initial gains, pushing into the enemy's defensive system, and ultimately destroying it. Unfortunately for the Red Army, Joseph Stalin's (1878-1953) purges claimed Tukhachevsky and many other members of the officer corps in 1937. As a result, the army entered the Second World War with a doctrine that was neither fully developed nor well understood. Its performance from 1939-42 reflected this. Of all armies in the interwar period, however, it was the Red Army that was most successful in combining the lessons of the First World War with the rapidly evolving capabilities of new technologies to develop a realistic approach to military operations in the next war.

At first glance, the lessons learned by German officers appear similar to those drawn by their Soviet counterparts. The German army's response to defeat on the Western Front, however, resulted from a very different mixture of political constraints, strategic calculations, and military culture. Its assessment of the lessons of the First World War took place in the shadow of the Treaty of Versailles, which reduced dramatically Germany's ability to use military power to achieve its grand strategic objectives. The treaty limited the size of the army to just 100,000 long-service volunteers, including 4,000 officers. This prevented the development of a large cadre of trained reservists who could be called to serve in the event of another war. The German General Staff and its intellectual training ground, the *Kriegsakademie*, were abolished. Moreover, the armed forces were prohibited from acquiring tanks, aircraft, anti-aircraft guns, and heavy artillery. To constrain further Germany's ability to fight a major war, the treaty imposed strict limitations on the development and production of the country's major arms manufacturers.[17]

The task of rebuilding the army in the context of these restrictions fell to Hans von Seeckt (1866-1936), its commander from 1920-26. In an effort to maximize the effectiveness of his small force, Seeckt incorporated the members of the disbanded General Staff into the new officer corps and initiated a comprehensive program to distill the lessons of the First World War, establishing no less than fifty-seven committees to study the issue. Examining German battlefield successes, these studies emphasized the importance of offensive tactics that relied on maneuver and the use of initiative by junior leaders.[18] Seeckt concluded that a highly-trained professional force could use speed and mobility to defeat larger conscript armies before they were able to mobilize fully for war. Such a conclusion was convenient, given the limitations imposed by the Treaty of Versailles, and the fact that Germany faced potential adversaries on both frontiers. It also reflected the longstanding preference of German officers for a professional army over a conscript force. Germany had not developed tanks in large numbers during the war, but British maneuvers as well as joint exercises with the Red Army in the late 1920s demonstrated their potential as a means of enabling mobile operations. By 1929, the German army was training to employ tank formations independent of

slower-moving infantry.[19]

Not all German officers agreed that a small professional force would be sufficient to win the next war. In 1935, Erich Ludendorff (1865-1937), Quartermaster-General of the army and *de facto* commander of the German war effort from 1916-18, published *Der Totale Krieg*, which argued that victory would require the mobilization of all of German society and its resources. Seeckt's successors had similar views. Ludwig Beck (1880-1944), who served as Chief of the reconstituted General Staff from 1933-38, favored the independent use of tanks. He placed greater emphasis, however, on combined arms operations and believed that a mass conscript army was essential to victory.[20] The ascension of Adolf Hitler (1889-1945) to power in 1933, however, had a decisive influence on the development of German strategy and tactics in two ways. A proponent of mechanization and technology more generally, Hitler supported advocates of radical concepts of armored warfare like Heinz Guderian (1888-1954). In addition, the pace of German expansion under Hitler outpaced the army's preparations for a prolonged war requiring national mobilization. The German army thus went to war in 1939 using innovative mobile tactics led by independent tank formations supported by aircraft. These tactics produced rapid victories in 1939-40, but they did not result from a widespread consensus within the army regarding the lessons of the previous war. Rather than advocating victory through "*blitzkrieg*", most German officers believed that the next major war would be a prolonged affair requiring the complete "militarization" of society.[21] When Hitler took Germany to war before this could be achieved, the army improvised by employing tactics that reflected its experiences in 1917-18, as well as its institutional preference for a mobile offensive executed by a professional army. These tactics proved successful in the opening campaigns of the Second World War. By late 1941, however, the German army was engaged in a titanic struggle on the Eastern Front, for which it had not adequately prepared. In this context, the army's inability to integrate fully the strategic lessons of the previous war became manifest.

War at Sea

Like their counterparts on land, naval officers were surprised by the character of the First World War at sea. The late 1800s had seen the evolution of weapons such as submarines and torpedoes, which posed a threat to the large battleships that had traditionally formed the core of European naval fleets. By the end of the century, however, improvements to armor as well as the development of countermeasures such as torpedo nets and search lights had reduced concerns about the vulnerability of the battleship. At the same time, the writings of the American naval historian and theorist Alfred Thayer Mahan (1840-1914) emphasized its centrality to maintaining command of the sea. The Battle of Tsushima (1905) during the Russo-Japanese War reinforced Mahan's views about the importance of decisive naval battles. Thus, navies raced to build heavily armed and armored Dreadnought-class ships in the decade leading up to 1914.[22]

Contrary to expectations, the decisive naval encounter never occurred. The Royal Navy's Grand Fleet engaged the German High Seas Fleet at the Battle of Jutland in 1916, but the result was

indecisive. While British losses in the encounter exceeded their own, the Germans were reluctant to risk another fleet engagement against the more powerful Royal Navy. Germany's most effective naval weapon was in fact the submarine, which sunk nearly 12 million tons of Allied shipping during the war. While most of this total constituted unarmed merchant ships, the scale of losses caused serious concern among British leaders, who feared in early 1917 that the ongoing German submarine campaign would starve Britain out of the war. Rationing, product substitution, and the adoption of defensive naval tactics such as convoying combined to reduce the U-boat threat. But the war demonstrated clearly the ability of the submarine to disrupt the supply lines of states dependent on seaborne trade like Britain. The First World War also saw the dramatic growth in the role of aircraft in support of naval operations. Britain's Royal Naval Air Service (RNAS) expanded from less than 1,000 personnel and 100 aircraft to 60,000 personnel and nearly 3,000 aircraft, which provided reconnaissance and artillery spotting for British naval vessels. By the end of the war, the Royal Navy had built twelve aircraft carriers and the Royal Naval Air Service was planning a torpedo-bomber raid against the High Seas Fleet.[23]

The belligerents involved in the First World War recognized the exorbitant cost of modern naval vessels. As a result, they were able to agree on limits to naval construction that held for most of the interwar period. The Treaty of Versailles drastically reduced the strength of the German navy and prohibited it from possessing large battleships or aircraft carriers. The Treaty of Washington, signed in 1922 and renewed in 1930, limited the tonnage of battleships and aircraft carriers of the world's other major fleets, specifying a ratio of 5:5:3:1.75:1.75 for the British, US, Japanese, French, and Italian navies respectively.[24] It was only in the mid-1930s that Japan and Italy abandoned it. This, along with Germany's renunciation of the Treaty of Versailles, finally forced the other powers to follow suit. While they could agree on the desirability of preventing another naval arms race, navies were less certain regarding the extent to which war at sea had changed. In retrospect, the impact of the submarine and the aircraft on naval warfare might seem as obvious as that of the tank on land. Nonetheless, navies proved reluctant to abandon what has been termed the "battleship paradigm", continuing to conduct exercises involving set-piece engagements between opposing fleets.[25]

Based on its experiences in the First World War, the German navy clearly understood the offensive potential of the submarine. While the Treaty of Versailles forbade it to possess aircraft or submarines, by the early 1920s the Germans were developing prototypes abroad in conjunction with other states. But German enthusiasm for submarines should not be overestimated. The German navy went to war in 1939 with an inventory of only fitfty-seven U-boats, far less than the 300 that Karl Doenitz (1891-1980), their leading proponent, deemed necessary for a large-scale offensive against enemy merchant shipping.[26] Germany's slow development of submarines during the 1930s stemmed in part from skepticism about their impact in future conflicts. Given the evolution of underwater detection methods such as the British ASDIC, many officers doubted that they would have the same impact as in 1917. More generally, many senior leaders continued to view the battleship as the primary instrument of naval warfare. Erich Raeder (1876-1960), commander of the German navy from 1928-43, dismissed the submarine as a weapon of the weak, funneling limited

economic resources into the construction of surface vessels like battleships and cruisers. Even Hitler himself preferred large battleships over less glamorous but potentially more effective weapons like the U-boat. Thus, German construction of submarines in large numbers would only begin once the opening years of the Second World War had demonstrated their value once again.

The Royal Navy saw significant debate in the interwar period regarding the role of the battleship in future conflicts. Some officers argued that the inconclusive engagement at Jutland resulted from the excessive caution of the British commander, Admiral John Jellicoe (1859-1935). Had the Grand Fleet defeated its German adversary decisively, they maintained, the war might have been shortened. Nevertheless, most British naval officers recognized that even a decisive naval victory over the High Seas Fleet would not have neutralized the threat posed to merchant shipping by submarines.[27] From the conclusion of the First World War, Britain therefore advocated an international agreement to abolish the submarine. While this effort proved unsuccessful, the Royal Navy also initiated a deception campaign, exaggerating the capabilities of ASDIC, its underwater detection technology, in order to convince adversaries and allies alike that further investment in submarines was not a worthwhile use of resources. This campaign had some success in slowing the German development of submarines, not least because it reinforced existing preferences for surface vessels.[28]

The British also recognized the impact of aircraft on naval warfare, developing ambitious plans to develop twelve modern carriers. As was the case with the British army, however, the Royal Navy's application of the lessons of the First World War was hampered by limited means and expanding responsibilities. The establishment of the Royal Air Force in 1918 resulted in the diversion of aircraft and talented aviators to other roles in the interwar period.[29] In addition, the emergence of Japan as a revisionist power in the Pacific compelled Britain to invest in the development of a major naval base at Singapore and to commit resources to defending its Asian colonies. More generally, the Royal Navy continued to adhere to the battleship paradigm. Although financial constraints curtailed naval construction for most of the interwar period, when Britain began rearming in earnest during the late 1930s, the first priority of the Royal Navy remained battleships and slightly smaller cruisers. Thus, rather than twelve modern aircraft carriers, Britain entered the Second World War with only four "first-line carriers and three obsolescent ones."[30] Moreover, beyond its efforts to create a mystique around ASDIC, the Royal Navy did not develop adequate countermeasures to the submarine, entering the Second World War with a dearth of escort vessels, a focus on offensive tactics rather than proven defensive methods such as convoying, and little experience with the use of aircraft for escort duties.[31]

The US and Japanese navies also remained committed to the battleship. The Japanese navy played only a minor role in the First World War, and its decisive victory at Tsushima in 1905 therefore continued to loom large in its conception of naval warfare in the interwar period. The Japanese spent approximately three times as much as the Royal Navy modernizing their existing battleships, and in the 1930s constructed the largest battleships in the world, the *Musashi* and the *Yamato.* Despite the

efforts of American airpower advocate Billy Mitchell (1879-1936) to demonstrate the vulnerability of naval vessels by to aircraft, the US navy also continued to conceive of the battleship as the centerpiece of its fleet, spending more than five times as much as the British on modernization of existing ships. It was geography and shifting strategic realities, rather than the lessons imparted during the First World War, that led the Japanese and Americans to develop aircraft carriers during the 1930s. As the likelihood of a conflict between the United States and Japan increased, both sides recognized that they would have to project naval power across the vast expanses of the Pacific. Carriers would be essential to protect their fleets as they moved beyond the range of their own land-based aircraft. Thus, while both navies made extensive use of carriers during the Second World War, they both initially conceived of them in a supporting role, protecting the fleet so that it could engage in the type of decisive battle envisioned by naval theorists since the nineteenth century.[32]

War in the Air

In the decade after Orville Wright's (1871-1948) first successful flight in 1903, the capabilities of winged aircraft developed quickly. The Italian army first used airplanes for military purposes in 1911 when it seized Libya from the Ottoman Empire. The First World War saw aircraft perform a variety of roles, including reconnaissance, support of ground and naval forces, and even bombing of civilian targets. After conducting Zeppelin raids against Britain from early 1915, the Germans began using winged aircraft to bomb British cities in 1917. By 1918, the British were retaliating in kind. While these rudimentary bombing raids had a negligible impact on the outcome of the war, they captured the imaginations of officers who saw a potentially decisive role for aircraft in future conflicts. The best known was Giulio Douhet (1869-1930), a staff officer in the Italian army. Interested in the military use of aircraft since well before the war, Douhet advocated bombing raids against enemy production centers as early as 1915. In 1921, he published *Il Dominio dell' aria* [*The Command of the Air*], which argued that air power had the potential to avert bloody stalemates like that which had prevailed in Europe from 1914-18. Writing prior to the invention of radar, Douhet argued that a surprise attack by a fleet of bombers could inflict significant damage on population centers, devastating civilian morale and compelling the enemy to surrender. The only means of avoiding such an attack was to launch a preemptive strike against the air force of the adversary. Douhet therefore advocated the development of an air force consisting predominantly of bombers, capable of bringing future wars to a rapid and decisive conclusion.[33]

Douhet was not alone in his thinking. Hugh Trenchard (1873-1956), the first Chief of Staff of the Royal Air Force upon its establishment in 1918, developed similar ideas independently, advocating the acquisition of bombers for offensive purposes rather than diverting resources to develop air defense capabilities. Trenchard and especially Douhet influenced officers elsewhere. In the United States, Billy Mitchell argued that air power had rendered land and naval forces obsolete, calling for strikes against urban centers behind enemy lines. In France, officers such as Pierre Fauré argued that airpower was capable of achieving a "quick and cheap victory" in future wars. In Germany as

well, officers recognized the benefit of targeting enemy production centers.[34]

It is worth noting, however, that the First World War offered very limited historical evidence to support the lessons derived by the leading advocates of air power. Bombing raids against civilian targets had certainly affected morale in Germany and Britain, but in neither country did they come close to inducing the type of collapse envisioned by Douhet. Indeed, Douhet argued explicitly that given the rapid development of air warfare, history offered few relevant lessons for the future.[35] Not surprisingly therefore, air power advocates faced multiple criticisms based on analysis of the actual role of aircraft in the First World War. The Italian naval officer Giuseppe Fioravanzo (1891-1975) challenged Douhet, arguing that command of the air could be contested. Air forces were therefore foolish to concentrate on developing bombers that would be vulnerable to attack by smaller fighter aircraft. In France, General Albert Niessel (1866-1955) emphasized that ground forces would continue to play a decisive role in future conflicts. As late as 1942, when the capabilities of aircraft had grown significantly from 1918, British Admiral John Tovey (1885-1971) challenged Trenchard's assertion that bombing enemy cities would be sufficient to win a war. Based on the events of the last major conflict, Tovey maintained that aircraft would be put to better use protecting the sea lines of communication on which Britain depended for survival.[36]

As was the case with land and naval warfare, the lessons derived by military organizations regarding air warfare were shaped by geographic, institutional, and economic factors. Those organizations that engaged in rigorous post-war analysis tended to draw conclusions that emphasized the importance of cooperation between air and ground forces. In Germany, for example, Hans von Seeckt's comprehensive assessment of the lessons of the First World War included examinations of the contributions of air power, conducted by multiple teams of officers. These studies revealed the importance of achieving air superiority before initiating other operations, the relative inaccuracy of bombing, and the crucial role of aircraft in supporting the German offensives of 1918.[37] As discussed previously, Soviet theorists also emphasized coordination of air and ground forces, rather than the potential of strategic bombing.

These conclusions, however, were influenced by geographic considerations. Connected by land to potential adversaries, the Soviet Union and Germany were inclined to view aircraft primarily as a means of supporting ground forces, which had always played an essential role in the defense of their territories. In contrast, Britain and the United States were protected by water from imminent invasion and could therefore afford to gamble on Douhet and Trenchard's unproven assertions about the decisiveness of airpower. Economic and institutional imperatives reinforced the Anglo-American infatuation with strategic bombing. From its establishment in 1918, the Royal Air Force faced hostility from both the Royal Navy and the British army, which saw little need for an independent air force. This hostility prevailed throughout the interwar period, as the services competed for shares of a shrinking defence budget. Defining strategic bombing as its central role allowed the RAF to argue that it was capable of achieving decisive results in a future war, independently of the other services. While the United States Air Force was not established until 1947, strategic bombing played a similar

role for American air power advocates, helping them make the case for an independent air force in the 1920s and 1930s.[38] This is not to suggest that these organizations disregarded entirely the lessons of the war regarding the value and potential of air power. Both Britain and the United States recognized the importance of air superiority, as well as air support to land and naval forces. The Germans also saw potential in strategic bombing. The relative value of these roles, however, was subject to debates, the outcome of which was influenced significantly by the particular circumstances of the states, organizations, and individuals involved.

Conclusion

The military lessons of the First World War were never obvious. A century after the end of the conflict, historians continue to debate how and why the Allies won it. Even if it was possible for military professionals involved in the war to identify weapons, tactics, or operational methods that produced success, the rapid pace of technological change during the interwar period made it very difficult to determine the extent to which these advantages would prevail over time. Through careful analysis of the events of the war, military officers were able to discern valuable lessons that proved effective during the Second World War. This was particularly true in the German army. Nevertheless, this essay demonstrates that it is overly simplistic to praise certain military organizations for drawing the “right” lessons from the war, while criticizing others for drawing the “wrong” ones. While rigorous analysis of the events of the First World War produced a variety of tactical and operational insights, the relative importance of these insights was subject to debate in all of military organizations that participated in the conflict. Moreover, the lessons that individual military organizations chose to emphasize reflected their very different geographic situations, ideological perspectives, economic realities, and institutional interests. For example, in the final months of the war both German and British officers discerned the possibility of using armor, motor vehicles, and aircraft to restore mobility to the battlefield. That the British did not apply this lesson to the same extent as the Germans resulted less from indifference or lack of imagination than from Britain’s different geographic, strategic, and economic realities. Overall, the military lessons derived from the war depended on the perspective of those who searched for them.

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Notes

1. ↑ Murray, Williamson: Armored Warfare: The British, French and German Experiences, in: Allan R. Millett and Williamson Murray (eds.): Military Innovation in the Interwar Period. Cambridge 1998, p. 7.

2. ↑ Travers, Tim: The Evolution of British Strategy and Tactics on the Western Front in 1918: GHQ, Manpower and Technology, in: The Journal of Military History 54/2 (April 1990), pp. 191-92.
3. ↑ Boff, Jonathan: Combined Arms during the Hundred Days Campaign, August-November 1918, in: War in History 17/4 (October 2010), pp. 459-478.
4. ↑ Harris, Paul and Marble, Sanders: The 'Step-by-Step' Approach: British Military Thought and Operational Method on the Western Front, 1915–1917, in: War in History 15/1 (January 2008), pp. 17-42.
5. ↑ Schmidt, Ulf: Preparing for Poison Warfare: The Ethics and Politics of Britain's Chemical Weapons Program, 1915-1945, in: Bretislav Friedrich et al. (eds.): One Hundred Years of Chemical Warfare: Research, Development, Consequences, New York 2017, p. 99.
6. ↑ Travers, The Evolution of British Strategy and Tactics 1990, pp. 183-85.
7. ↑ Liddell Hart quoted in Heuser, Beatrice: The Evolution of Strategy: Thinking War from Antiquity to the Present, Cambridge 2010, p. 185.
8. ↑ Murray, Armored Warfare 1998, p. 26.
9. ↑ French, David: Raising Churchill's Army: The British Army and the War Against Germany, 1919-1945, Oxford 2000, p. 43.
10. ↑ Kier, Elizabeth: Imagining War: French and British Military Doctrine between the Wars, Princeton 1997, p. 43.
11. ↑ Ibid., pp. 41-44.
12. ↑ Murray, Armored Warfare 1998, p. 32.
13. ↑ Strachan, Hew: European Armies and the Conduct of War, New York 2001, p. 158.
14. ↑ Lee, Wayne: Waging War: Conflict, Culture and Innovation in World History, Oxford 2015, p. 420.
15. ↑ Gat, Azar: A History of Military Thought from the Enlightenment to the Cold War, Oxford 2001, p. 635.
16. ↑ Kipp, Jacob: Two Views of Warsaw: The Russian Civil War and Soviet Operational Art, 1920-1932, in: B.J.C. McKercher and M.A. Hennessy (eds.): The Operational Art: Developments in the Theories of War, Westport 1996, p. 53.
17. ↑ Liedtke, Greg: Enduring the Whirlwind: The German Army and the Russo-German War, 1941-1943, Solihull 2016, p. 46.
18. ↑ Murray, Armored Warfare 1998, pp. 36-37.
19. ↑ Geyer, Michael: German Strategy in the Age of Machine Warfare, 1914-1945, in: Paret, Peter (ed.): Makers of Modern Strategy: From Machiavelli to the Nuclear Age, Princeton 1986, p. 559.
20. ↑ Strachan, European Armies 2001, p. 162.
21. ↑ Deist, Wilhelm: The Road to Ideological War, in: Murray Williamson, MacGregor Knox and Alvin Bernstein (eds.): The Making of Strategy: Rulers, States, and War, Cambridge 1994, p. 359.
22. ↑ Black, Jeremy: Warfare in the Western World, Bloomington 2002, pp. 125-30.
23. ↑ Till, Geoffrey: Adopting the Aircraft Carrier: The British, American and Japanese Case Studies, in: Millett and Murray, Military Innovation in the Interwar Period 1998, pp. 194-195.

24. ↑ The treaty placed tonnage limitations on the battleships and aircraft carriers possessed by the signatories. Britain and the United States were each restricted to 525,000 tons, while Japan was allowed 315,000 tons. France and Italy were each permitted 175,000 tons. The agreement is often expressed as the ratio 5 (Britain):5 (United States):3 (Japan):1.75 (France):1.75 (Italy).
25. ↑ Ibid., p. 220.
26. ↑ Maiolo, Joe: Deception and Intelligence Failure: Anglo-German Preparations for U-Boat Warfare in the 1930s, in: Thomas G. Mahnken and Joseph A. Maiolo (eds.): Strategic Studies: A Reader, London 2014, p. 184.
27. ↑ Heuser, The Evolution of Strategy 2010, p. 251.
28. ↑ Maiolo, Deception and Intelligence Failure 2014, p. 195.
29. ↑ Till, Adopting the Aircraft Carrier 1998, p. 207.
30. ↑ Ibid., p. 198.
31. ↑ Maiolo, Deception and Intelligence Failure 2014, p. 184.
32. ↑ Till, Adopting the Aircraft Carrier 1998, p. 222.
33. ↑ Gardner, Nikolas: “Military Thought from Machiavelli to Liddell Hart”, in: Matthew Hughes and William Philpott: Palgrave Advances in Modern Military History, London 2006, p. 76.
34. ↑ Heuser, The Evolution of Strategy 2010, pp. 307-2088, 315.
35. ↑ Muller, Richard: The Airpower Historian and the Education of Strategists, in: Richard Bailey, James Forsyth and Mark Yeisley (eds.): Strategy: Context and Adaptation from Archidamus to Airpower, Annapolis 2016, p. 115.
36. ↑ Heuser, The Evolution of Strategy 2010, pp. 310-311.
37. ↑ Murray, Williamson: Strategic Bombing: The British, American, and German Experiences”, in: Millett and Murray, Military Innovation 1998, p. 115.
38. ↑ Muller, Richard: Close Air Support: The German, British, and American Experiences, in ibid., pp. 163-73.

Selected Bibliography

Bernstein, Alvin H. / Knox, MacGregor / Murray, Williamson (eds.): **The making of strategy. Rulers, states, and war**, Cambridge 1994: Cambridge University Press.

Black, Jeremy: **Warfare in the Western world, 1882-1975**, Bloomington 2002: Indiana University Press.

Dülffer, Jost: **Weimar, Hitler und die Marine. Reichspolitik und Flottenbau 1920-1939**, Düsseldorf 1973: Droste.

Förster, Stig (ed.): **An der Schwelle zum Totalen Krieg. Die militärische Debatte über den Krieg der Zukunft, 1919-1939**, Paderborn 2002: Schöningh.

French, David: **Raising Churchill's army. The British army and the war against Germany, 1919-1945**, Oxford 2000: Oxford University Press.

Gat, Azar: **A history of military thought. From the Enlightenment to the Cold War**, Oxford 2001: Oxford University Press.

Kier, Elizabeth: **Imagining war. French and British military doctrine between the wars**, Princeton 1997: Princeton University Press.

Millet, Alan R. / Murray, Williamson (eds.): **Military innovation in the interwar period**, Cambridge 2007: Cambridge University Press.

Paret, Peter (ed.): **Makers of modern strategy. From Machiavelli to the nuclear age**, Princeton 1986: Princeton University Press.

Posen, Barry R.: **The sources of military doctrine. France, Britain, and Germany between the World Wars**, Ithaca 1984: Cornell University Press.

Strachan, Hew: **European armies and the conduct of war**, London; New York 1991: Routledge.

Travers, Timothy: **How the war was won. Command and technology in the British army on the Western front, 1917-1918**, Barnsley 2005: Pen & Sword Military Classics.

Wettstein, Adrian: Zwischen Trauma und Erstarrung. Die französische Doktrin der Zwischenkriegszeit, in: Jaun, Rudolf / Olsansky, Michael M. / Picaud-Monnerat, Sandrine / Wettstein, Adrian (eds.): An der Front und hinter der Front. Der Erste Weltkrieg und seine Gefechtsfelder = Au front et à l'arrière. La Première Guerre mondiale et ses champs de bataille, Baden 2016: hier + jetzt, pp. 202-222.

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The lessons they drew from their World War I experience colored their outlook and guided their decisions, as it did for the mass of their countrymen who did the fighting, building, and suffering over the following half century. For some, the combat experience had enlightened them, for many others it had brutalized them, but for almost all, it had weakened the certainties which had been the underpinning of European society for centuries.Â Banks, Arthur. Military Atlas of the first World War. London: Heineman Educational Books, 1975. The heart of this book are the approximately 300 very comprehensible maps covering all the fronts. World War I (or the First World War, often abbreviated as WWI or WW1) was a global war originating in Europe that lasted from 28 July 1914 to 11 November 1918. Contemporaneously known as the Great War or "the war to end all wars", it led to the mobilisation of more than 70 million military personnel, including 60 million Europeans, making it one of the largest wars in history. It is also one of the deadliest conflicts in history, with an estimated 8.5 million combatant deaths and 13 million civilian... After studying the lessons of the Crimean War and other 19th century conflicts, military industrialists developed hundreds of improvements and rushed them to patent. The most significant changes improved the calibre, range, accuracy and portability of heavy artillery. During the American Civil War (1861-65), heavy artillery could fire up to 2.5 kilometres (1.5 miles) at best. By the early 1900s, this range had almost tripled.Â These advances allowed artillery shelling and bombardments to become standard practice along the Western Front during World War I. First developed in 1881, machine guns also became smaller, lighter, more accurate, more reliable and much faster, some capable of firing up to 600 rounds per minute. Small arms also improved significantly. World War I is often called â€˜the Great Warâ€™, â€˜the first modern warâ€™ or â€˜the war to end all warsâ€™. It was the first war in which modern machine guns, chemical weapons, tanks, fighter aircraft and submarines were used to cause devastation on a global scale. Regardless of what it is called, the events of World War I destroyed entire cities and towns and took the lives of millions of soldiers and civilians. At the end of World War I, the map of Europe was redrawn.Â By joining one of these alliances, each participating nation promised to provide military support if one of its members was attacked by a member of the opposing alliance. Ironically, one of the main goals of the alliance system was actually to prevent the outbreak of war.