Expeditions with MCUP

The American and Joint Origins of Operational Depth in the Meuse-Argonne Campaign

Thomas Bruscino, PhD

https://doi.org/10.36304/ExpwMCUP.2021.05

Abstract: A common view is that the U.S. military adopted wholesale the Soviet concept of operational depth in the 1970s and 1980s. However, a closer look at U.S. Army concepts, doctrine, and planning reveals that the concept, word, and definition of *depth* existed in the U.S. military prior to the 1970s. The beginnings of depth in the U.S. Army predate even the great interwar Soviet theorists. The American idea traces to the World War I era, during which it was made manifest in the Joint campaign and operations known as the Meuse-Argonne offensive.

Keywords: military theory, operational art, operational depth, World War I, doctrine, Saint-Mihiel, Meuse-Argonne, airpower, artillery, Joint warfighting, operational design

---

Thomas Bruscino, PhD, is an associate professor of history in the Department of Military Strategy, Planning, and Operations at the U.S. Army War College in Carlisle, Pennsylvania, and an editor of *War Room*. He holds a PhD in military history from Ohio University, Athens, and was a professor at the U.S. Army School of Advanced Military Studies, Command and General Staff College, Fort Leavenworth, Kansas. He is the author of *A Nation Forged in War: How World War II Taught Americans to Get Along* (2010) and numerous book chapters and articles on military strategy and operational art.

In the mid-1970s, the U.S. military was trying to recover, like the rest of the country, from the travails of the Vietnam War. Since it seemed safe to say that the United States would avoid Vietnam-type interventions for a while, much of its armed forces returned to a more singular focus on a potential war with the Soviet Union in Europe. This focus helped the Services rebuild, and the armed forces improved tremendously in their recruiting, training, education, and technology. Revitalized schools and rigorous training events, especially in Europe, led to a closer look at the Soviet armed forces and their fighting doctrines and theories. Out of such studies of the enemy came the formal adoption into U.S. doctrine of the Soviet concept of *operational art*, the level of war between strategy and tactics. With Soviet operational art came the tenet of *depth*.[1]

Or at least so the story goes. The Soviets, led by such thinkers as Alexander A. Svechin, Mikhail N. Tukhachevsky, Vladimir K. Triandafillov, and Georgii S. Isserson, had invented the concepts of operational art and depth during the interwar period between the First and Second World Wars. Their focus was on the activities of large units—armies, corps, and divisions—in the field, along with a Marxist-Leninist emphasis on revolutionary changes in warfare. For them, operational art was a deviation from the old strategy of a "single point," whereby armies would maneuver until they came together for a decisive battle. Greater numbers of soldiers, extended ranges and rates of firepower, and the extension of continuous lines had created the necessity of campaigns that consisted of multiple large units engaged in simultaneous, successive, and distributed operations. Depth was the central feature of modern operations that drove operational art. This had been evident in World War I, with deep-echeloned defensive formations and long-

range artillery. But the Soviets quickly moved past that depth and focused on the advent of faster and more durable tanks, longer-range attack and bombing aviation, and large long-range airborne units. Their deep operations included deep fires, especially using aviation, simultaneous to the advance of a ground attack on the front lines to achieve a penetration, which would be followed by a breakthrough of mechanized and motorized forces deep into the enemy's defensive echelons and reserves, causing shock and collapse of enemy forces.[2]

In the 1970s, the U.S. Army, the confidence of which had been hit especially hard by the Vietnam War, took the lead in the United States in developing more well-defined operational concepts. Through an agreement with the U.S. Air Force, Army leaders developed the operating concept of AirLand Battle in the 1980s. This new operating concept explicitly used operational art and emphasized depth. In *Operations*, Field Manual (FM) 100-5, published in 1986, offensive depth was described as follows:

> Momentum in the attack is achieved and maintained when resources and forces are concentrated to sustain operations over extended periods, adequate reconnaissance is provided beyond areas of immediate concern, committed enemy forces are adequately fixed, uncommitted enemy forces are interdicted or otherwise prevented from interfering, adequate air protection is provided, the enemy's command and control system is disrupted, adequate reserves and follow and support forces are provided, vulnerable rear area facilities are protected, logistic resources are moved forward, and combat forces project tactical operations . . . deep into the enemy's

> vulnerable areas. . . . In conjunction with air and naval operations, [commanders] employ maneuver, fires, and special operations to attack enemy units, facilities, and communications throughout the theater and to force the enemy to fight battles on their terms. Following the battle, theater operations in depth are used to extend the advantages gained by tactical success or to limit losses.[3]

While Soviet and American uses of depth contained similarities, the Soviets tended to place greater focus on technological innovations in mechanization and motorization to lay out a specific form of deep battle and deep operations.[4] The Americans laid out some similar examples of deep operations, but they kept their understanding and definition of depth more conceptual.

So what? There is an interesting characteristic about the adoption of military theory into formal doctrine. When supposedly new ideas emerge, whether wholesale from the mind of a theorist or on encountering them from foreign sources, a military organization will be more likely to take on that idea if it is already one to which they subscribe. The new idea may be better named or expressed, such as operational art, but in the main its characteristics are already present and often deeply imbedded in the military culture of the adopting organization.

So it was with the formal American adoption of operational depth. The idea of the concept, as it was expressed in AirLand Battle, had long been a part of the U.S. Army's way of campaigning, so it was an easy sell when the Army adopted the word more formally in the 1970s and 1980s. But even

that is not quite right. A closer look at Army concepts, doctrine, and planning reveals that it was not just the concept of depth that had existed in the U.S. military prior to the late 1970s, but rather the word and definition itself. The clear beginnings of depth in the U.S. Army predate even the great interwar Soviet theorists. The American idea traces to the World War I era, where it was made manifest in the Joint campaign and operations known as the Meuse-Argonne offensive.

Origins of Depth

The concept of depth as applied to campaigning was not well developed prior to World War I, but it appeared in enough military literature that it took on a common meaning. Writers used depth in multiple related ways. The first dealt with the length of a formation in a marching column. The second had to do with the old military idea of echelonment in battle. An attack in echelon involved units stacked behind one another, often on a diagonal. As the lead units became exhausted, the follow-on units would fill in and continue the attack. The more units were echeloned, the deeper the overall formation and operation became. German staff histories in the late nineteen and early twentieth centuries used depth in these ways, as did other commonly read works of the era.[5] A third version of depth first appeared during the American Civil War but became more prevalent along fixed fronts, beginning in the Russo-Japanese War (1904–5) and continuing into World War I. This would eventually be called *defense in depth*—the use of multiple parallel lines of defense, starting at the front lines and working backward.[6]

One of the ways in which all of these ideas could come together in the offensive was by echeloning forces in sufficient depth to sustain an attack all the way through a defense in depth. An even better option would be to use fires to attack defenders throughout their depth simultaneous to launching an echeloned attack. These basic ideas existed around the turn of the twentieth century and were becoming more common in military usage around the world, including in the United States. They had been studied and developed at the U.S. Army Command and General Staff School and U.S. Army War College in the decades prior to World War I. As a result, nearly all of the commanders and staff officers who served in key roles in American field armies and corps during the war had been exposed to these terms and concepts in American texts and lecture series that they had studied in those years.[7]

When the United States entered World War I in April 1917, and when U.S. Army major general John J. Pershing and his initial American Expeditionary Forces (AEF) staff—including future AEF operations chief Lieutenant Colonel Fox Conner and First Army chief of staff Major Hugh A. Drum—went to Europe to learn what might be required of them to contribute to the fight, the American conception of depth began to evolve. Based on their own strategic situation, the nature of the stalemated western front, and the observations and recommendations of their Allies, the Americans came up with their own operating concept as part of a larger program of what they called “open warfare.” Open warfare, a broad way of fighting that was meant to be different from the positional warfare that dominated the western front, had many interrelated aspects, tracing from

the training of individual soldiers to the tactics of small units to the theater military strategy-making of the AEF general headquarters.

When it came to the blurred line between large-unit (division and above) tactics and operational art, one of the most famous and misunderstood manifestations of open warfare was organizational: the so-called "square division," made up of four large infantry regiments. The leaders of the AEF purpose-built the square division for open warfare explicitly because it could fight in depth. In battle, the division would array frontline units such as regiments or battalions with a similar unit directly behind them. For example, two regiments would be forward and two would be back, or more commonly, all four regiments would be abreast, with their three battalions arrayed in depth. These arrangements would allow the front units to penetrate enemy front lines in the attack, with the rear units to be used to follow-on and exploit the breeches. Such an organization gave the division tactical depth and a greater ability to keeping moving forward in the attack.[8]

Less well known is that Pershing and his staff also intended for corps to be large square formations. The creators of what would become the First U.S. Army developed a concept for a standardized corps, to be made up of a total of six divisions. Four of those divisions would be engaged in the fighting, one held for replacements, and one assigned depot duty. Each corps commander would fight their unit in a square, just like the divisions. The creators envisioned two divisions going forward in the attack and creating a tactical breakthrough. When they became exhausted, the two follow-on divisions would move forward through the front lines and in and through the operational rear areas of the enemy. The initial divisions would

rest and refit using the replacement or depot divisions, or one or both would be replaced entirely, so that they could head back into the fight when the follow-on divisions became exhausted.[9]

Figure 1. American troops in action in France, 1918

U.S. Marines drive into Argonne, France, 1918. American soldiers and Marines fought together on the western front of World War I as members of the U.S. Army's 2d Division, I Corps, First Army. Organized as a "square division," 2d Division was made up of four infantry regiments, two Army and two Marine. Source: Official U.S. Marine Corps photo.

In May 1918, this square organization, especially involving divisions, came under scrutiny from the United States' Allies on the western front. Fox Conner, now a temporary colonel in the field, had his AEF operations section revisit the question, drawing on their understanding of the problem and feedback they had received from division commanders. Lieutenant Colonel

Hugh A. Drum led the committee and wrote a report on its findings, explaining the "principle of 2- or 4-unit system":

> Its efficiency is more evident today than ever before. It applies to all units from the company to the corps. In the warfare of small forces, the tactics of the high command being mainly the envelopment, etc., of the enemy, the 3-unit system has many advantages. In the war of masses and protected flanks, the offensive produces success by surprise blows, whose power is insured by great depth. . . . The requirement is depth of formation so arranged as to permit a constant pressure from the rear combined with local envelopments, etc. Success in this particular is best insured [*sic*] by organization of the attack units so that depth may be secured within an organization and not by combining several larger organizations and thus disrupting the machine at a time when smooth running is essential.
>
> Based on the foregoing, we have organized our corps of four divisions and our divisions of four infantry regiments.
>
> The strength of our regiments plus the artillery of the division insures [*sic*] to the division the ability to carry an attack by its own power through to a reasonable objective. This avoids mixing units at the critical time. Back of each division, the corps has a corresponding unit ready to carry on the attack, meet counterattacks or, if needed, to relieve the exhausted division.[10]

Drum carried on the principle of depth to within the division down into regiments, battalions, companies, and platoons. That this view had become so prevalent throughout the AEF was indicated by Major General Charles P. Summerall's response to Pershing about whether he could keep up the fight in the Battle of Soissons in the summer of 1918: "Sir, when the 1st Division has only two men left they will be echeloned in depth and attacking toward Berlin."[11]

Enter the Artillery and Airplane at Saint-Mihiel

At that point, in mid-1918, the AEF leadership's understanding of depth was a product of their own military history and experience. Their focus was on building deep resilient formations that could extend operations and campaigns in time, which allowed them to continue fighting, attrite enemy forces, and take ground until they achieved their operational objectives, much like U.S. Army general Ulysses S. Grant had done in the Civil War. What they had not spent quite as much time on, because there was no opportunity to do so, was the initial extension of operations in space. Consequently, the AEF leadership still had to develop the idea of striking the enemy throughout the depth of their formations.

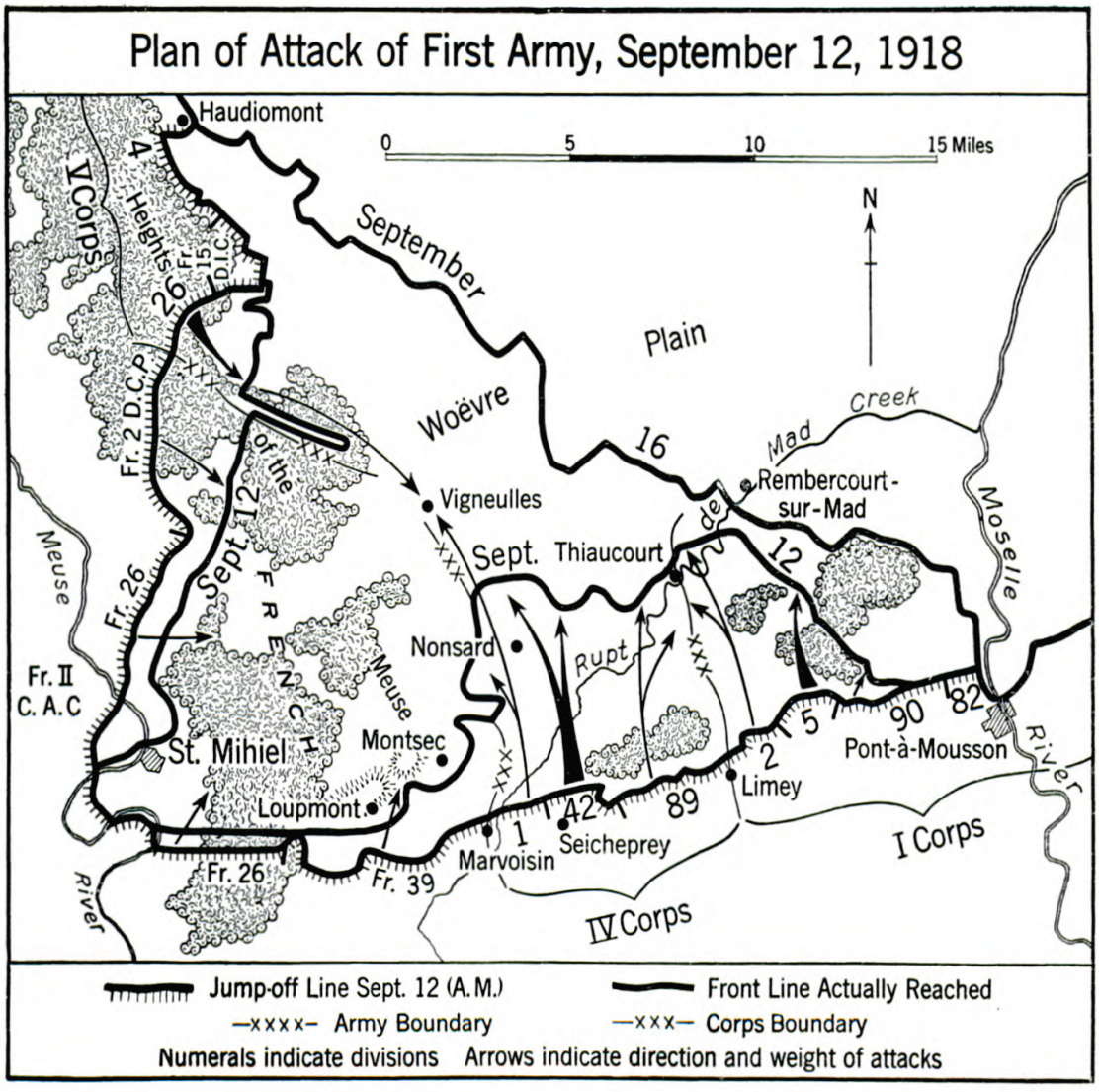
New organizations and technology greatly influenced the development of these new ideas. The field armies of World War I, made up of corps and divisions, were something different from field armies of the past. These formations had access to a dizzying variety of new and developing technologies, some of which could be incorporated into older organizations but many of which required innovations in organization. Machine guns, tanks, and gas all stand out as examples, but so too do

artillery and airpower. The problem with artillery had mainly to do with the huge sizes and long ranges of new guns. It did not make sense to place less-mobile weapons with tactical units like divisions at the front, so as a general rule, heavier and longer-range weapons went to corps and field armies, each with dedicated artillery headquarters. By 1918, airplanes had their own set of capabilities and missions—pursuit, observation, attack, and bombardment—and they too were divvied out among ground units based on their specific capabilities, especially when it came to range. By the time First Army went into action at Saint-Mihiel, France, in September 1918, it had its own air and artillery assets, most of which had the ability to place fires on targets as far as 45 kilometers beyond the front lines. These assets did not have to wait for ground exploitation forces to get into the depth (the rear) of the enemy's defenses—they could hit those deep defenses as the ground troops engaged the front lines.[12]

That is precisely what they did. In the Battle of Saint-Mihiel, which by the time of its execution had become a shaping operation in the Meuse-Argonne campaign, most of the artillery preparation to deal with the enemy's front lines would come from artillery units assigned to First Army's corps and divisions. The corps were equipped with guns and howitzers possessing a maximum range of around 11,000 yards; division artillery, led by the ubiquitous French 75mm field gun, had even shorter ranges. Obviously, getting through the enemy's front lines was vital, but more directly important to First Army commanders and staffs was what happened behind the front lines, sometimes kilometers past the trenches. Two First Army planners, Colonels George C. Marshall and Walter S. Grant, said as much, emphasizing that a longer barrage meant that "interdiction fire can

be kept up to prevent the sending forward of any enemy reinforcements . . . and can interfere materially with his exercise of command."[13]

Map 1.



Source: *American Armies and Battlefields in Europe: A History, Guide, and Reference Book* (Washington, DC: American Battle Monuments Commission, 1938), 109.

These were deep fires, meant to extend the operational depth of the assault by destroying or disrupting unengaged enemy forces simultaneous to the attacks on the front lines.[14] For the offensive at Saint-Mihiel, the First Army artillery staff organized its artillery into three groupings. Throughout the operation, each group would bombard enemy secondary positions, especially strongpoints such as bridges, key roads and road junctions, and gathering points for reinforcements or retreating enemy forces. The railway artillery—the heavier, longer-range guns—had a list of some 28 targets deep in the Saint-Mihiel salient and beyond. Most would begin with a heavy bombardment for 45 minutes, "followed by slow, destructive, harassing and prohibitive fire . . . [to be] continued during [the] operation, on important railroad and road centers, depots, etc." in the vicinity of their target list. Metz and Conflans, key points along the major railway that ran to Sedan and beyond, would be targeted on the chance that the heavy guns could cut the railroad itself and maybe even erode the morale of the German population.[15] The American guns never managed to crack those lines, and there was no evidence that they affected German civilian morale, but their intention to do so drives home the point about how far out, and how deep, American planners visualized their operations, even to the point of aiming for strategic targets.[16]

First Army had another new weapon to add to the operation: the airplane. Little more than a decade had passed since Orville and Wilbur Wright made their first flight in the United States, but airplanes had come a long way from the shaky *Wright Flyer*, which was essentially a low-powered glider.[17] The war had accelerated technological and tactical advances, and planes transformed from aerial scouts, to air-to-air weapons, to

bombardment aircraft that could attack the ground from above. By 1918, the belligerents of World War I had all manner of aircraft, including bombers that could range hundreds of kilometers and drop thousands of pounds of bombs on enemy positions. Technology advanced so quickly that designs could become obsolete by the time they went into production. Though the stuttering American war machine never did produce its own aircraft in time or at rates to influence the fighting on the western front, it was no matter.[18] For the Saint-Mihiel operation, the Allies could fill the gap. Relative pauses elsewhere along the front allowed the massing of the largest air armada yet seen for a single operation. Colonel William L. Mitchell, First Army's air chief, had more than 1,400 French, British, Italian, and American planes at his disposal to participate in the operation.

First Army's air forces had several standard airpower missions at Saint-Mihiel: counter air defenses to conceal preparations for the attack, observe enemy positions in the salient for intelligence, and to offer pursuit over the battle itself. The planes also played an important role in extending the depth of the operation. The First Army Air Service under Mitchell directed American pursuit aircraft first to attack troop concentrations close behind enemy lines, then to attack any available railroad centers with large numbers of visible troops and supplies. Day bombers had the purpose of confusing and disrupting enemy troops moving to and from the battlefield, so they initially attacked enemy division and corps command posts and eventually moved on to bridges and bridgeheads over the Moselle River. The American night bombers were to bomb railroad centers and airfields. Mitchell also sent bombers from French units under his command to assault similar targets in their assigned areas.

That was not the extent of their activities. The British offered up some of their longer-range bombers for the operation, which were aimed at key points farther behind German lines. During the battle, Mitchell stayed in contact with British general Hugh M. Trenchard, who commanded the Independent Air Force of the Royal Air Force, which executed long-range bombing missions deep into German territory. In preparation for the operation, the British bombers targeted key railroads and airdromes far beyond the salient, and during the battle Trenchard suggested to Mitchell that they should continue the bombardment on specific targets in the vicinity of Metz. Mitchell wrote back that the proposition "is entirely satisfactory to us. Metz and Conflans are the two points at which the Germans are heavily concentrated."[19]

Though many of these designs were impeded by terrible weather and immature tactics, the point stands: even in its early stages as a weapon, and even as they struggled with inaccuracy and heavy losses, First Army planners saw the airplane as a tool to extend their simultaneous operations farther into the depth of the enemy's positions.[20]

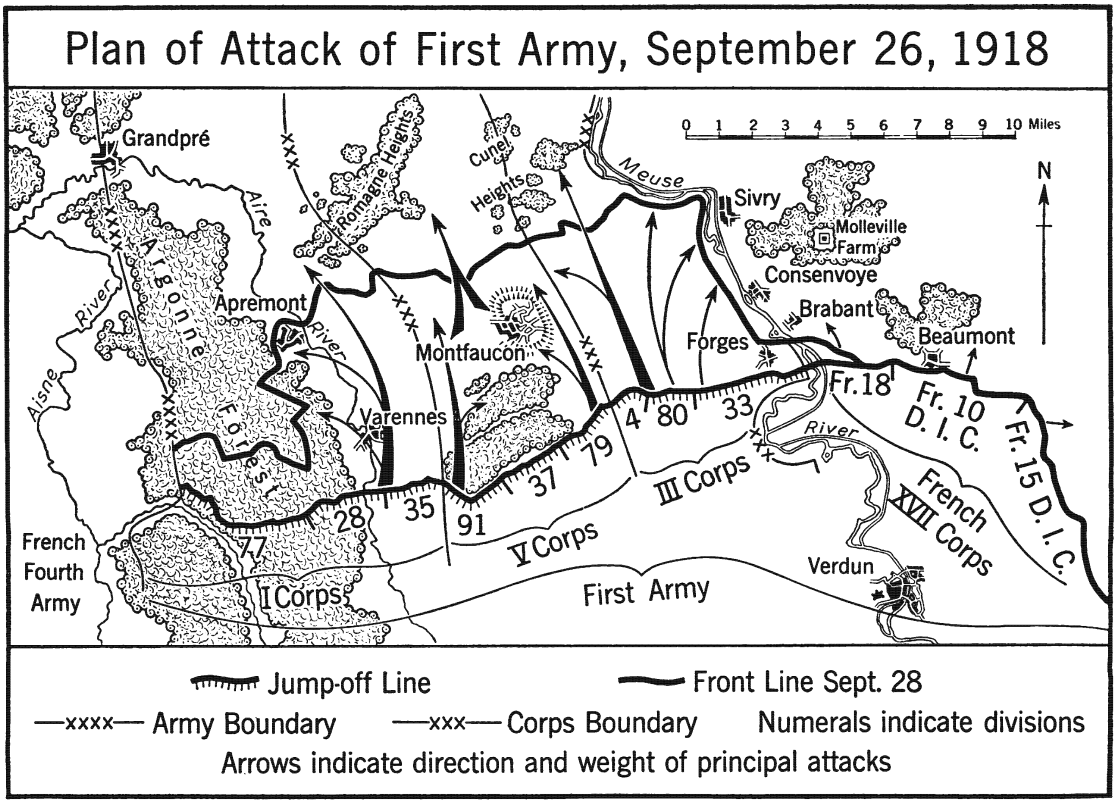
American efforts to integrate depth into their operations at Saint-Mihiel went well, but the battle presented unique conditions that did now allow for a full exploration of the concept. Saint-Mihiel was a salient and could be attacked on multiple sides. Yes, American forces used deep fires, and yes, they arrayed their divisions in deep formations that allowed them to extend operations farther into the faces of the salient. But they were still attacking the sides of the salient and not directly into the fixed, parallel, and extended front lines. A fuller expression of the American concept of depth would have to be tested in the Meuse-Argonne.

Finding Depth in the Meuse-Argonne

The American First Army attacked in the Meuse-Argonne on 26 September 1918, as part of a general offensive all along the western front. Had conditions been different, this campaign might have proven the true test of the AEF leadership's focus on depth and square formations. As it happened, the strategy of the Supreme Allied Commander, French Army general Ferdinand Foch, for the 1918 Allied offensives meant that First Army had to launch its major campaign at least six months earlier than intended and into terrain that was highly restrictive to any military operations, especially those of a huge field army. Attacking early in the Meuse-Argonne meant that First Army did not yet have forces available and trained to build its powerful square corps, which would have changed the entire approach to the disposition and tasks of the field army in the campaign.[21]

As at Saint-Mihiel, American forces built depth into their own formations as best as they could, intending that the inexperienced (but powerful) square divisions would be able to project forces forward with sufficient depth and power to create and exploit flanks in the enemy's deeper positions. They knew it was a long shot, but that was just the beginning of how they intended to use depth. General Pershing, Colonel Drum, and key planners at First Army also had designs on attacking simultaneously throughout the depth of the German positions. Some of the issues were the same. With surprise at a premium, and given the success of the shorter artillery barrage before Saint-Mihiel, American planners decided once again to limit the artillery preparation to four or five hours prior to the scheduled advance of the infantry.[22]

Map 2.



Source: *American Armies and Battlefields in Europe: A History, Guide, and Reference Book* (Washington, DC: American Battle Monuments Commission, 1938), 172.

There were, however, key differences in the environment in the Meuse-Argonne that complicated the matter. Most importantly, American forces would not be attacking a salient from multiple directions. They would instead be on a straight line in highly restrictive terrain, and a successful advance would mean going into a salient of their own creation. To extend operational fires throughout the depth of the German defenses, this time replete with multiple bands of entrenched positions (approximately 16 kilometers deep) known collectively as the Hindenburg Line, American planners once again organized First Army artillery into groupings.[23] After the

initial bombardment of critical targets in the front lines, and except when they were to provide support to corps and division artillery, all of these U.S. Army artillery units would maintain "harassing and prohibitive fire on enemy lines of communication" in their normal, longer-range zones.[24]

The key difference with Saint-Mihiel is that First Army did not assign specific targets. Instead, they decentralized the specific targeting for deep interdiction, as each of the grouping commanders "would be more familiar . . . with enemy circulation in their own sectors." That said, the Army artillery headquarters also sent each artillery grouping instructions to take a closer look at interdiction fire around some specific towns and river crossings. The railway groupings had more extended deep targets some 16–20 kilometers away, going out to a line that started around Saint-Juvin near the Argonne on the left, and ran east through Romagne-sous-Montfaucon, crossed the river at Dun-sur-Meuse, and went out to Jametz on the east side of the river.[25]

All efforts had to be done in secret, which limited opportunities for observation and made ranging the weapons prior to H-hour, the specific time designated for the operation to begin, all but impossible. Still, the artillerymen did the best they could, in part by moving their guns, even their heavy batteries, as close to the front as possible. First Army artillery chief Colonel Conrad H. Lanza wrote that this "enabled guns to fire deep into hostile areas, facilitating penetration of our infantry up to extreme limits of the guns, which fully covered from initial emplacements the enemy second line of defense." But this was not a salient like Saint-Mihiel, where all of the ultimate targets were in range of the heavy guns from the beginning. The

problem would be moving the guns, especially the heavy guns, forward once the infantry got past the second line.[26]

Still, it would be a spectacular initial show. The big guns began a limited bombardment at 2330 on 25 September, which turned into a full-blown barrage three hours later. When it began, troops approximately 20 kilometers from the front at First Army headquarters at Souilly could hear clearly "the roar of the cannons."[27] The scale of the bombardment of the front lines took the Germans by surprise and would greatly assist the Allied advance. Reports came in that fires had broken out well beyond the front lines, which seemed to indicate that ammunition dumps had been hit. But, it was a foggy morning. Deep fires were difficult to observe anyway, and their effectiveness difficult to gauge. The best indication would be the advance of the ground troops getting to those deep targets.[28]

First Army's leadership did what it could to see that their operational depth added to and extended beyond the range of even the biggest guns.[29] As at Saint-Mihiel, they turned to airpower to gain whatever advantage they could. When it came to depth, bombardment remained a First Army concern. The daytime bombers had struggled with weather and enemy airplanes at Saint-Mihiel, so they stressed the importance of tighter formations in their efforts. The aircraft would go in at higher altitudes and drive even farther, aiming along with the artillery at key towns, railroad junctures, and enemy troop concentrations along the Meuse River at Dun-sur-Meuse and at Bantheville, Romagne, Saint-Juvin, and Grandpré. These targets were at an extreme depth for the time, some as far as 25 kilometers beyond the front lines. The night bombers, entirely French and Italian, led the way, joining the predawn artillery bombardment. Their missions were

similar to what they had done at Saint-Mihiel. Colonel Mitchell reported that "our night bombardment aviation made a simultaneous attack against their airdromes, railway stations, and principal depots of supplies and command, so as to destroy as much as possible, and at the same time interfere with their system of command." Once the battle began in earnest, and the Germans began to fall back, the bombers would target their retreating columns.[30]

Once again, the weather did not cooperate with the actual execution when the attack began on 26 September. Rain and fog obscured much of the battlefield. The bombers went in anyway. On that first day, they dropped 4.5 tons of bombs on the rail yards and town at Dun-sur-Meuse while staying in formation and fighting off waves of German pursuit aircraft. The effects of such deep interdictions are always difficult to measure, but the fact that they made the effort indicated just how concerned First Army was with trying to cause destruction and disruption throughout the full depth of the German defenses. As it turned out, the time and conditions were not yet right, but the intent was to use heavy artillery and airpower to do everything possible to allow for the ground troops to advance rapidly through the disrupted areas.[31]

For a variety of reasons, the advance did not go entirely as planned, and First Army ended up in the more positional-type fight that it had so dreaded. At least one part of its depth worked partially as designed: its heavy formations did have enough staying power to take terrible casualties but continue to fight, which extended their operations in time. In the slog that followed throughout October, the Americans learned and made

constant adjustments to their tactics and techniques, many of which applied to artillery, airpower, and deep operational fires.

These changes would go into effect for the final large planned operation on 1 November. First Army artillery spent much of the fighting in October learning how to execute all of its missions with great skill and effectiveness. The lessons they gleaned led to advancements in tactics and techniques that would work in that environment, with that technology, and against that enemy. These extended to counterbattery fire, rolling barrages, ammunition resupply, working with air and infantry, and the movement of guns.

The same was true for deep fires. Part of what First Army planners learned from earlier battles was not to allow the range and weight of guns to determine missions. For example, the heavy army and corps artillery had proved very useful for attacking frontline targets, especially in suppressing or destroying machine gun nests and infantry positions. Therefore, depth for the operations of these heavy guns became more about moving those fires and eventually those guns forward to destroy enemy positions in support of infantry advances. In the meantime, the Americans found that interdiction fire worked better if it was persistent over a long period of time as opposed to being one part of an overall simultaneous preparatory fire. They also learned that it was better if they put that consistent fire on routes that the enemy had to use versus routes that they might use. In the case of the phase of the campaign beginning on 1 November, the German troops could only be resupplied through a few defiles on the heights of the Meuse, coming across the river, and up to the defensive positions on the western side. All of these spots were in the range of 155mm guns. Beginning on 25

October, the Americans began a steady bombardment of those defiles to attrite unengaged enemy forces.[32]

First Army still had long-range guns, which included railway guns and, as the battle developed, naval gun batteries, to fire on more distant targets. As First Army artillery placed persistent fire on the defiles closer behind the front lines, the big guns did the same on deeper targets, especially along the main railroad running from Metz through Sedan, which was the ultimate target of the offensive. The intent was to cut those lines and erode German fighting morale. The effects are difficult to measure. Though they caused damage, the long-range fires were not enough to cut the railroad on their own. Still, the idea for such a use of deep fires was clearly there.[33]

Once the infantry jumped off, the focus of deep fires shifted. The artillery would still target unengaged enemy forces, especially those on the move to or from the battlefield. In this case, they came off of the concept of simultaneity in their deep fires, having learned that simultaneity is just one form of synchronization, and sometimes not the most effective form. Instead, they chose to synchronize their deep fires in sequence. The Americans learned that it was better to target deep lines of communication after a delay, allowing the frontline ground attacks to get the enemy on the move, either in retreat or to reinforce. Such fires would hit retreating or reinforcing units on the move, in the open, and using those lines of communication because they had not been tipped off by previous fires that those lines would be targeted.[34]

A similar change happened within the air Services. By late October, First Army's Air Service, now under the command of Colonel Thomas D. Milling, had been depleted heavily in comparison with the Saint-Mihiel and

26 September attacks, mostly because the French planes and pilots that the Americans had so relied on before were reallocated for other offensives on the western front. That meant that First Army's Air Service had to become more efficient with how it used its resources. Like the artillery, it made plenty of adjustments to tactics and techniques, and like artillery it would use more of its attack and bombardment aircraft to attack positions that directly threatened infantry.[35]

That did not mean that the Air Service neglected deep operations, where its approach was similar to the artillery. Prior to the launch of the attack on 1 November, longer-range night bombers engaged in persistent bombardments on deep, borderline strategic targets such as the railway at Mézières west of Sedan and distant command posts. Day bombers hit railroads at slightly closer points along with "hostile P.C.'s [command posts] at medium distances." For the November 1 operation, and similar to artillery fires, the Air Service learned that attack and bombardment aviation worked better at destruction and interdiction once the enemy was on the move and in the open. Therefore, First Army aircraft went up after H-hour to strike targets of opportunity throughout the enemy's depth. Pursuit aircraft in part would "attack concentrations of enemy troops, convoys and machine gun nests," while "concentrations of troops reported from various sources will be attacked in force [and] enemy P.C.'s neutralized" by daytime bombers. All the orders instructed pursuit and bombardment groups to maintain reserves to hit such targets throughout the enemy positions.[36]

<Map 3. Operations of First Army, 1–11 November 1918**>**

Source: *American Armies and Battlefields in Europe: A History, Guide, and Reference Book* (Washington, DC: American Battle Monuments Commission, 1938), 186.

All of these efforts went so well that they assisted tremendously in the highly successful 1 November attack, and First Army made huge advances until the ceasefire went into effect on 11 November. The overall destruction wrought on the Germans, including to their already strained

supply system, led them into a general retreat all the way over the Meuse River. The pursuing Americans found incredible destruction deep behind the German lines. “As we advanced,” one private reported, “the roads and fields were strewn with dead Germans, horses, masses of Artillery, transports, ammunition limbers, helmets, guns, and bayonets.”[37] Deep operational fires had never cut railroads permanently or forced full retreats on their own, but in this last attack they contributed mightily to making the final advance a full-on rout. The large and deep American corps and divisions drove forward without significant pauses, exploiting opportunities along the way, executing opposed crossings of the Meuse at several points, and reorienting to the east for potential follow-on campaigns into Germany itself. The Americans had extended the depth of their operations in space and time, and it worked.

Conclusion: What Was Learned and Where Depth Went

The American field army and corps commands in World War I did sound work from the beginning, especially under the circumstances, in building resilient formations that could extend the depth of their operations in time and, as a result, space. They had the idea of using long-range artillery and airpower to extend their initial operations in depth, though they struggled somewhat to put that idea into practice, especially when they got to the solid linear front of the Meuse-Argonne. Their deep formations allowed them time to improve their position, which they used to improve their application of depth, along with other ideas, for the 1 November attack.

With the Meuse-Argonne experience in mind, it is useful to go back to the 1986 field manual *Operations*. Again, in its description of operational depth, the manual reads:

> Momentum in the attack is achieved and maintained when resources and forces are concentrated to sustain operations over extended periods, adequate reconnaissance is provided beyond areas of immediate concern, committed enemy forces are adequately fixed, uncommitted enemy forces are interdicted or otherwise prevented from interfering, adequate air protection is provided, the enemy's command and control system is disrupted, adequate reserves and follow and support forces are provided, vulnerable rear area facilities are protected, logistic resources are moved forward, and combat forces project tactical operations . . . deep into the enemy's vulnerable areas.[38]

It is hard to imagine a more perfect description of what AEF and First Army leaders sought to accomplish with their ground forces in the Meuse-Argonne, and how planners attempted to integrate artillery and airpower into their operations.[39] In fact, they could have—and did—write in almost exactly the same terms, and many of those senior leaders came back from the war to serve as instructors at the U.S. Army Command and General Staff School and U.S. Army War College, which allowed them to pass on much of their approach to the next generation.

The evidence of this is clear. The 1919 provisional *Infantry Drill Regulations* manual, produced by the AEF the previous year, had a section on "The Fire Attack," which included a discussion of the "deep disposition of

attacking units" that emphasized constant pressure and activity: "one of the purposes of the disposition in depth is to enable the attacking units to act in any direction." Support and reserve units were to push forward and seek opportunities under their own initiative to follow on with successes, protect friendly flanks, attack enemy flanks, and fill gaps in the line. This section was reproduced in the U.S. Navy's *Landing-Force Manual* and U.S. Army colonel William K. Naylor's influential *Principles of Strategy* in the 1920s.[40]

In 1922, members of the faculty at the U.S. Army's General Service Schools at Fort Leavenworth, Kansas, serving under the direction of former First Army chief of staff Colonel Hugh Drum and including many of his former staff officers, produced a work called *Tactical and Strategical Studies: Corps and Army* for use by their students. The book, meant explicitly to study the problems of larger combat units, used depth extensively. Its authors emphasized the value added to offensive operations by building depth into formations to allow for continuation into the enemy's depth as well as the use of corps and army artillery "to carry out those missions throughout the depth of the attack."[41] The Army's *Field Service Regulations* manual (1923), produced by the General Staff under acting chief of staff Major General John L. Hines, a division and corps commander in the Meuse-Argonne, followed a similar vein. "Units assigned to decisive missions are distributed in relatively great depth with strong reserves," the doctrine instructed. Those reserves are "the leader's weapon which on the offensive enables him to shape the course of the action and finally to enforce a decision." At the same time, field army artillery "operates against distant targets beyond the range of their matériel," and "corps artillery takes especial charge of counterbattery and long-range interdiction and destruction missions."[42]

All of this culminates in the question: Why is there a common impression that contemporary American doctrinal depth came from the Soviet Union, when that American depth looks so . . . American?

The word *depth* did increasingly lose its emphasis after World War I in the U.S. Army, both on the ground and in the air. On the ground, many veterans of the AEF, of whom George C. Marshall was the most emblematic, believed that their operating concept on the western front was situation specific. Big and heavy divisions and corps, as well as deep operational fires, were meant to deal with the fixed linear front that existed there. Americans anticipated that, in the future, they would not operate in such an environment. Similarly, in future operations, armies would be more motorized and mechanized, there would be open flanks to attack, and units would move faster while being more dispersed. In light of these anticipated conditions, the logic went, operational depth as achieved in the Meuse-Argonne would not quite apply. For example, the Army's 1936 *The Principles of Strategy for an Independent Corps or Army in a Theater of Operations* carried on the tradition of relating march formations to the question of depth, discussing the advantages of both "formations in depth" (squares, diamonds, and columns) and "echelon formations" in maintaining combat power, but all with an emphasis on movement and maneuver in more open warfare than obtained on the western front.[43]

Additionally, and in keeping with the proposition that future campaigns would involve more fluid operations and not be fixated on solving the World War I problem of rigidly fixed fronts, the Americans turned their attention to theories of war and campaigning that did not emphasize depth. Foremost was a new list of the principles of war, famously

promulgated by British Army officer J. F. C. Fuller and partially grafted into American doctrine in the 1920s. While depth did not disappear, it lost prominence and was folded into discussions of such subjects as security, objective, offensive, superiority (including concentration and mass), economy of force, mobility and movement, surprise, simplicity, and cooperation.[44] Discussions of depth, though not as a principle or element, can be seen in *Field Service Regulations*, which adopted "general principles" in its chapter entitled "Combat."[45] *The Principles of Strategy* went further by listing, delineating, and discussing in detail the "principles of war."[46]

The Principles of Strategy is of interest for another reason that relates to the diminishment of the word *depth* in what is now called *operational doctrine*. In its introduction, the authors explicitly wrote:

> In view of the diverse definitions and interpretations given to the words "strategy," "grand strategy," "grand tactics," "tactics," and "minor tactics," it has been found necessary to clearly limit the terms "strategy," "tactics" and "conduct of war" for the purposes of this presentation, in order to fit their scope into the phases of military education now applicable to the United States Army.[47]

In other words, for the sake of simplicity and clarity, the authors of *The Principles of Strategy* chose to limit what are now called *levels of war* by compressing together what are now called *theater strategy* and *operational art* (or the *operational level*) into the lone moniker of *strategy*. Documents such as *The Principles of Strategy* shifted to more generally applicable principles of war and tended to neglect the detailed elements and tenets of campaigning. As a result, concepts that were still being widely discussed and

used in campaign and operation planning in the U.S. Army's schoolhouses (and often showed up in tactical forms in tactical doctrine) were not called *principles* in strategic and operations doctrine. *Depth* was one of those concepts, but it was not the only one. Phasing, the breaking of *campaigns* and *operations* into discrete but connected conceptual parts, was a constant feature of campaign and operational design after World War I, but it was not a formal principle. *Center of gravity* and *culminating points* had also been in use in the World War I era but suffered worse fates, disappearing from much of the Army's formal and informal doctrinal literature altogether.[48]

When it came to depth and airpower after World War I, U.S. Army ground theory and doctrine writers initially tended to see airplanes serving more of a reconnaissance role, with the capability of seeing deeper into enemy defensive systems. They thought about the idea of deeper strikes as part of a ground campaign, much like the AEF had attempted in the Meuse-Argonne, but at first the vulnerability of bombardment aircraft limited their ambitions. By World War II, the technology had advanced so that Army operations doctrine added reconnaissance attacks on a "hostile rear area" as a "powerful means for influencing battle."[49] By that time, however, airpower theory and doctrine had gone in a different direction. Despite some immediate postwar works by William C. Sherman that focused more on tactical and operational ground fights, the airpower story came to be dominated by the issue of strategic bombing.[50] This is not the place to rehash that tale, except to say that the focus on airpower and bombing as potentially war-winning on their own took a lot of intellectual energy from operational issues, including depth. The problem grew more acute with the advent of nuclear weapons, which seemed to prove the strategic role of

airpower. Consequently, operational depth received much less focus in airpower theory and doctrine during World War II and beyond than it did in World War I, and though the word itself did not disappear, it was not featured prominently in operational doctrine as airpower related to ground warfare.[51]

American operational depth as it existed in World War I had a way of sticking, with just enough mentions in U.S. Army theory, doctrine, and the schoolhouses to keep the concept in mind. Moreover, in World War II and Korea, the Army ended up in fights with relatively or totally fixed fronts that looked a lot like the Meuse-Argonne. In those cases, the Army leaders who grew up at the knees of John Pershing, Fox Conner, Hugh Drum, George Marshall, and other leaders of the AEF and First Army returned to the lessons of operational depth and deep fires from the Meuse-Argonne. They made deals with the aviation leaders of their generation, too, and deep air interdiction played huge roles in many of the ground campaigns of those wars.[52]

As a result, operational depth became imbedded in the American military experience and fighting culture, so much so that when U.S. military leaders encountered the terminology again in relation to their potential Soviet enemy, they grabbed on to it. When depth came back into doctrine in a more prominent fashion, as part of the "fundamentals of offense," it was in the 1976 edition of *Operations*, FM 100-5—the "Active Defense" manual—which explicitly discussed Soviet doctrines of depth.[53] Even then, U.S. Army leaders rewrote American depth to replicate the concept as it functioned in World War I. They developed their own attack aviation and convinced the U.S. Air Force to participate, and they devised the AirLand Battle operating

concept, complete with *depth* as one of its four tenets, along with *initiative*, *agility*, and *synchronization*. They also restored *centers of gravity*, *lines of operation*, and *culminating points* as the "key concepts of operational design."[54]

The essential difference between the years after World War I and more recent times is that the U.S. military has continued to identify *depth* explicitly as a key tenet or element of Army and Joint operations, even as some of the potential or actual conflicts, especially counterinsurgency operations, are not likely to resemble the Meuse-Argonne. For example, some contemporary commanders and staffs well-steeped in viewing *depth* as unengaged enemy forces have developed operations to defeat insurgent recruiting as their deep fight while simultaneously combating active enemy combatants in the close fight.[55] The full story of applying depth to counterinsurgency is beyond the scope of this article, but the fact that the U.S. military continues to explore its application is a testament to how operational depth has become engrained in its collective DNA.[56] No matter its future application, this uniquely American concept of operational depth—extending operations and campaigns far out in time and space—owes much less to a Cold War-era reading of Soviet theory and doctrine than it does to the experience of the U.S. Army and its Joint campaign in the Meuse-Argonne in 1918.

---

[1] See Bruce W. Menning, "Operational Art's Origins," in *Historical Perspectives of the Operational Art*, ed. Michael D. Krause and R. Cody Phillips (Washington, DC: U.S. Army Center of Military History, 2005), 3–21; Roger J. Spiller, "In the Shadow of the Dragon: Doctrine and the U.S. Army after Vietnam," *RUSI Journal* 142, no. 6 (December 1997): 41–54, https://doi.org/10.1080/03071849708446210; Richard M. Swain, "Filling the Void: The Operational Art and the U.S. Army," in *The Operational Art: Developments in the Theories of*

War, ed. B. J. C. McKercher and Michael A. Hennessy (Westport, CT: Praeger, 1996); and John L. Romjue, *From Active Defense to AirLand Battle: The Development of Army Doctrine, 1973–1982* (Fort Monroe, VA: Historical Office, U.S. Army Training and Doctrine Command, 1984).

[2] Mikhail Tukhachevsky, *New Problems in Warfare from the Art of War Colloquium* (Fort Leavenworth, KS: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1983); Georgii Samoilovich Isserson, *The Evolution of Operational Art*, trans. Bruce W. Menning (Fort Leavenworth, KS: Combat Studies Institute Press, 2013); James J. Schneider, *The Structure of Strategic Revolution: Total War and the Roots of the Soviet Warfare State* (Novato, CA: Presidio, 1994); Krause and Philips, *Historical Perspectives of the Operational Art*, 125–326; Jacob W. Kipp, "The Tsarist and Soviet Operational Art, 1853–1991," in *The Evolution of Operational Art: From Napoleon to the Present*, ed. John Andreas Olsen and Martin van Creveld (Oxford, UK: Oxford University Press, 2010), 64–95, https://doi.org/10.1093/acprof:oso/9780199599486.003.0004; and Bernard Semmel, ed., *Marxism and the Science of War* (Oxford, UK: Oxford University Press, 1981).

[3] *Operations*, Field Manual (FM) 100-5 (Washington, DC: U.S. Department of the Army, 1986), 16–17.

[4] The interwar German Army (*Reichsheer*) also had something like operational art and its own specific form of preferred operations, commonly called *blitzkrieg*, that U.S. military leaders also studied to help develop their doctrine in the 1980s.

[5] LtCol France James Soady, *Lessons of War as Taught by the Great Masters and Others; Selected and Arranged from the Various Operations of War* (London: W. H. Allen, 1870); MajGen Edward Bruce Hamley, *Operations of War Explained and Illustrated*, 4th ed. (London: William Blackwood and Sons, 1878); Victor Derrécagaix, *Modern War*, vol. 1, *Strategy*, trans. C. W. Foster (Washington, DC: James J. Chapman, 1888); and Victor Derrécagaix, *Modern War*, vol. 2, *Grand Tactics*, trans. C. W. Foster (Washington, DC: James J. Chapman, 1890); and Otto F. Griepenkerl, *Letters on Applied Tactics: Problems Dealing with the Operations of Detachments of the Three Arms*, trans. C. H. Barth (Kansas City, MO: Franklin Hudson, 1906).

[6] Maj Benjamin Maher, USA, "The Origins of Operational Depth in the First World War" (unpublished monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 2016); Bruce W. Menning, *Bayonets before Bullets: The Imperial Russian Army, 1861–1914* (Bloomington, IN: Indiana University Press, 1992); Nicholas Murray, *The Rocky Road to the Great War: The Evolution of Trench Warfare to 1914* (Lincoln: Potomac Books, University of Nebraska Press, 2013); and Timothy T. Lupfer, *The Dynamics of Doctrine: The Changes in German Tactical Doctrine during the First World War*, Leavenworth papers No. 4 (Fort Leavenworth, KS: Combat Studies Institute Press, U.S. Army Command and General Staff College, 1981).

[7] Matthew Forney Steele, *American Campaigns*, 2 vols. (Washington, DC: Byron S. Adams, 1909); 1stLt John Bigelow, USA, *The Principles of Strategy: Illustrated Mainly from American Campaigns*, 2d ed. (Philadelphia, PA: J. B. Lippincott, 1894); James Mercur, *Elements of the Art of War*, 3d ed. (New York: John Wiley & Sons, 1894); Arthur L. Wagner, *Organization and Tactics* (New York: B. Westermann, 1895), 462–68; Capt Arthur L. Wagner, USA, *The Service of Security and Information*, 6th ed. (Kansas City, MO: Hudson-Kimberly, 1899); LtCol John F. Morrison, USA, *Seventy Problems: Infantry Tactics: Battalion, Brigade, and Division* (Fort Leavenworth, KS: U.S. Cavalry Association, 1914), 183–84; "Tactical Notes: Frontage and Depth," *Military Historian and Economist* 1 (January 1916): 86–93; and Col Gustave J. Fiebeger, USA, *Elements of Strategy* (West Point, NY: U.S. Military Academy Press, 1917).

[8] John B. Wilson, *Maneuver and Firepower: The Evolution of Divisions and Separate Brigades* (Washington, DC: U.S. Army Center of Military History, 1998), 47–78; *A Study in Battle Formation*, Monograph No. 6 (Washington, DC: Historical Branch, War Plans Division, General Staff, 1920); Fox Conner, "Notes on Organization," typescript, 24 April 1920, Military History Institute, U.S. Army Heritage and Education Center, Carlisle Barracks, PA; Michael E. Bigelow, "Brigadier General Fox Conner and the American Expeditionary Forces" (master's thesis, Temple University, 1984), 67–70; and Elliott L. Johnson, "The Military Experiences of General Hugh A. Drum from 1898–1918" (PhD dissertation, University of Wisconsin–Madison, 1975), 222–25.

[9] Bigelow, "Brigadier General Fox Conner and the American Expeditionary Forces," 71–73; I. B. Holley Jr., *General John M. Palmer, Citizen Soldiers, and the Army of Democracy* (Westport, CT: Greenwood Press, 1982), 302–3; and *The Genesis of the American First Army* (Washington, DC: Historical Section, Army War College, 1929), 6–7.

[10] *United States Army in the World War, 1917–1919*, vol. 2, *Policy-forming Documents of the American Expeditionary Forces* (Washington DC: U.S. Army Center of Military History, 1989), 406–12.

[11] Douglas V. Johnson II and Rolfe L. Hillman Jr., *Soissons, 1918* (College Station: Texas A&M University Press, 1999); Edward G. Lengel, *Thunder and Flames: Americans in the Crucible of Combat, 1917–1918* (Lawrence: University Press of Kansas, 2015), 242–301; Timothy K. Nenninger, ed., *The Way of Duty, Honor, Country: The Memoir of Charles Pelot Summerall* (Lexington: University Press of Kentucky, 2010), 126–32; and Donald Smythe, *Pershing: General of the Armies* (Bloomington: Indiana University Press, 1986), 157.

[12] For more on the Battle of Saint-Mihiel, see James H. Hallas, *Squandered Victory: The American First Army at St. Mihiel* (Westport, CT: Praeger, 1995); Donald Smythe, "St. Mihiel: The Birth of an American Army," *Parameters*, 13, no. 1 (June 1983): 47–57; and Mark E. Grotelueschen, "The Doughboys Make Good: American Victories at St. Mihiel and Blac Mont Ridge," *Army History*, no. 87 (Spring 2013): 6–18.

[13] Larry I. Bland and Sharon R. Ritenour, eds., *The Papers of George Catlett Marshall*, vol. 1, *"The Soldierly Spirit," December 1880–June 1939* (Baltimore, MD: Johns Hopkins University Press, 1981), 156–57.

[14] Conrad H. Lanza, *The Army Artillery, First Army*, vol. 1 (Carlisle, PA: U.S. Army Military History Institute, n.d.), 1–13.

[15] Lanza, *The Army Artillery*, vol. 1, 53–61.

[16] Lanza, *The Army Artillery*, vol. 1, 36–37.

[17] David McCullough, *The Wright Brothers* (New York: Simon & Schuster, 2015).

[18] I. B. Holley Jr., *Ideas and Weapons* (Washington DC: Air Force History and Museums Programs, 1983); Herbert A. Johnson, *Wingless Eagle: U.S. Army Aviation through World War I* (Chapel Hill: University of North Carolina Press, 2001); and James J. Cooke, *The U.S. Air Service in the Great War, 1917–1919* (Westport, CT: Praeger, 1996), 1–73.

[19] William L. Mitchell to Hugh M. Trenchard, 14 September 1918, and Hugh M. Trenchard, "Report on Operations Carried out by Independent Force, Royal Air Force, in Co-Operation with American 1st Army in Their Attack on the St. Mihiel Salient," 18 September 1918, Air 1/1997/204/273/244, British National Archives, Kew, United Kingdom.

[20] Maurer Maurer, ed., *The U.S. Air Service in World War I*, vol. 1, *The Final Report and a Tactical History* (Washington DC: Office of Air Force History, Headquarters, U.S. Air Force, 1978), 37–40, 343–45, 357–69; and Cooke, *The U.S. Air Service in the Great War*, 118–57.

[21] Elizabeth Greenhalgh, "General Ferdinand Foch and Unified Allied Command in 1918," *Journal of Military History* 79, no. 4 (October 2015): 997–1023. For more on the Meuse-Argonne offensive, see Edward G. Lengel, *To Conquer Hell: The Battle of Meuse-Argonne, 1918* (New York: Henry Holt, 2008); Robert H. Ferrell, *America's Deadliest Battle: Meuse-Argonne, 1918* (Lawrence: University Press of Kansas, 2007); Paul F. Braim, *The Test of Battle: The American Expeditionary Forces in the Meuse-Argonne Campaign*, rev. ed. (Shippensburg, PA: White Mane, 1998); Frederick Palmer, *Our Greatest Battle (The Meuse-Argonne)* (New York: Dodd, Mead, 1919); Mitchell A. Yockelson, *Forty-Seven Days: How Pershing's Warriors Came of Age to Defeat the German Army in World War I* (New York: Nan Caliber, 2016); Geoffrey Wawro, *Sons of Freedom: The Forgotten American Soldiers Who Defeated Germany in World War I* (New York: Basic Books, 2018); Douglas V. Mastriano, *Thunder in the Argonne: A New History of America's Greatest Battle* (Lexington: University Press of Kentucky, 2018); and Gene Fax, *With Their Bare Hands: General Pershing, the 79th Division, and the Battle for Montfaucon* (Oxford, UK: Osprey, 2017), 158–60.

[22] *United States Army in the World War, 1917–1919*, vol. 9, *Military Operations of the American Expeditionary Forces* (Washington DC: U.S. Army Center of Military History, 1990), 82–97; and Thomas I. Faith, *Behind the Gas Mask: The U.S. Chemical Warfare Service in War and Peace* (Urbana: University of Illinois Press, 2014), 51–53.

[23] *United States Army in the World War, 1917–1919*, vol. 9, 82–97.

[24] Lanza, *The Army Artillery*, vol. 1, 107–10.

[25] Lanza, *The Army Artillery*, vol. 1, 111–12.

[26] Lanza, *The Army Artillery*, vol. 1, 111–22.

[27] James Lawton Collins Diary, 25 September 1918, Folder 12, Box 11, James Lawton Collins Sr. Papers, Military History Institute, U.S. Army Heritage and Education Center, Carlisle Barracks, PA.

[28] Lanza, *The Army Artillery*, vol. 1, 129–223.

[29] Railway and naval guns were considered very long-range weapons, which meant that they could hit targets more than 20 kilometers away. Naval guns could fire as far as 37 kilometers, but the Americans tended to concentrate their very long-range fires between 20 and 25 kilometers. Conrad H. Lanza, "Very Long Range Fire (over 20,000 Meters) in the Meuse-Argonne Campaign," *Field Artillery Journal* 25, no. 3 (May–June 1935): 249–60.

[30] *United States Army in the World War, 1917–1919*, vol. 9, 101–2.

[31] Maurer, *The U.S. Air Service in World War I*, vol. 1, 313–19, 371–72; Cooke, *The U.S. Air Service in the Great War*, 166–78; and Edward M. Coffman, *The War to End All Wars: The American Military Experience in World War I* (Lexington: University Press of Kentucky, 1998), 208–9.

[32] Conrad H. Lanza, *The Army Artillery, First Army*, vol. 2 (Carlisle, PA: U.S. Army Military History Institute, n.d.), 377–97.

[33] *The United States Naval Railway Batteries in France*, Publication No. 6 (Washington, DC: U.S. Department of the Navy, 1922); and Lanza, "Very Long Range Fire (over 20,000 Meters) in the Meuse-Argonne Campaign," 249–60.

[34] *The United States Naval Railway Batteries in France*; and Lanza, "Very Long Range Fire (Over 20,000 Meters) in the Meuse-Argonne Campaign," 249–60.

[35] Thomas Withington, "Airpower during the Meuse-Argonne Offensive, 26 September–11 November 1918," in *A Companion to the Meuse-Argonne Campaign*, ed. Edward G. Lengel (West Sussex, UK: Wiley Blackwell, 2014), 314–19.

[36] *United States Army in the World War, 1917–1919*, vol. 9, 333–40; and First Army Air Service, "Battle Order No. 41," 31 October 1918, Air 1/1997/204/273/244, British National Archives, Kew, United Kingdom.
[37] Coffman, *The War to End All Wars*, 346.
[38] *Operations*, FM 100-5 (1986), 16–17.
[39] To be fair, in the 1 November attack, many in the AEF and First Army wished that they had horse cavalry to exploit the advantage, but not exactly like a Soviet deep penetration. The Americans wanted that cavalry more for an old-style pursuit than a Soviet-like armor exploitation.
[40] *Infantry Drill Regulations (Provisional), 1919* (Washington, DC: United States Infantry Association, 1919), 135; *Landing-Force Manual, 1920* (Washington, DC: U.S. Department of the Navy, 1921) 166; *Landing-Force Manual, 1927* (Washington, DC: U.S. Department of the Navy, 1927), 317; and Col William K. Naylor, USA, *Principles of Strategy: With Historical Illustrations* (Fort Leavenworth, KS: General Service Schools Press, 1921), 260–61.
[41] *Tactical and Strategical Studies: Corps and Army* (Fort Leavenworth, KS: General Service Schools Press, 1922), 10, 80, 99, 160–62, 176–85, 258, 304–9, 339, 379, 391–93, 401–5, 419.
[42] *Field Service Regulations, 1923* (Washington, DC: U.S. Department of War, 1924), 78–80.
[43] *The Principles of Strategy for an Independent Corps or Army in a Theater of Operations* (Fort Leavenworth, KS: Command and General Staff School Press, 1936), 66–69.
[44] The most thorough example is Oliver Prescott Robinson, *The Fundamentals of Military Strategy* (Washington, DC: United States Infantry Association, 1928). On principles of war and their adoption by the U.S. Army, see John I. Alger, *The Quest for Victory: The History of the Principles of War* (Westport, CT: Greenwood Press, 1982); and William O. Odom, *After the Trenches: The Transformation of U.S. Army Doctrine, 1918–1939* (College Station: Texas A&M University Press, 1999), 35–46.
[45] *Field Service Regulations, 1923*, 77–78.
[46] *The Principles of Strategy for an Independent Corps or Army in a Theater of Operations*, 9–14.
[47] *The Principles of Strategy for an Independent Corps or Army in a Theater of Operations*, 3.
[48] See, for example, the 1941, 1949, 1954, 1962, and 1968 editions of *Field Service Regulations, Operations*, FM 100-5 (Washington, DC: U.S. Department of the Army). For the prevalence of operational art concepts in the interwar period, see Michael R. Matheny, *Carrying the War to the Enemy: American Operational Art to 1945* (Norman: University of Oklahoma Press, 2011); and BGen Harold W. Nelson, USA (Ret), "The Origins of Operational Art," in Krause and Philips, *Historical Perspectives of the Operational Art*, 333–47. A good overview of all of the capstone doctrine and key authors discussed throughout is Walter E. Kretchik, *U.S. Army Doctrine: From the American Revolution to the War on Terror* (Lawrence: University Press of Kansas, 2011).
[49] *Operations*, FM 100-5 (Washington, DC: U.S. Department of War, 1941), 12–13.
[50] William C. Sherman, *Air Warfare* (1926; repr., Maxwell Air Force Base, AL: Air University Press, 2002).
[51] A recent, somewhat exaggerated, overview can be found in Phil Haun, "Foundation Bias: The Impact of the Air Corps Tactical School on United States Air Force Doctrine," *Journal of Military History* 85, no. 2 (April 2021): 453–74. Balanced and interwar focused accounts include Heather Venable, "The Strategic Triangle: The Air Corps Tactical School and Its Vision of Future Warfare," *From Balloons to Drones*, 24 July 2019; and Heather Venable, "You Can't Escape Your Past . . . Even in Space: What Space Force Can Learn from the Air Corps Tactical

School," *War on the Rocks*, 27 October 2020. A more thorough account comes from Robert Frank Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force*, 2 vols. (Maxwell Air Force Base, AL: Air University Press, 1989).

[52] Wesley Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II*, vol. 3, *Europe: Argument to V-E Day, January 1944 to May 1945* (Washington, DC: Office of Air Force History, 1983), 67–181.

[53] *Operations*, FM 100-5 (Washington, DC: U.S. Department of the Army, 1976).

[54] *Operations*, FM 100-5 (1986). On the whole process, see Kretchik, *U.S. Army Doctrine*, 193–216; and Saul Bronfeld, "Did TRADOC Outmanoeuvre the Manoeuvrists?: A Comment," *War & Society* 27, no. 2 (October 2008): 111–25, https://doi.org/10.1179/war.2008.27.2.111. A good overview of operational art and its formal adoption by the U.S. Army can be found in LtCol Wilson C. Blythe Jr., USA, "A History of Operational Art," *Military Review* (November–December 2018): 37–49.

[55] Thomas Bruscino, "The Theory of Operational Art and Unified Land Operations" (unpublished School of Advanced Military Studies theoretical paper, Command and General Staff College, Fort Leavenworth, KS, 2012).

[56] The most direct examples of this thought can be found in Maj Bill Benson, USA, "Operational Thinking in a Tactical Environment and Targeting in Iraq," *Armor* 113, no. 3 (May–June 2004): 11–14; Maj Drew R. Conover, USA, *A Commoner's View: The Application of Operational Art in Counterinsurgency Operations* (Fort Leavenworth, KS: School of Advanced Military Studies, U.S. Army Command and General Staff College, 2011); and Col Bill Benson, USA, "Unified Land Operations: The Evolution of Army Doctrine for Success in the 21st Century," *Military Review* 92, no. 2 (March–April 2012): 2–12. See also Dale Andrade, *Surging South of Baghdad: The 3rd Infantry Division and Task Force Marne in Iraq, 2007–2008* (Washington, DC: U.S. Army Center of Military History, 2010), 218, 249.