



### 3. Preparing the Attack: Part I, 1914-1916

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#### Introduction

Artillery has two jobs in attacks: bombarding the enemy ahead of time, and then supporting the attackers during the assault with a protective barrage. Since the bombardment comes before the attack, it will be considered first.

Before the Boer War, a preliminary bombardment was a normal part of a battle plan. (In this study, to prevent confusion, the term "bombardment" will be used to describe artillery fire before an attack, and "barrage" for artillery fire during an attack.) Like so many other prewar conceptions, it was discarded during the war and replaced by the doctrine of artillery providing close support of the infantry. Bombardments had proven ineffective, while barrages worked. By 1914, the bombardment had made a partial comeback, but under the new thinking it would only be needed for sieges. There would be no bombardment in ordinary situations, and the target of any bombardment was the opposing troops, never fixed defenses. In the opening months of World War I, this more or less sufficed, since trenches were only scratches in the ground. The trenches were not yet serious obstacles, nor did they offer much protection to the German infantry. But by the spring of 1915, the Germans had built up their defenses: barbed wire, parapets, and other obstacles impeded movement and offered solid protection. At first the British saw the obstacles as the problem, and restored the preparatory bombardment. Their first efforts were rudimentary and mechanistic, but over time the BEF learned what to do; new weapons and new methods also helped. Eventually German defenses would be shelled as much as necessary, pressing ahead against weak defenses but pulverizing strong sectors in order to save lives in the eventual attack.

The *Field Service Regulations*, the army's war-fighting guide, foresaw battles falling into the categories of either mobile operations or siege warfare, with minimal overlap. Douglas Haig supervised the writing of *FSR*, and it set the main goal of artillery as support of the infantry assault. This fit the army's general view of battle as a struggle of will and morale. The infantry would gradually advance to charging distance, while the artillery would "help the infantry to maintain its mobility and offensive power." <sup>1</sup> Then the artillery fired an intense burst, the infantry charged, and routed the enemy. There were provisions for defenders in various types of cover. Howitzers, with their arced trajectory, could fire into trenches. Percussion shrapnel would be used against buildings, since the slight delay of the fuze meant the shells would burst inside. <sup>2</sup> However, the section on mobile warfare simply ignored the issue of obstacles. Barbed wire, although used in both South Africa and Manchuria, was not mentioned at all.

Sieges were considered an altogether different kind of operation, mutually exclusive from field battles. Even in sieges, however, bombardments were discouraged, and it was thought that they "should rarely directly precede the ... assault," thus sacrificing many of the bombardment's effects, perhaps in an effort to preserve surprise for the moment of assault. <sup>3</sup> Sieges were viewed as an attritional type of battle, and inflicting losses was the field artillery's main employment, although there might be circumstances for them to reduce "the resisting power of fortified localities." <sup>4</sup> Cupolas, parapets, and trenches were the expected obstacles; once again, barbed wire was ignored. The main emphasis placed on diminishing enemy morale was sound: if the enemy was disinclined to fight, strong positions were useless. However, the focus on morale was excessive. If other factors are roughly equal, then morale can be the difference, but the serious imbalance between offensive and defensive firepower was being ignored.

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More time had been spent thinking about field battles than sieges, but the real failing was not in doing either one badly, but in separating the two. Encounter battles were expected, sieges were possible; what the British army was not ready for was set-piece attacks. British plans for attacks revolved around scenarios involving open flanks, not the need to penetrate a defensive line. The British army had no ready response to the circumstances they would be facing.

Preliminary bombardments were, in a sense, politicized. They were correctly seen as a vital part of preparing an offensive, but the bombardment was designed according to the strategic goals of the offensive, rather than the offensive's goals being tailored to fit the resources and tactics available. Planning was top-down. Since the Allies intended to win the war quickly, and were usually sure that German morale was failing, the Allies usually tried to break through, to crack the German lines and pass the cavalry through for a grand pursuit. The flaw in this approach was that it put the cart before the horse. While the strategic goals were impeccable, the tactical means were lacking—planning for pursuit and exploitation was useless when the Allies could not even break the German line. Bombardments were sometimes shortened to save shells for later (after the theoretical breakthrough), or to try for the element of surprise.

To digress for a moment, there is no right answer to the question of what strategy the Allies should have used on the Western Front. In the broadest terms, they had a choice between a breakthrough strategy—to try and win the war quickly, and thus at less overall cost, although probably at a higher short-term cost—or an attritional strategy that accepted a longer war but tried to compensate by losing fewer men per month. The politicians wanted the war over quickly but also wanted low casualties. Generals also had a responsibility to their troops to not waste lives in futile attacks. On top of these pressures, there were the normal ones that occur in any organization: hesitant leaders are generally replaced by someone who is more positive about their goals. This combination of pressures produced senior commanders who were, generally speaking, prone to attack and try for breakthroughs. It also brought political pressure, however indirectly, to bear on major offensives, but not on smaller attacks. The converse was tried on occasion: launching tactically efficient attacks and trying to combine them to strategic effect. It could work (as at Gorlice-Tarnow), it could fail and turn into an attritional bloodbath (as at Verdun), or (as in the German 1918 offensives) it could fail when the tactical and strategic goals diverged. Thus there is no one best strategy to use in a war, even using hindsight.

Since bombardments had become so important, the artillery moved to center stage. Being so noticeable and important meant that the artillery (and artillerymen) frequently got blamed for things that went wrong. Failed battles stuck in the mind, and because the bombardment generally was the starting point for failure, the blame fell on the artillery. In fact, the artillery designed neither the offensives nor the tactics. Nor, in 1915, did artillerymen know enough to criticize the plans handed to them. They made suggestions but were constrained by their belief that artillery should be subordinate to the combat arms. However, the Royal Artillery did what it could to help, and artillerymen (once they had the necessary experience) were not shy about suggesting alternatives.

## 1914

Reflecting expectations of a low firepower/high mobility war, in 1914 the BEF went to France without any siege artillery. At first their tactics did not include bombardments, but within a month it was evident that more firepower was needed. The Siege Train (referred to in capitals) and various other "heavies" trickled out to France, even without a siege going on. They were very effective against the slight German trenches, although once the Allies lost the initiative it became more difficult to integrate them into the fighting. The shell shortage also affected them, reducing the firepower they could produce. By December, The Siege Train was a defunct concept, and the Committee on Siege Artillery Material, only

three months old, was dissolved. <sup>5</sup> It had done its job of diligently calculating the number of guns needed to break the German frontier forts, but its results were fantasy, given both the military situation and the pace of munitions production. Perhaps its most original conclusion was the need for a major-general to command The Siege Train, thus guaranteeing a high-ranking position for an engineer.

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Instead of a separate Siege Train, siege pieces went to France as fast as batteries mobilized; in peacetime, siege batteries were kept at reduced strength in personnel and lacked any horses. Siege artillery proved its worth, although first impressions were prejudiced by pre-war views. At first, Haig found he could have all the 6-inch howitzers to himself, because no other commander wanted them, believing they would be too slow for forthcoming battles. <sup>6</sup> From September through November, Sir John French tried to pry heavy guns out of the War Office, even begging for old muzzle-loaders. From being viewed as an encumbrance, heavy guns were suddenly vital: "If heavy ordnance is not forthcoming when required future operations may be seriously handicapped and protracted, and increased loss of life may result." <sup>7</sup>

Tactically, the heavy artillery was used properly: the heavies aimed at strongpoints, fortified buildings, and trenches. This shelling of positions was combined in a complementary fashion with field artillery and small-arms fire intended to kill and demoralize the defenders. Artillery "preparation" at the time was quite simple. A bombardment consisted of a few minutes of shelling before the infantry cheered and charged. German positions were not elaborate enough to require a more complicated artillery plan, nor were there enough shells to do much more when the need arose. Already, the requirement to attack on time or according to a schedule trumped the need for a heavy bombardment. If there was not enough heavy artillery, field artillery was asked to do what it could. Sometimes the lack of a bombardment was entirely justified. For a quick counterattack, so common in the desperate fighting around Ypres, it was more important to counterattack before the Germans consolidated a gain than to deluge a position with shells. Once the German pressure abated, the BEF could recover and contemplate how they should conduct their own war-winning offensive.

### The First Trench-warfare Attack

The BEF's first planned set-piece attack was in December 1914, up the Messines Ridge. While pathetically unsuccessful, it represented the state of the art, which still included no wire-cutting and no preliminary bombardment. <sup>8</sup> The senior artilleryman involved thought that any preliminary bombardment would sacrifice surprise, not differentiating between five minutes or five days, but he was overruled. <sup>9</sup> (His view closely followed what Bethell had written: "A preliminary bombardment of the point of assault would only serve to attract attention to it." <sup>10</sup>) Sir John French limited himself to saying that the heavy artillery should "support the general attack," and afterwards noted that the attack was "assisted by a heavy artillery bombardment." <sup>11</sup> Clearly, French had no particular idea of what the artillery should do, only that it should be involved. The tone of the whole operation was hurried and amateurish; only the infantry plans were even half-heartedly thought out, and the artillery and cavalry were both simply supposed to "support" the attack. <sup>12</sup>

The lack of artillery wire-cutting stemmed from three causes. First was the shell shortage: there were not enough shells to cut the German wire, and the British troops had to resort to bizarre expedients such as carrying rope mattresses to throw over the wire so they could run across. Secondly, there was very little experience in using artillery to cut barbed wire, and no established method of doing so. Finally, trench destruction was considered more important; the focus was on the German troops, following the pre-war siege doctrine. The need to attack was paramount, and with a limited number of shells trench destruction took priority over something that could be extemporized. Smith-Dorrien, in letters of that week,

referred to "completely smashing to pieces the enemy's trenches" and "blowing in any trench the enemy can make," and these were things that could not be jury-rigged with rope mattresses. <sup>13</sup> Haig, a few days later, thought that a bombardment was necessary "to destroy the enemy's protection." <sup>14</sup> There was no planned support during the attack, although the guns would be available to fire on opportunity targets if orders could reach them about where fire was needed.

Obviously, smashing German trenches would kill Germans, destroy machine-guns, and demoralize the defenders, but Smith-Dorrien's ideas go back to the old division between mobile and siege warfare. He saw trench warfare as a temporary circumstance, soon to be corrected. After the breakthrough, flanks would reappear and "normal" fighting would return. <sup>15</sup> While Smith-Dorrien was referring to an attack in December 1914, this view of trenches and barbed wire as a momentary problem rather than as the new norm would prevail through 1915. It was a slight update of the pre-war ideas about morale: if these obstacles could only be removed, the two infantries could again fairly test their mettle.

### 1915: Neuve Chapelle

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The second British trench-warfare attack was at Neuve Chapelle. ([Map 12](#) shows the battles of 1915 and 1916.) The BEF was attacking to prove to the French that the British forces would (and could) attack; the primary goal of the attack was to be aggressive and win some political points with the French. Militarily, the objective was to break the German line and occupy a low ridge that gave the Germans observation over British lines and would give the British observation over German lines.



The battle lasted from 10-12 March 1915, and the pause between attacks on entrenched positions from December 1914 to March 1915 gave the British much more time for planning. Wire-cutting was a key part of this planning process. With the background of the Messines Ridge attack, in January 1915 the British conducted experiments on the wire-cutting abilities of machine-guns and field guns. Replicas of German positions were built and shelled under realistic, if optimistic, conditions. In light of later historical controversy, shrapnel performed better than HE in these tests. <sup>16</sup>

The French had already experimented in mid-December 1914, and the BEF had copies of the reports in a week, but the French results were not directly applicable, mainly because the French were using HE, which was in short supply for the BEF. <sup>17</sup> Between those tests and Neuve Chapelle, front-line experience in minor actions was carefully noted and circulated, in hopes of learning from these experiences. <sup>18</sup> Haig personally pored over these reports in planning the battle of Neuve Chapelle.



I received a detailed report of the Artillery work in the action against Duck's Bill (Givenchy) last Saturday (20th). [Examines the wire-cutting in terms of number of guns, range, number of shells, duration of fire, length of wire, layout of wire, and effectiveness overall.] The effect was very successful. The 'storming party' report that they had no difficulty in getting through the wire. ... The storming party report enemy's trenches very much knocked about. <sup>19</sup>

But wire-cutting was only one of the challenges to be overcome; there had been no comparable bombardment tests. <sup>20</sup> Different people had different ideas on how many shells were needed to demolish German trenches, and artillerymen had no better ideas than anyone else. It might take minutes, hours, or days, depending on who was asked. <sup>21</sup> ([Appendix 5](#) has Sir William Robertson's general thoughts.) Since nobody had data or experience, Haig felt free to consult widely, even outside the chain of command. But time

passed and he needed to have a plan; in the end he demanded, and received, one. [22](#)

... I received this evening Rawlinson's proposals for the forthcoming operation. I wired for him and General Holland (commanding the artillery of the 8th Division). They arrived about 9 p.m. It is difficult to estimate the proper number of howitzers to batter in a line of trench. We don't want to run any risk of failure, so I decide to ask for two more batteries of 6-inch howitzers (siege) making 28 in all. None of the artillery commanders seem able to agree as to the amounts of ammunition or time required to destroy a given length of hostile position as now constructed. So I decide to go in to G.H.Q. tomorrow to see C.G.S. on the subject. [23](#)

There was not too much logic behind this plan. Without any data to plan the bombardment, the bombardment was simply assigned as much time as the wire-cutting would take. ([Appendix 6](#) has some of Rawlinson's handwritten planning notes.) The goals for both elements were the same: complete results, sweeping away all the wire and demolishing all the trenches. Moreover, had more heavy artillery and especially more shells been available, the plans would likely have been changed to a longer bombardment, with the wire-cutting added at the end.

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Prior and Wilson have neatly covered the course of the battle, so only a very brief summary is needed here. The bombardment stunned the Germans, except on the British left, and the initial attack was largely successful. But bad communications delayed the advance of reserves, and the Germans occupied a second line that the British could not break. The initial success blinded the officers involved to the flaws in the attack's plan, but convinced them that when the communications problems were ironed out, there could indeed be breakthroughs in trench warfare. It is vital to keep in mind that the bombardment had been intended to destroy the German positions and troops; it only turned into a neutralizing bombardment because of the lack of guns and shells.

The partial victory at Neuve Chapelle was a combination of skill, judgment, and beginner's luck, but unfortunately the bombardment plans were taken as a template that needed only to be repeated for guaranteed future success. The reason for the short bombardment (the tie to the wire-cutting) was forgotten. Nor were wire-cutting and bombardment accorded equal analysis. The wire-cutting had mainly worked, but the bombardment had suffered problems, so the BEF focused on fixing the bombardment. This likely contributed to forgetting the linkage between the two. In post-battle analysis, the failure on the left flank (where British guns had missed the German trenches and thus failed to suppress the German infantry) could be explained by bad luck and inaccurate shooting, thus further masking the fundamental issue of shortage of guns and shells. The British command had a static view, and they passed on the "lessons," assuming these would hold good for the rest of the war. (To be fair, they expected to win the war later in 1915.) Oddly, in doing this senior British commanders compromised their belief in personality-dominated warfare. This template assumed that the enemy would not react to British success, ignoring the human element. Both First Army and GHQ circulated reports of lessons learned, so the success might be repeated in the future. [24](#) Not content with this level of success, after-action reports were studied and fresh wire-cutting experiments were conducted a week later. [25](#)

### Another View on Tactics

The senior artillery officer in the BEF, Major-General John du Cane, drew different lessons from Neuve Chapelle. He advocated limiting the infantry attack to the area the artillery had smashed, a procedure later called bite-and-hold, one that had been raised at the same time by Sir Henry Rawlinson, who had commanded the main attack at Neuve Chapelle. [26](#)

Essentially, du Cane suggested that the war was not going to be won quickly, so it should be won efficiently, and looked more toward mechanistic warfare than to leadership and morale. He was arguing for attrition, not breakthroughs. His ideas were not adopted, nor was there a strong debate or even a reply to his memorandum. In an organization as ponderous and slow to change as an army, a complete change based on a single datum was unlikely, especially since Neuve Chapelle had been a partial success. The 'old guard' could point to this and argue for improvements: surely it was better to iron out the flaws in the present system than to junk everything in favor of a totally new and untested scheme. It is also a mistake to think of this debate as embodying two diametrically opposed schools of thought. Officers were enormously busy with myriad other problems, and many simply never thought this question through. It is easier in retrospect to measure people against a standard and categorize them according to a dichotomy; more typically they agreed with bits of both. (For instance, Smith-Dorrien had thought about artillery bludgeoning the Germans out of successive trench lines and thereby creating a breakthrough.) [27](#)

Not all those who rejected the bite-and-hold approach were reactionary: as a strategy it had flaws. First, there were political and diplomatic problems. It would be hard to get political and popular support for any plan that did not call for quick and decisive victory. At this stage of the war, the massive volunteer forces enlisted in 1914 had not entered combat, and Britain was hardly likely to give up on decisive battles before fielding her full strength. It would also be very hard to get the French to agree that the Germans should occupy portions of France for the foreseeable future. It also required that the politicians totally trust the military's views on strategy. Suspicion and frustration had not yet accumulated to the extent they would reach in 1916 and 1917, but even in 1915 some politicians doubted the Western Front strategy. Many politicians favored the Gallipoli venture, and the military 'experts' were not always right. After the failed breakthroughs of 1916 and 1917, in late 1918 the Allied generals were still wondering whether they would win the war in 1919 or 1920. Second, there was confusion about what constituted a 'bite' as opposed to a breakthrough. Henry Rawlinson, something of a 'biter,' wanted to take the village of Neuve Chapelle in two bites (of roughly 300 yards each), but when planning the Somme offensive he argued 2,000 yards was a bite. [28](#) To be fair, the circumstances were different (and would be for every battle), but at both Neuve Chapelle and the Somme Haig and Rawlinson disagreed. Each was right once, but the bite-and-hold school was not infallible. Third, switching to bite-and-hold meant rejecting the army's whole concept of warfare, making a leap in the dark away from all accepted ideas and experience. However, the concept would survive as an alternate strategy, and was resurrected at least as an internal memorandum in GHQ before the Third Ypres campaign. (See [Appendix 22](#) for details.)

While an artilleryman, du Cane, put these ideas on paper, it would be a great mistake to think that this argument pitted the artillery versus the rest of the army. Artillery officers did not flock to du Cane's corner, and many later criticized the concept he advanced when they rose to influential positions. Henry Rawlinson may have invented the phrase 'bite-and-hold,' but even he treated it simply as an option, not as a radical new strategy that would replace everything before it.

### **The Next Attacks: Aubers Ridge and Festubert**

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The next British attacks were timed to help much larger (and geographically separated) French offensives. On 9 May the battle of Aubers Ridge was fought for nearly the same purpose as that at Neuve Chapelle: to capture a piece of high ground that offered an observation point. On 20 May the BEF scraped up enough troops, despite the ongoing fighting at Ypres, to launch a larger and longer-lasting attack at Festubert.

For the attack at Aubers Ridge, the First Army relied on repeating the artillery procedures of Neuve Chapelle. Simply repeating the pattern of Neuve Chapelle was a grievous error. The Germans took the simple step of reinforcing their trenches and stringing more barbed wire.

One element of the bombardment had been thoroughly tested—using 18-pounder HE shells against trenches and parapets as well as the larger, more powerful shells from howitzers. Previously, only howitzer HE had been trusted against these sturdy targets, but on 20 April careful tests had apparently proved field gun HE adequate. Haig hoped this would mean larger attacks, since 18-pounders could now supplement the limited number of howitzers. <sup>29</sup> At Neuve Chapelle, the frontage of the attack had been limited because the number of howitzers was limited; the BEF had no data proving howitzers were the only weapons capable of the job, but it had been cautious. Now Haig thought he had a way to bypass these limitations and launch larger, and thus more powerful, attacks. Yet the 20 April tests were conducted against parapets like those at Neuve Chapelle, as if the Germans would not react to that battle.

At Aubers Ridge, after an inadequate preliminary bombardment, the morning attack lost heavily for no gains. But the attack was renewed in the afternoon after a bit more wire-cutting and a cookie-cutter repetition of the morning's inadequate bombardment. (Given the lack of time to plan anything else, repeating the original plan, however flawed, may have been the only option.) The afternoon attack also failed, again with heavy losses. Haig, ever optimistic, and operating with inadequate information, was planning how to resume the attack the next day until more detailed information reached him and the attack was abandoned. There was a curious dichotomy in the later plans. Some further attacks were planned, both in new areas and renewing earlier, failed, attacks. When renewing an attack, there was to be a further bombardment, presumably because the element surprise was gone. But when launching a brand new attack (even only a few hundred yards away), no destructive bombardment was planned, only a few minutes of fire to suppress the German defenders. Why these brief bombardments were thought to be enough when similar bombardments on 9 May had failed was never explained, but it is clear that officers thought in terms of two different types of attack; again the BEF suffered from compartmentalized thinking. GHQ referred to "rapid assault" and "deliberate methods," and preferred the latter. <sup>30</sup> GHQ finally stopped the attacks, uncharacteristically insistent on the point, emphasizing that

It is of great importance that the infantry should not attack until the artillery preparation has been effective. The results of your attacks on the 9th show that the artillery preparation was not effective, and the Commander in Chief does not feel sure that sufficient time is being allowed on this occasion. <sup>31</sup>

Haig could see that the criticism was justified, and he now focused on accurate bombardments, complaining that Germans could survive even very heavy shelling. <sup>32</sup> He "*had no intention of ordering any infantry under [his] command to attack until the hostile position was thoroughly prepared*, so they [Gough and Birch] were not to underestimate merely to please G.H.Q." <sup>33</sup> Haig's error had been in using 18-pounder HE to try to replace heavy howitzers. Eager for a larger attack that could be the decisive one, he needed more bombardment guns, but the 18-pounder shell was just not powerful enough. He would continue his optimism about 18-pounder HE, but would never again base a whole battle upon it. <sup>34</sup> Artillery officers had been more dubious of its performance before the battle, but had loyally accepted the decision of higher authority. Noel "Curly" Birch, Haig's artillery adviser, then drew up plans that would meet Haig's own standard of "thorough preparation," but Haig altered the plans and suddenly there was a miraculous coincidence between what he had available and what he needed. Birch knew better but did not complain; he can be faulted for being too loyal, but he was steadfast in subordinating the artillery to the other arms. <sup>35</sup>

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After the failure at Aubers Ridge, the method of bombardment was altered, yet the purpose—destruction—was not. One factor in this change was the shell shortage, which led

GHQ to drop intense bombardments, which it felt led to "hurry and inaccuracy and consequent waste of ammunition. ... We must base our plans on careful, methodical and accurate fire, aimed at producing the desired result with the minimum of ammunition." <sup>36</sup> That this apparent sea change in the nature of bombardments was made so quickly (two days after Aubers Ridge) and without debate shows that the short bombardment á la Neuve Chapelle was the aberration rather than the rule, and that the purpose of bombardment was unchanged. The short, or 'hurricane,' bombardment had worked at Neuve Chapelle because the German defenses were weak and the defenders were stunned by even the few available shells. The next efforts at such bombardments failed because the Germans thickened their defenses, which both saved their lives and gave the survivors more confidence to fight once the shelling lifted. The new German defenses were too stout for the limited number of shells that could be fired by the limited number of British guns in a short period of time. Since the BEF did not have any more guns with which to fire more shells in a given span of time (the 18-pounders' HE having proved useless), the answer was to change the time factor in the equation. The slower bombardment also promoted accuracy and made destruction easier to achieve, but at the expense of abandoning operational surprise.

The 'hurricane' bombardment was designed for purposes of destruction, not neutralization, as it would be later in the war and after the war. The pre-war objective had been neutralization, and that had worked through the field battles of 1914, but for the set-piece trench warfare attacks the British army sought destruction. Neutralization was a lucky and unintentional by-product at Neuve Chapelle. When attempts at both destruction and neutralization failed, the natural response was to use more guns and shells. Destruction continued to be the goal until the Royal Artillery more than mastered the techniques. Not until November 1917 would destruction be abandoned as a primary goal of artillery attack, but until the definite development of the creeping barrage the artillery's first priority was destroying German positions and obstacles.

So the BEF continued to plan artillery bombardments to destroy the enemy. The Chief of Staff, Sir William Robertson, had already written Haig recommending "deliberate, observed, and controlled fire, so that every shot may be definitely directed on the objectionable places," and that is what was done. <sup>37</sup> In the next battle, at Festubert, just a little further along the Aubers Ridge, there was a 60-hour preliminary bombardment designed to demolish German defenses; demoralized defenders would simply be the by-product. Again the battle was to support a French offensive, even though the BEF was desperately short of ammunition and shells. The ammunition situation in the BEF was so bad that infantry reinforcements were held in Britain because there was not enough ammunition for them to use as combat troops if they went to France. <sup>38</sup> By all objective criteria the attack failed, taking some first line trenches and a short stretch of one reserve trench in exchange for 16,000 casualties. GHQ repeated its criticism, <sup>39</sup> but the battle dragged on for a fortnight of small attacks and growing casualty lists. Only days after Festubert staggered to an end, planning for a minor attack near Givenchy began, calling for a "deliberate bombardment of the most accurate nature ... extending over several days, to ensure ... obstacles are destroyed and that [German] troops are seriously demoralized." <sup>40</sup> The First Army submitted ammunition estimates it blandly admitted were unreliable, even if they were based on experience. These estimates fluctuated depending on what was likely to be available, since—despite all official pronouncements about properly preparing attacks—the BEF felt strong pressure from the French to attack, and many British generals were willing to do so. It was more important to attack than for the attacks actually to be properly prepared. <sup>41</sup> Gains were minimal, and afterwards GHQ noted, "Ammunition is the governing factor in the operations and it must be recognized as such." <sup>42</sup> Given the BEF's track record in 1915, the truth of such a statement was not likely to interfere with operations.

## Loos

The next significant British attack was the battle of Loos, in late September 1915. (The [Panoramic Photo](#) shows part of the Loos/Lens sector, although of uncertain date.) Once again the BEF was cooperating with a major French offensive. Following the new pattern, the bombardment lasted for four days so that all fire could be carefully aimed and no shell would be wasted. Emphasizing the continuity in artillery thinking in 1915, when the First Army issued a circular entitled "General Principles for the Attack" in September, it was little more than a re-print of April's edition. <sup>43</sup> (The April edition is available as [Appendix 7](#).) Once more, there were not enough heavy howitzers, and 18-pounders firing HE were pressed into service, but the number of bombardment guns (and their power) was still markedly insufficient. The largest British attack to date, it was supported by the largest number of guns. But the density of the artillery support was actually diminished, as the guns were spread over a wider front. Moreover, the greater number of guns led to new problems posed by the inadequate command structure. Guns were parceled out to the infantry divisions so that the divisions could control all aspects of their attack. While it did ensure that a division commander had complete responsibility, it meant the infantry formulated requirements without considering artillery problems or asking for suggestions, and then complained if anything less than perfection was the result. Holding firm to their ideal of providing whatever support they were asked for, artillery officers did not complain until after the battle, when the defective system was changed.

With few guns to cover a large front, the shells were spread thin: there were only two 4.5-inch shells and one heavy howitzer shell available per yard of German trench, and that assumes that they hit their targets. <sup>44</sup>



The weight of shelling was inadequate (less than was fired against weaker defenses at Neuve Chapelle), and the Germans had once again improved their defenses. At Aubers Ridge and Festubert the Germans had strengthened their front line trenches, and now they added a series of strong supporting lines. <sup>45</sup> The BEF tried to plan around this, recognizing that it lacked the means to do everything it wanted, but not all plans were reconciled. Haig thought it was only necessary "to destroy the hostile front trenches or parapets where they form a physical obstacle to the infantry advance," but he also wanted German observation posts, command posts, communications trenches, and roads shelled. <sup>46</sup> All this was necessary but impossible given the shortages. Haig also reduced his requirements to fit within his means—as part of the Allied effort, the BEF was going to attack whether it was ready or not. The artillery plan was reduced to hitting key points, firing as much as possible on other targets, and hoping for the best.

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So, without enough shells to destroy the Germans, the First Army attacked on 25 September covered by smoke and gas. All through the planning of the attack, the First Army knew there would not be enough guns for an adequate destructive bombardment. The use of lethal gas (chlorine) was intended to compensate by killing, terrorizing, or incapacitating the German troops. In one sense this was a reasonable substitution for artillery: gas could kill as well as HE could. But gas did not breach obstacles or rip telephone cables or demolish observation posts. In addition, there was not enough gas to saturate the German positions. German gasmasks gave about forty minutes of protection, so the gas had to provide a lethal concentration for over forty minutes. So the British mixed smoke into the gas discharge to mimic gas so the Germans would at least keep their gas masks on longer, even though the gas would kill very few men (some masks would fail, and some dugouts would collect a lethal concentration, even if the general average was too low). In this case, however, the gas/smoke cloud was intended mainly for cover, reducing visibility so the Germans could not see the attackers as clearly. From playing a destructive role in the plan, the gas had switched to only a suppressive role, and in only a very limited way. All these compromises were necessary because the BEF had promised the French to attack on a specific date.

The gas, smoke, and the [lifting barrage](#) indicated the recognition that the Germans would not be destroyed (a belated recognition of artillery's limitations). The whole artillery plan was a muddle, based more on the necessity of attacking than on the presence of sufficient guns and shells or clear thinking. Haig himself spent more time considering how the gas and smoke should be used than on going into details concerning the artillery; perhaps he felt he knew enough about artillery planning, or maybe he was more interested in the novelty of gas as a weapon. [47](#) He did intervene in the planning, for instance urging the use of 18-pounder HE, which some subordinates recognized as inadequate to the demands put on it. [48](#)

The bombardment had not "*thoroughly prepared*" the German positions, as Haig had himself promised in June. The battle's results were mixed, but there was great dissatisfaction with the artillery's performance. Several problems were identified, including poor organization but also lack of guns and shells, inaccuracy, and poor quality of materiel. Haig blamed organizational problems and shortages, and was confident gas and smoke were adequate substitutes in the destructive role until more artillery was available, not noticing the different functions the two weapons played. [49](#)

### The Search for a Formula

Throughout 1915 there was a tendency in the BEF to look for an artillery formula, a magic solution (expressed as guns or shells per yard) that would end trench warfare. Careful tests determined the wire-cutting ability of field guns, but nothing could show how to demolish German trenches, since the Allies could never test a position until they had captured it. Nor was there a way to predict the effects of shelling on enemy morale. This led to debate about whether short, intense bombardment or prolonged shelling was more debilitating, a question without an answer. The artillery formulae created in 1915 varied, depending on when they were made (battle experiences changed expectations), who was making the forecast, and (since German defenses varied) the sector of the front. The shared trait of the formulae and forecasts was that none were implemented. [50](#) Despite paying extensive lip service to the primacy of artillery in the new conditions of trench warfare, British attacks regularly, even typically, took place without adequate artillery preparation. Trained since Sandhurst and Woolwich to consider offense more important than defense, generals simply attacked with what they could assemble. For one minor attack Birch, Haig's trusted artillery adviser, established his requirements for artillery support but then had to revise them downwards twice until they approximated what was available. [51](#) Rawlinson, who was to command the attack in question, heard from Haig that

GHQ say, if we [First Army] can't do the job with less shells they will transfer the active duties to the II Army who can do it with a less expenditure. I [Haig] am quite sure they cannot but it is a bad policy to start the competition between the two Armies cutting us down in ammunition like this only increases the number of casualties and seriously endangers the success of the enterprise. It is a great mistake for which Sir John is alone responsible. [52](#)

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Yet the next day Rawlinson forgot his concerns, and remarked he had "a lot of howitzers" and later thought the attack was bound to succeed since it followed two days of bombardment. [53](#)

The formulae were also misused: too often in 1915 the BEF assumed that repeating a successful formula would bring success. For a start, the Germans could change their defenses, as they did at Aubers Ridge and again at Loos. Thus any artillery formula was instantly out of date the moment it was used. Second, artillery may not have been the key feature in a successful attack. Finally, this emphasis was also a curious philosophical

departure for the British army. Firmly believing that warfare was morale-centered and depended on the quality of men and officers rather than on bookish knowledge, why were they now desperately looking for quantitative formulae? Perhaps in a way it was so they could return to the task of leadership. If a formula were discovered, they need never worry about artillery again—artillery would be factored out of their discussions, and leadership/morale restored to their rightful place. What was more, the successful formula would have by definition ended trench warfare, and the fighting would have returned to a 'normal' state. It is harder to say why British generals ignored the Germans' ability to improve their defenses or tactics, something the British did recognize later in the war. Probably the hope that trench warfare was a temporary aberration discouraged officers from adopting special methods. Perhaps they had partaken too deeply of the idea that defense was passive, or perhaps they were too absorbed in their own problems to look ahead. It was not a view restricted to infantrymen or cavalrymen, so it was not simply a matter of un-technical officers avoiding hard thinking on artillery.

Nor had the artillery thought hard enough, even within its role of supporting others. Artillery officers took part in planning attacks, but accorded other branches of the army priority. Seldom was something done just to suit the artillery, and even technical impossibilities could not stand in the way of someone else's desires. Some of the first artillery pamphlets were an explanation for the infantry about why, no matter how careful the gunners were, some shells would fall short, and thus the infantry might need to withdraw from the foremost trench to avoid risk. The segregated nature of pre-war training left infantry officers ignorant about the artillery but expecting perfection; nobody had told them, or showed them, what artillery really did. Effective bombardments without enough shells were just as impossible as perfect accuracy.

### **GHQ's Role**

Throughout 1915 the commander-in-chief of the BEF, Sir John French, took a largely supervisory role in operations. He paid even less attention to artillery matters, focusing his attention on the shell (and gun) shortage. Sir John did not quite grasp the nature of the artillery planning at Neuve Chapelle, and thought the plan centered on artillery neutralizing the Germans when in fact it sought destruction. <sup>54</sup> French did little more than follow the conventional wisdom about artillery, thinking a bombardment necessary and supporting heavier, and explicitly destructive, bombardments later in the year. <sup>55</sup> French was gravely concerned about the excessively wasteful attack at Aubers Ridge, intervening in Haig's handling of the battle and afterwards pondering "whether we ought not but to stand altogether on the defensive [un]til an adequate supply of HE is available." <sup>56</sup> He listened to the concerns of Major-General du Cane, GHQ's Artillery Adviser, whom he thought very able, but did little to implement any suggestions. <sup>57</sup> On the whole, French was a hands-off commander-in-chief, not technically minded, who only acted slowly on any suggestions from subordinates. The shortage of guns and shells could not be ignored, but he had few new ideas about how to use the artillery that was available.

Although not getting much direction from the commander in chief, the General Staff at GHQ produced a series of information and training booklets. These started in December 1914, and about ninety were produced in the next year, but only a few dealt with artillery. Some were produced for home consumption rather than for the BEF, since there were more troops at home in training than in France and they needed up-to-date information. <sup>58</sup> Others were to teach troops everywhere how to handle the new conditions of trench warfare and new technologies; sometimes these only appeared months after the new equipment. <sup>59</sup> There was no comprehensive series on combined operations or on artillery operations, nor was any artillery doctrine laid down. The BEF did not borrow French artillery concepts, although periodically some gunners compared British and French methods. For instance, in June 1915 the French were starting down the road to their 'artillery conquerors,

infantry occupies' doctrine, but the BEF did not publish the relevant pamphlet until November, while different British ideas were published in more detail in July. <sup>60</sup> (Two important pamphlets are available as [Appendix 8](#) and [Appendix 9](#).)

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French methods could be used to pressure the War Office. When the BEF learned how many shells the French used in a bombardment, it was used as grounds to demand increased British production. <sup>61</sup> Gunners were still content with their subordination to the infantry during the planning stages, whether the battle was intended as a breakthrough or a limited one to pin down German reserves. Strategy was allowed to drive tactics, and infantry tactics outweighed the artillery's concerns. Higher commanders launched battles knowing that preparations were inadequate but believing there were overriding reasons to press on, and artillerymen were willing subordinates.

### Haig Takes Over

Over the winter of 1915-1916 the BEF was preparing for a great offensive, one that would finally win the war. The forces available were larger than ever, raising the question of how large the attack should be. There still were not enough guns to attack everywhere, so the width of the forthcoming attack depended on predictions of how much artillery would be available, and on yet another artillery formula: how much front the available guns could cover. In mid-December, the Loos figure (100 yards per heavy piece) was recycled, although it had already been labeled as inadequate *before* Loos, and was proven inadequate there. <sup>62</sup> Smoke and gas would be used as supplements, but at Loos these had proven terribly fickle, and eventually they would be dropped as significant elements of any major attack, and of any attack of any kind that had to be launched on a given day regardless of weather. (They were retained as possibilities for smaller attacks that could wait for favorable weather conditions.) By late January, GHQ switched to an estimate of about 75 yards per heavy piece, and when in 1916 more artillery arrived the attack was widened rather than the artillery density increased. <sup>63</sup> To produce this figure, GHQ asked for data. The First Army reported on the battles of Neuve Chapelle, Festubert, and Loos, and derived a formula that told how many guns and shells a corps would need to take a thousand-yard-deep bite from German defenses. <sup>64</sup>

In this planning, however, one factor was missing: the strength of the German defenses. On paper, the same number of guns was adequate anywhere. Also, the formula recognized little difference between preliminary attacks and a decisive offensive. Artillery ratios hardly differed between types of attack, and both the First and Third Armies put forward plans for limited attacks that assumed ratios of 70-75 yards per piece. <sup>65</sup> This was broken down as 100 yards per heavy howitzer, <sup>66</sup> and the other heavy guns present lowered the overall figure. 75 yards per 'heavy' was already a considerable dilution from Haig's 1915 hopes. Before Loos, he addressed the possibilities of both general offensives along 25 miles of front and small attacks only 3,000 yards wide. <sup>67</sup> In both instances he advocated a ratio of about 40 yards per piece, 88 percent denser than he accepted in 1916.

To attack a strong position like Vimy Ridge or Messines Ridge, a higher gun density would be needed, but only for a Verdun-style attack with artillery conquering, infantry occupying. <sup>68</sup> But this was not the style of offensive the British had used in 1915, nor was it the style they intended to use in 1916. This suggests there were actually three, not two, categories of attack: decisive, preliminary, and limited, the last only intended to seize a specific piece of ground at a minimum cost in lives, which brought it closest to bite-and-hold tactics. However, Haig had already rejected the 'limited' methods for use in a decisive offensive, and they were seen as not even fit for preliminary offensives, being of use only in local attacks. <sup>69</sup> The calculations involved in rejecting bite-and-hold tactics deserve attention, since the debate about their worth continued after the war. The Allies were trying to win the war as

quickly as possible, assuming that an earlier victory would save more lives than fighting a longer, slower war, even at a lower monthly cost. Thus, the breakthrough—the decisive battle—remained the goal, and this strategy drove operational planning. While Haig rejected a strategy of limited attacks, circumstances forced him not to launch preliminary attacks. There was not enough artillery for near-simultaneous operations, and the transport system could not move the guns fast enough from preliminary attacks to a main attack. [70](#)

## 1916

### The Somme: Planning

Before tackling the details of the Somme offensive, it is worth taking a few moments to look at the planning process in general. It is important to understand who planned bombardments, and how. But first there must be a large caveat: circumstances changed over time, with different personalities involved, and according to outside pressures. GHQ, thinking about domestic and alliance politics and available strength, would decide where the attack would take place. That determined which armies and corps were involved. Extra corps could be added to handle arriving troops, and sometimes different corps were brought in to replace those with inexperienced or out-of-favor commanders. If possible, the divisions slated for the attack would occupy their sectors and familiarize themselves with the terrain and the objectives.

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GHQ would decide, in consultation with the army or armies, how long the bombardment needed to be. This was a strategic decision: it affected the time available to shift German reserves and British diversionary operations. The army decided, in consultation with its corps, how to allot the available heavy artillery, based on the strength of German defenses. The army also apportioned the counter-battery artillery. The corps would take its artillery and consult divisions on which targets within their sectors were most important. The corps also commanded spotting aircraft and balloons, so the corps headquarters would prioritize air-artillery co-operation. Infantry divisions would, after consulting their brigade and sometimes even battalion commanders, draw up lists of targets facing them, and discuss them with the corps' other infantry divisions. The infantry thus had a great deal of input into what was shelled, as long as there was adequate time to plan, a caveat that typically restricted this system to the preliminary bombardments. During a battle, as infantry divisions were rotated through armies and corps, they lost local knowledge and their contributions would be limited to looking at maps. Any real familiarity with terrain and defenses then came from corps headquarters, and the infantry battalions naturally felt divorced from the decision-making and complained even more bitterly if something went wrong. However, as [Appendix 13](#) shows, the BEF paid little attention to artillery when training for attacks.

It is also worth noting who went to planning meetings. At the division level and above it was typically a maximum of three men per unit: the commander, the senior artilleryman, and the chief of staff, but the artilleryman was often left out. When the infantry brigades or battalions were consulted, typically only the commander took part. Artillery brigade commanders did not participate. Thus the men around the table were overwhelmingly infantry officers, with an infantry perspective. Artillerymen were there to discuss how to do what the infantry wanted, suggesting alterations to take advantage of such things as enfilade fire but with sufficient clout to make only marginal changes. When an operation was small, and planned around artillery support (such as some of the small attacks in 1918), participation was more equal, with infantrymen actually listening to artillerymen. The major offensives had to be built around broad-front advances, however, and had less room for local variations. The armies set major factors, even including the pace of the infantry advance. There was little for the artillery or infantry to do at the lower levels beyond settle details. Through the entire planning process it mattered that the artillery would not be going "over the top." Artillerymen knew their lives were not the ones in danger, and it reinforced their tendency to defer to the infantry.



With that introduction to the generalities, we will now turn to the Somme in particular. (Map 13 shows the Somme sector.) Many historians have studied the Somme attack. <sup>71</sup> There is no need for an exhaustive re-examination, but some points in the argument between GHQ and the Fourth Army should be emphasized. The argument was really between Haig and Sir Henry Rawlinson, the commander of the

Fourth Army, who had commanded IV Corps in 1915 in a number of attacks under Haig's command. Haig clearly vacillated during the planning, mainly about whether the offensive was to be decisive or was part of the wearing-out struggle that would precede the decisive attack.

As shown in the previous section, this made no difference for artillery planning. The difference arose because Haig and Rawlinson had different responsibilities. Haig focused on strategic objectives and wanted a breakthrough, whereas Rawlinson had to solve the tactical problems and preferred to take a chunk out of the German line. Haig vacillated about whether the attack should be planned as a breakthrough from the very start, or whether a breakthrough could develop out of successive tactical gains. At one point he wrote, "I think such a plan [rushing the whole German defenses at once] would be impracticable against this position," but he had no comments to make about the bombardment. <sup>72</sup> The depth of the planned advance made a huge difference for the density of shellfire. Since there was no extra artillery available for a planned breakthrough, the amount of artillery fire was fixed, and by planning to advance 2,000 yards instead of 1,000 the density of shellfire was roughly halved.

Another big argument concerned the bombardment's duration. Haig preferred a short bombardment, hoping to achieve surprise and rush through the successive German lines, assuming that a short but heavy bombardment would be enough to both demoralize the German defenders and seriously damage their positions. Rawlinson originally had no preference about bombardment length, saying both were demoralizing. Neither Haig nor Rawlinson paid much attention to the weight of the bombardment. Both assumed that there would be enough guns and shells and that the German defenses (trenches and wire obstacles) would be pummeled, so their plans moved on to dealing with the German infantry. As Rawlinson thought more about it, he was won over to a preference for a long bombardment, citing two reasons Haig could not gainsay. Whether the bombardment was long or short, the wire-cutting would take several days and thus negate the element of surprise. Second, the French (attacking on the British right) were planning a long bombardment, which would void any chance of surprise for the Fourth Army. Rawlinson also reiterated the arguments that a long bombardment weakened morale more than a short one, maybe playing to Haig's obsession with German morale. <sup>73</sup> In this Rawlinson seems strongly influenced by reports from Verdun:

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Results have proved that the defenders though subjected to this very heavy fire were able at the moment of assault to man the remnants of their trenches and bring the enemy to a standstill. All that artillery can definitely accomplish is a diminution of the material means of defence and wear and tear of its moral [sic]; it cannot ensure their destruction. <sup>74</sup>

Rawlinson's sound reasons won GHQ's grudging support, and for a few weeks Haig talked about only advancing as far as the artillery could prepare the way. <sup>75</sup> However, as usually happened, Haig's confidence rose as the offensive neared and, only four days before the bombardment was to start, GHQ resumed meddling. <sup>76</sup> Their idea was to save shells during the bombardment and not fatigue gunners, so that the expected success could quickly be exploited. <sup>77</sup> Rawlinson argued back, quoting some of GHQ's own (earlier) arguments. They

compromised; Rawlinson trimmed one day off the planned bombardment, but not as much as GHQ wanted. <sup>78</sup> (The reduction in the planned bombardment did not affect the results, since it was also prolonged two days due to weather.) Through all the various plans, Haig treated initial success as certain and devoted his attention to the later stages of the battle. Rawlinson, being responsible for ensuring that initial success, was less confident than Haig.

In this battle of the memos there seems to have been very little input from the artillerymen. Haig does not mention any discussions, but Rawlinson sometimes talked matters over with his Chief of Staff, Archibald Montgomery, who happened to be an artillery officer, as well as with Noel Birch, his titular artillery adviser. <sup>79</sup> In the midst of the planning Birch was elevated from Major-General, Royal Artillery (MGR) with the Fourth Army to MGR at GHQ, but the change made no difference to the debate. He had not been Rawlinson's reason for wanting to limit the attack, and he did not suddenly dominate Haig's thinking. That artillerymen had so little input into planning serves as a silent reminder that they saw themselves as subordinate (if executive) officers who worked within the operational framework devised by others.

### Density of the Bombardment

The Fourth Army and GHQ both agreed, throughout the entire planning process, that there was enough artillery for the front involved. Haig's and Rawlinson's diaries reveal few concerns about the quantity of artillery and ammunition. <sup>80</sup> Both accepted that one heavy gun per 75 yards of front was enough to clear the way for the attack. If more guns had been available, they might have gone into thickening the support for the Somme, but might also have been used for a preliminary attack elsewhere. In 1916, preliminary attacks to pin down German reserves had to be rejected because there were not enough guns to support both main attack and preliminary ones, and a 20,000 yard-wide main offensive was sacrosanct—until after 1 July. After deducting guns to support the 20,000-yard main attack, there were not enough for preliminary attacks anywhere else. The possibility of shifting guns from one to the other had been examined, but was ruled to be too slow; the main attack could not lag far behind the preliminaries, else the Germans would reconstitute their reserves and the effect of the preliminary attacks would be lost. <sup>81</sup>

Certainly the Somme offensive was *not* intended to mimic the Germans at Verdun, with artillery replacing infantry as the assault arm. Such attacks had their place in British strategy, but they were not thought of as war-winners. The Somme attack more than met the 75 yards per gun yardstick (all corps involved had considerably more than one heavy per 75 yards, as much as one per 40 yards), and the German trenches and wire were expected to prove no significant obstacle. Obliterating these so that the British infantry would have a fair fight against the German infantry was the implicit purpose of the bombardment, although there were certainly features of the bombardment designed to kill as many Germans as possible. Official policy was that the bombardment should be "continued until the Officers Commanding the attacking units are satisfied that the obstacles to their advance have been adequately destroyed." <sup>82</sup> GHQ never made Rawlinson's rash promises of annihilation of the Germans in the bombarded area, which suggests more realism than GHQ is sometimes credited with. Rawlinson was also being deliberately optimistic, and speaking to boost morale. That there was also to be a barrage in addition to the bombardment is adequate proof that Haig and Rawlinson knew German infantry and machine-gunners would survive. However, they did apparently believe that the German wire would be entirely swept away and the trenches and strongpoints so heavily damaged that the BEF's numerical superiority in infantry would be decisive. The order of the day on the eve of the offensive pointed out that the Germans only had 32 infantry battalions (with 65 in reserve) in the area attacked by 13 British divisions. <sup>83</sup> Rawlinson wrote glibly of "destroying" and "pulverizing" the entire German front line and the fortified villages, and "beating down" defenses. <sup>84</sup>

GHQ official doctrine approached French thinking, thinking that destruction of German positions was the first priority. <sup>85</sup> Written in April 1916 and issued in May and June, *Artillery in Offensive Operations* was the BEF's

Under present conditions, no offensive operation can be expected to achieve complete success unless both the preparation and support by the artillery are effective. ... The first and most essential element of success is that the front selected for attack should admit of a full development of artillery fire, and of complete co-operation between the artillery and the infantry. ...

The preliminary bombardment is designed to achieve a certain purpose, namely, to enable the infantry to enter and penetrate the enemy's position: for this his works and the obstacles protecting them must be adequately destroyed, and his morale shaken. The extent of the ground to be bombarded will ... in all cases include, in addition to the destruction of the enemy's front-line system on the front to be assaulted, the next line in rear, and all communication trenches leading from it towards the front line. ...

Shortening the period may give the advantage of surprise, and may prevent the enemy bringing up more artillery to meet the attack. On the other hand, it will entail a much heavier expenditure of ammunition of the heavier natures, and a short bombardment, however intense, may not have the same effect on the enemy's morale as the protracted strain of some days' exposure to constant shell fire.... Judging [from experience] ... it cannot be said that the high road to success lies either in a short "hurricane" attack or in a protracted bombardment. The duration and character of the bombardment must primarily depend on the strength of the enemy's works, and the artillery available for the attack, but many other factors must be considered by the general officer commanding the force, with whom the decision must rest. It is the duty of the artillery commander to place before him the technical considerations involved. ... In some cases an attack must be launched at a pre-arranged time, whatever the cost, and the responsibility of the artillery commander is then limited to doing his best to have the preparation as complete as possible by that time. But when this is not the case, it is the duty of the artillery commander to inform the general officer commanding if he considers the attack should be deferred in order to allow of further artillery preparation. The completeness of such preparation must, however, always be a relative term, and many considerations other than the purely artillery one must influence the decision. <sup>86</sup>

(The full text is available as [Appendix 12.](#))

The pamphlet concluded with suggestions on how much ammunition to use for this level of destruction. French and German rules-of-thumb were mentioned, but the numbers recommended were British ones, simply repeating the lessons from Loos. But (Haig's) First Army had already denounced the Loos ammunition allotment, saying it "did not allow of a thorough bombardment." <sup>87</sup> Why there was such a change in opinion in the next few months is unclear, but, at least on paper, the BEF was shifting to an ammunition allowance known to be inadequate. There seems to have been a mental gap in the General Staff regarding artillery.

On paper, BEF planners acknowledged that "guns formed the 'iron

framework of battle," but they qualified this so heavily that anything else would take priority. If strategy called for an attack in a particular sector that was not suited to the artillery, then strategy trumped the "iron framework of battle." If the pace of an advance needed to be increased, then the attacks went ahead without an adequate preliminary bombardment. But looking at artillery in terms of X heavy guns per thousand yards of an offensive sector mistook the means for the ends. The requirement was not for a certain number of guns (or shells) per yard of front but for adequate results against German defenses. <sup>88</sup> It simplified planning to calculate numbers of guns and shells and assume these would do the job, but this ignored what the Germans were doing. <sup>89</sup> Not until the pious phrases about infantry-artillery co-operation became reality, rather than the artillery being the infantry's adjunct, would the situation improve. This really means that a change was required in the rest of the army, since the artillery hardly wavered in doing what others thought best, not what best suited themselves. ([Map 7](#) shows one battery's part of the Somme sector and its targets during normal trench warfare, aside from the bombardment.)



### Wire-cutting

If they argued about the duration of the bombardment, GHQ and the Fourth Army eventually agreed about wire-cutting. Obviously the German wire had to be cut for the attack to succeed. Experiments with new fuses and methods were ongoing, and eventually general procedures evolved. <sup>90</sup> Test results went out to the army hot off the presses, with rush editions even being printed in the final days before the Somme bombardment. <sup>91</sup> (Two of the pamphlets are available as [Appendix 10](#) and [Appendix 16](#).) Planners received guidelines on how many shells it took to cut through a given quantity of wire; the guidelines were revised in the June edition, having been reduced because experience showed that the guidelines were actually too high.

Throughout 1916, wire-cutting was a difficult operation, requiring considerable time and skill. As the Germans added greater depth in their defenses, it became more important to cut distant wire, an even more difficult target. Grass grew up in wire entanglements, making them almost impossible to spot from aircraft, while the wire covering the German second line was seldom visible from the British front lines. Since shrapnel, which lost effectiveness at longer ranges, was the best shell available to cut wire, there was an additional difficulty in cutting distant wire: field artillery might not be able to reach the wire at all, and even if it could it would require an inordinate number of shells. This meant that the medium artillery (4.7-inch and 60-pounder guns) had to help, and there were not enough mediums for their other responsibilities (mainly harassing fire and counter-battery work). As a result, distant wire-cutting was more often honored in the breach than creating an actual breach in the wire.



Wire-cutting would improve in speed and ease with the availability of the "106" fuze, which allowed HE to be used instead of shrapnel and also allowed howitzers to supplement field guns. However, despite a paper in-service date of March 1916, <sup>92</sup> meaningful quantities only arrived in early 1917. Lacking an easy way to cut wire, the only alternative was to accept the delay and fire deliberately and carefully.

The original Somme bombardment plan had scheduled five days of wire cutting. Poor weather caused the bombardment to be stretched to seven days. The extra time did balance the weather-related problems, and the wire was adequately cut. <sup>93</sup> Some units realized the German wire could not all be swept away, and that only gaps would be cut. III Corps lacked



time and shells and concluded that, "It is therefore for the infantry to state what wire can be left [un-cut]." <sup>94</sup> This shows yet another way that artillery planning was subordinated to the infantry, for it was the infantry who wanted all the wire swept away even though this put severe strain on guns. The Fourth Army's artillery files show the trouble caused (mainly gun breakdowns), yet the artillery never asked for a change of plan.

### Ammunition Supply

GHQ still had to worry about ammunition supply. Production was increasing in quantity, but there was no great surplus and economy was still desirable. Shortly after Loos, the question of short or long bombardments was again examined with a view to economy, this time contrasting British figures with a captured German paper. <sup>95</sup> The Germans relied upon short, intense bombardments to neutralize the defenders, and used two-thirds as many shells as the British. The BEF misused the data by ignoring the German purposes. Instead they mixed British ideas about destruction with German data about neutralization. Also, now that the BEF had more guns and shells, they questioned whether surprise combined with weight of fire might save ammunition. Not realizing the German intentions, the British fell between two stools: they thought intense bombardments might be more effective at destroying defenses (not true), but still wasted surprise by thinking of short bombardments that lasted several days. Concern over ammunition stocks persisted throughout the Somme campaign, and as early as 2 July Haig told Rawlinson that manpower was not a problem but shell supply was. <sup>96</sup>

### Course of the Battle

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There is no need here to chart the daily events of the battle of the Somme, but some trends are worth examining. After 1 July the active front narrowed, sometimes to exploit a success but more frequently to redeem a failure by focusing resources. The important point is that the artillery was more concentrated, and this increased the firepower density. This raised the density of typical bombardments, and the density also rose over time as commanders gained experience and found that a heavier bombardment typically saved their soldiers' lives. <sup>97</sup> Bidwell and Graham, in *Firepower*, quote with approval a

memorandum from Birch about this concentration of artillery. <sup>98</sup> Birch wrote that, if artillerymen had been consulted, the guns would have been more concentrated from the beginning, ensuring the German trenches were destroyed. Yet he went on to say, "Presuming that this view had been accepted and that the German defenses had been totally demolished ... I do not consider that we should have been in a better position today, in fact not so good." <sup>99</sup> (Birch's full report is available as [Appendix 18](#).) He was not being schizophrenic, but assessing the risks of a narrow penetration, against which the Germans would concentrate their fire and that would get flanking fire, against a broader advance. Birch was doing what other senior artillerymen did, looking beyond an artillery-centered viewpoint, considering matters as they affected the army as a whole and subordinating himself to that wider view.



Regardless, artillery was concentrated and its tasks eased because there were fewer breakthrough attempts, which helped allow for the increasing density of shellfire. Yet, as Prior and Wilson demonstrate, <sup>100</sup> the concentrated artillery (to which Birch was opposed) did little good on its own, since the Germans could concentrate their fire just as much. Capturing German trenches became the goal instead of breaking through; seldom were objectives more than 2,000 yards away. <sup>101</sup> Often attacks were made as soon as fresh infantry arrived, before the artillery had time to smash German defenses. Yet the artillery did what they could, and the inadequate bombardments were a result of pressure from GHQ. British military doctrine talked about combined arms action, but it was only lip-

service, and the results were infantry-centered operations with other branches supporting. The artillery had to do its best in the time allotted, and postponements were more often made because of weather (which affected infantry and artillery) than to allow more thorough bombardment. Through the battle of the Somme, the task of simply blasting trenches dwindled as a part of the artillery's duties, although weight of bombardment did not; what happened was that other work grew more rapidly. Aerial spotting developed quickly, improving bombardment accuracy, but it was more important for counter-battery work. Counter-battery work became more important after the British artillery was, finally, strong enough to blast the Germans out of any given trench. Once that happened, the Germans changed their defensive tactics, using more reserves, more counterattacks, and more artillery. Since the British artillery still had to pound the infantry's objectives, but now also had to fire on German reserves and artillery as well, either attacks needed more preparation time or they went ahead without a thorough bombardment. The creeping barrage also developed rapidly, and attention centered on these newer parts of artillery work. The British changes were gradual, fixing problems and improving on successes. Commanders were too busy during the fighting to be more reflective, and extensive changes had to wait until a lull in the fighting.



## Conclusion

In retrospect, the bombardments of 1914 through 1916 look amateurish. Yet at the time, most were on the cutting edge of technique and technology. It is critical in reviewing bombardments from much of this period to remember that German defenses were lighter than later in the war. If British bombardments of 1915 were lighter than in 1917, they had less work to do. There was less barbed wire, fewer trenches and pillboxes.



But there were still too many instances of inadequate bombardments, for two reasons. First, it was sometimes politically imperative to attack, usually because of French pressure on the British to 'do their share.' Second, there were times when the generals simply got it wrong. Lacking any experience with trench warfare, they had to improvise until experience was bought with lives. There were still errors of judgment, typically the product of thinking that the BEF could fix its failures while the Germans would sit still. The Germans did not. Lacking any idea when the war was going to end, and hoping for decisive victory rather than merely to exhaust the Germans, the constant goal was a breakthrough. If desirable at all levels, from the grand strategic to the tactical, it proved to be impossible. Artillerymen consciously held themselves subordinate to the combat branches and did what they could to help, which was not always what was best.

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## Notes:

**Note 1:** *FSR 1909*, 135. [Back.](#)

**Note 2:** *Ibid.*, 16-7; *FAT 1914*, 228. [Back.](#)

**Note 3:** *FSR 1909*, 166. This shows a strong concern with the element of surprise. [Back.](#)

**Note 4:** *FAT 1914*, 230-1. [Back.](#)

**Note 5:** WO33/701, Report of the Committee on Siege Artillery Material. [Back.](#)

**Note 6:** Haig Diary, 23 September 1914. [Back.](#)

**Note 7:** WO32/5150, French to War Office (hereafter WO), 10 October 1914; and also the letters of 29 and 30 September 1914. [Back.](#)

**Note 8:** OH 1915, vol. 1, 18. [Back.](#)

**Note 9:** A. H. Hussey Diary, RAI Military Document 1175 (hereafter Hussey Diary), 18 December 1914. Hussey also commented on the attack more as an observer, without suggesting he should have involved himself more. [Back.](#)

**Note 10:** Bethell, *Modern Artillery in the Field*, 344. [Back.](#)

**Note 11:** Field-Marshal Earl French of Ypres diary, IWM (hereafter French Diary), 10 and 14 December 1914. [Back.](#)

**Note 12:** GHQ letter OA816, 12 December 1914, WO95/688. [Back.](#)

**Note 13:** Smith-Dorrien to von Donop, 20 December 1914, WO79/84; to French, 19 December 1914, WO159/215. See also Smith-Dorrien's memo, 10 December 1914, WO95/630. [Back.](#)

**Note 14:** Haig Diary, 6 January 1915. [Back.](#)

**Note 15:** Smith-Dorrien to French, 19 December 1914, WO159/215. [Back.](#)

**Note 16:** "Dossier," Sir Stanley von Donop papers, IWM. Later there were tests of chain-shot (ammunition that split into two halves, connected by a chain) to determine its utility in cutting wire, which turned out to be poor. The RA had predicted it would be ineffective, but Lloyd George, Minister of Munitions, insisted on tests. SUPP6/169, Annual Report of the President of the Ordnance Committee, 1914. [Back.](#)

**Note 17:** French Diary, 27 December 1914; Montgomery-Massingberd papers, LHC, file 5/7. [Back.](#)

**Note 18:** Montgomery-Massingberd papers, file 5/7; WO158/275, 29 January 1915. Smith-Dorrien was particularly interested. [Back.](#)

**Note 19:** Haig Diary, 24 February 1915. [Back.](#)

**Note 20:** Prior and Wilson refer several times in *Command on the Western Front* to Rawlinson planning the bombardment based on tests and data. I believe they have mistaken the wire-cutting tests for bombardments tests. [Back.](#)

**Note 21:** Rawlinson (commanding the attacking corps) wanted several hours of bombardment, Mercer (First Army's Artillery Adviser) several days. WO158/374. [Back.](#)

**Note 22:** Haig Diary, 28 February-3 March 1915. [Back.](#)

**Note 23:** Haig Diary, 28 February 1915. [Back.](#)

**Note 24:** E.g. Montgomery-Massingberd papers, file 5/7. [Back.](#)

**Note 25:** WO106/388B, Indian Corps at Neuve Chapelle; Montgomery-Massingberd papers, file 5/7. Haig and Hussey diaries, 17 March 1915, Mercer report to Haig, 21 April 1915, WO95/155. [Back.](#)

**Note 26:** Memorandum, 15 March 1915, WO158/17. For Rawlinson, see Prior and Wilson, *Command on the Western Front*, 77-80. Rawlinson may have invented the phrase. [Back.](#)

**Note 27:** See note 13 supra. [Back.](#)

**Note 28:** The distance would vary with the number the British guns and the strength of

the British infantry, but also according to the German defensive scheme. [Back.](#)

**Note 29:** Haig and Hussey diaries, 20 April 1915. [Back.](#)

**Note 30:** WO95/155, handwritten note by William Robertson (CGS at GHQ), 10 May 1915. [Back.](#)

**Note 31:** GHQ OAM217, 11 May 1915, WO95/155. Although OAM 217 was dated 11 May, its essential message—stop the attack—was telephoned early on the 10th. To be fair to Haig, GHQ's standard of "effective" preparation was one that could only be judged in hindsight, and thus was little use for planning. However poorly worded, French's intention was clear: he wanted deliberate bombardments. [Back.](#)

**Note 32:** Haig Diary, 10 and 17 May 1915. [Back.](#)

**Note 33:** Haig Diary, 6 June 1915, emphasis in original. [Back.](#)

**Note 34:** "Secret Memorandum" from 1st Army, 18 September 1915, WO95/728. [Back.](#)

**Note 35:** Haig Diary, 6 June 1915. [Back.](#)

**Note 36:** GHQ OA290, 27 May 1915, WO158/17. [Back.](#)

**Note 37:** Robertson to Haig, 12 May 1915, WO95/155. [Back.](#)

**Note 38:** *OH 1915*, vol. 2,45. [Back.](#)

**Note 39:** E.g. WO95/155, 16 May 1915. [Back.](#)

**Note 40:** 1 June 1915, WO95/155. [Back.](#)

**Note 41:** WO95/154 and WO95/155, 1-6 June 1915. [Back.](#)

**Note 42:** OAM424, 19 June 1915, WO95/156. [Back.](#)

**Note 43:** WO95/155 (13 April 1915), and WO95/158 (6 September 1915). [Back.](#)

**Note 44:** Rawlins Papers, Third Army Royal Artillery HQ letter, 4 April 1918. [Back.](#)

**Note 45:** On the evolution of German defensive doctrine, see Timothy T. Lupfer, *The Dynamics of Doctrine: The Changes in German Tactical Doctrine During the First World War* (Leavenworth, KS: Combat Studies Institute, 1981); available online at <http://www-cgsc.army.mil/carl/CSIPUBS/Lupfer/lupfer1.htm> [Back.](#)

**Note 46:** WO95/157, 23-24 August 1915. [Back.](#)

**Note 47:** Haig Diary, volume 5. [Back.](#)

**Note 48:** WO95/728. [Back.](#)

**Note 49:** Haig Diary, 8 and 18 October 1915. [Back.](#)

**Note 50:** There are far too many for even a reasonably comprehensive list, but see WO95/155 1 June 1915; WO95/156, 6 June 1915 and 30 July 1915; Haig Diary, 1 March 1915 and 8 August 1915; Sir Richard Butler papers, IWM, memo c.29 June 1915; WO95/160, 2 and 9 November 1915. An interesting comparison can be made between WO95/268, 16 February 1915 and WO158/18, 12 October 1915, both concerning attacks on Messines Ridge. [Back.](#)

**Note 51:** WO95/156, 4-6 June 1915, Haig Diary, 6 June 1915. [Back.](#)

**Note 52:** Rawlinson Diary, 7 June 1915. [Back.](#)

**Note 53:** Rawlinson Diary, 8 and 17 June 1915. [Back.](#)

**Note 54:** French to WO, 27 March 1915, WO32/5152. [Back.](#)

**Note 55:** French Diary, 28 February 1915, 9 and 13 May 1915, 15 June 1915. [Back.](#)

**Note 56:** French Diary, 12 May 1915. [Back.](#)

**Note 57:** French Diary, 13, 19, and 22 May 1915, 22 August 1915, 4 and 6 October 1915; letter, French to WO, WO32/5152. [Back.](#)

**Note 58:** E.g., the "Notes from the Front" series. Semi-official notes circulated as well, for example those sent to the West Riding Division in G. Helps Papers, IWM. [Back.](#)

**Note 59:** E.g., CDS49, 54, 92, 93, 82, IWM. All CDS and SS pamphlets consulted for this study are at the IWM. [Back.](#)

**Note 60:** CDS24, "Object and Conditions of Combined Offensive Action" (November 1915), CDS50, "Tactical Notes" (31 July 1915). [Back.](#)

**Note 61:** French to WO, 31 December 1914, WO32/5152, French Diary, 13 May 1915, "note on ammunition requirements for a bombardment," 2 October 1915, WO158/17. [Back.](#)

**Note 62:** WO158/18, 14 December 1915. [Back.](#)

**Note 63:** WO158/19, 22 and 18 January 1916. Experience from 1916 led to a general standard of 25 yards per gun for 1917. The Second Army set an "ideal" of 25-30 yards per gun in September 1915, but on this basis there were insufficient heavies for any sizable attack. Sir John Headlam Papers, RAI Military Document 183 (hereafter Headlam Papers), part 2, 11 September 1915. [Back.](#)

**Note 64:** WO158/259, no date but c. 22 January 1916. Paradoxically, Festubert had seen the greatest shell density but the worst results: the formula called for 82 heavy pieces, about one per 30 yards of front. [Back.](#)

**Note 65:** WO158/19, 29 January 1916, 21 February 1916. [Back.](#)

**Note 66:** At this point, 6- through 9.2-inch pieces were called heavy; later only 8- and 9.2-inch qualified. In 1916, considering only 8- and 9.2-inch as heavy would have roughly halved the number of "heavies." [Back.](#)

**Note 67:** Haig Diary, 29 June 1915, 8 August 1915. [Back.](#)

**Note 68:** WO158/19, 25 May 1916; WO158/18, 12 October 1915; plans for each respectively. [Back.](#)

**Note 69:** WO158/19, 16 January 1916. This is within a month of Haig replacing French. [Back.](#)

**Note 70:** See Sanders Marble, "General Haig Dismisses Attritional Warfare, January 1916," *Journal of Military History* 65:4 (2001): 1061-4. [Back.](#)

**Note 71:** Probably the best is Robin Prior and Trevor Wilson, *Command on the Western Front: The Military Career of Sir Henry Rawlinson 1914-18* (Oxford: Oxford University Press,

1992), but see also Martin Middlebrook, *The First Day on the Somme: 1 July 1916* (London: Penguin, 1984), which paints more of the ordinary soldier's perspective. [Back.](#)

**Note 72:** Fourth Army Operations Papers, IWM, vol. 5, letter 4 (hereafter thus: Fourth Army Papers vol. 5, letter 4); note on GHQ's copy of GX3/1 of 3 April 1916. [Back.](#)

**Note 73:** Fourth Army Papers, vol. 5, letter 10. Rawlinson watched German morale, but was not as fixated upon it as Haig. [Back.](#)

**Note 74:** Field-Marshal Baron Rawlinson of Trent Papers, National Army Museum 5201-33-68 (hereafter Rawlinson Papers), Joffre's report on the Verdun attack of 13 April 1916 with Rawlinson's marginal notes. [Back.](#)

**Note 75:** Haig Diary, 15 June 1916. [Back.](#)

**Note 76:** Haig Diary, 18, 27, 29, and 30 June 1916. Rawlinson's confidence also rose: Diary, 29 June 1916. [Back.](#)

**Note 77:** Fourth Army papers, vol. 5, letter 38. [Back.](#)

**Note 78:** Ibid., vol. 5, letter 39. [Back.](#)

**Note 79:** Rawlinson Diary, 4 March, 15 April, 1 June 1916. Of course, he probably talked with them more than this, but simply did not write it down. [Back.](#)

**Note 80:** Haig Diary, vols. 8-10; Rawlinson Diary, May-June 1916. [Back.](#)

**Note 81:** WO158/18, 14 December 1915. [Back.](#)

**Note 82:** OAD876 (16 May 1916), WO158/223. [Back.](#)

**Note 83:** OAD17, 21 June 1916. [Back.](#)

**Note 84:** Fourth Army Papers, vol. 5, letters 6 and 10. It is not clear whether Rawlinson saw Joffre's report before or after his letter of 19 April 1916. [Back.](#)

**Note 85:** SS98/4, "Artillery in Offensive Operations," April 1916. [Back.](#)

**Note 86:** It should not be thought that the last comments were forced upon the artillerymen by the General Staff or formation commanders; drafts of the pamphlet exist in the Headlam Papers, RAI. Headlam was Artillery Adviser at GHQ when it was adopted. [Back.](#)

**Note 87:** Advanced First Army, "Some Artillery Lessons to be learnt from the Recent Operations in September-October 1915," 7 November 1915, Rawlinson Papers, NAM. [Back.](#)

**Note 88:** In some cases it was realized that adequate results could not be guaranteed: III Corps did not have time or shells to re-bombard a section of German trench not sufficiently prepared by the first shelling. V Corps BGRA diary (WO95/756), "Report on visit to III Corps", n.d., but before the Somme offensive (hereafter V Corps, "visit to III Corps"). This report is available as [Appendix 15](#). [Back.](#)

**Note 89:** A detailed example of artillery planning, especially interesting for arguments between the artillery and the corps commander before the Somme offensive is X Corps BGRA diary (WO95/862) from April-June 1916. [Back.](#)

**Note 90:** Hussey Diary, 30 October 1915; Haig Diary, 17 January 1916; Headlam Papers, part 2, 18 October 1915, 1 and 25 November 1915, 9 December 1915. Hussey noted the presence of most artillery generals in the BEF at one test. [Back.](#)

**Note 91:** CDS93 ("Report on Experimental Firing ... at Calais"), November 1915; SS98/5 ("Artillery Notes: Wire Cutting"), February and June 1916. [Back.](#)

**Note 92:** Information kindly provided by Mr. Mike Hibberd, formerly of the IWM. [Back.](#)

**Note 93:** The *OH* mentioned only three places where wire offered any obstacle in the front line. The real problem was that the Germans were still strong, something patrol results showed; for whatever reason, this intelligence was ignored. See also Sanders Marble, "Artillery, Intelligence and Optimism: Wire-cutting during the Somme Bombardment," *Stand To!* 61 (April 2001): 36-39. [Back.](#)

**Note 94:** V Corps, "Visit to III Corps." [Back.](#)

**Note 95:** WO158/17, 19 December 1915. [Back.](#)

**Note 96:** Fourth Army Papers, vol. 5, conference of Haig, Kiggell, Rawlinson, and Montgomery, 2 July 1916. Guns never ran out of ammunition unless because of tactical delivery problems, but sometimes stockpiles were low. XIV Corps BGRA diary (WO95/915), 11 July 1916. [Back.](#)

**Note 97:** In August, XIV Corps used one heavy (8- or 9.2-inch) shell per yard of trench, or two 6-inch shells. By September, Reserve Army laid down a rule of four 4.5-inch or 2.5 6-inch or 1.5 heavy shells per yard. By October, the Canadian Corps pared this back to the August levels, but also were willing at times simply to blast German trenches: "The above sections of trench will be destroyed by deliberate shooting. ... No limit to number of rounds fired on each spot, except that each section of trench must be completely obliterated." XIV Corps BGRA diary (WO95/915), 16 August 1916; Canadian Corps RA diary (WO95/1059), 12 September 1916, 4 and 10 October 1916. [Back.](#)

**Note 98:** Bidwell and Graham, *Firepower*, 100, n. 102. [Back.](#)

**Note 99:** Memorandum, Birch to Kiggell, 9 July 1916, Rawlins Papers file 12a. [Back.](#)

**Note 100:** Prior and Wilson, *Command on the Western Front*, 203-26. [Back.](#)

**Note 101:** Some attacks were simply taking one enemy trench, and the army commander would intervene to the extent of ordering the registration of specific points. III Corps BGRA diary (WO95/690), 3 August 1916. [Back.](#)

["The Infantry cannot do with a gun less": The Place of the Artillery in the British Expeditionary Force, 1914-1918](#)