

***Fire Plan Vimy:
The Barrage that Built a Nation***

By

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Introduction

The battle of Vimy Ridge has etched itself on the Canadian national psyche as part of the country's culture, iconography and national narrative – and deservedly so. Canadian historians have been effusive in their praise of Canada's performance on Vimy Ridge; but so have international writers - esteemed British military historian John Keegan referred to the Canadian Corps' success on Vimy Ridge as "sensational."¹

Unfortunately, analysis of the role of the artillery at Vimy Ridge is generally threadbare. Most narratives discuss the fire plan in broad generalities usually limited to the number of guns used and the duration of the barrage. Interesting, and essential, as these elements are to the study of the Battle of Vimy Ridge, they nonetheless leave out a crucial analysis of the fire support system that made the Canadian assault successful and therefore leave a sprawling gap in our understanding of the battle.

How did the gunners of the Canadian Corps shape the battle to ensure the success of the infantry attack? There is more to the story of the Vimy Ridge fire plan than simply the number of guns and the duration of the barrage. To truly understand the battle, one must understand both the doctrine that shaped the fire plan, and the intricate fire support system that executed it. This paper will illustrate these elements.

The Paradigm of Artillery Manoeuvre

The use of artillery at Vimy Ridge represents a developmental stage in the doctrinal evolution of fire support during the Great War. At the start of hostilities, military leaders expected, and had trained for, a short, highly mobile conflict where a premium was placed on manoeuvre and penetration in depth best defined, from an artillery perspective, as *artillery manoeuvre*.² The parameters of this style of warfare are described by artillery historian Major-General J.B.A Bailey (Retired) as follows:

Warfare in 1914 was a linear affair, with prevailing doctrines emphasizing flanks, envelopments, and annihilations. Its essence was the contact battle of physical encounter, with masses of infantry and cavalry manoeuvring, supported by artillery firing directly, generally at short range, with guns deployed in the open.³

In the opening phases of the war, artillery was inefficient: command and control of fire units was decentralized, adjustment of fire was primitive, communications were woeful, ammunition was limited, counter-battery fire was ineffectual and the British artillery was distressingly outgunned by the Germans in the number of pieces, range and even the effectiveness of shells.⁴ This remained the case until the German offensive ground to a halt on the Marne in September 1914, and the war took on a more siege-like characteristics. Thereafter, the nature of the war, and the use of artillery, changed.

The Paradigm of Artillery Destruction

The size of the forces committed to battle by both sides increased and, consequently, manoeuvre room decreased, making it impossible to avoid frontal assaults.⁵ Unable to manoeuvre and restore the initial fluidity of the battlefield, both sides settled into a paradigm of protracted siege warfare and a phase of *artillery destruction* in which massive artillery barrages were employed to facilitate manoeuvre. In a doctrinal note that was issued by the British General Headquarters only a month prior to Vimy Ridge, the role of the artillery in this new paradigm was clearly defined:

The rupture of the enemy's front, generally strongly defended and organised in depth, is the first phase of an offensive battle. This entails the destruction of the obstacles to the infantry's advance and of the means of defence that support those obstacles; the moral and physical reduction of the defenders; and lastly a rapid and combined advance of all arms acting in close cooperation.⁶

The mode of command and control employed by the artillery during the *artillery manoeuvre* phase was incompatible for the *artillery destruction* phase. For example, at the start of the war the organizational establishment of the British Expeditionary Force⁷ called for no higher artillery control than the Commander Royal Artillery (CRA) who nominally commanded all artillery in a division – although he only exercised this command in exceptional circumstances. Moreover, the staff manual of 1912 made no reference to the duties of the Divisional Artillery staff.⁸ At Corps Headquarters there was an artillery advisor, the General Officer Commanding – Royal Artillery (GOC RA Corps) however his role was strictly advisory and he had no actual command authority over any artillery units whatsoever - in fact he did not even have his own clerk!⁹ This method of artillery command and control changed with the advent of the doctrine of *artillery destruction*.

The changes in artillery doctrine emerged in 1916. Starting that year, based on the static nature of the fighting and the requirement to centralize and mass fires, the GOC RA Corps was assigned full command of the artillery brigades (artillery units would not adopt the title 'regiment' until 1940) in the Corps' Divisional Artilleries, and all artillery assigned to support a Corps during its operations.¹⁰ An actual artillery staff emerged to assist in this regards and by early 1917 the establishment of the Corps Artillery headquarters included the commander, a staff captain, a staff officer and a reconnaissance officer.¹¹ Once *command* was centralized at the GOC RA Corps, *control* followed suit – under the doctrinal paradigm of *artillery destruction* the Corps Artillery Headquarters was responsible to set the timings for the fire support programme, the artillery objectives, the preparation of barrage maps and even the allocation of Forward Observation Officers. Divisional artilleries were tasked to execute the plan.¹²

The structure of the artillery brigades changed as well. At the beginning of the conflict, the war establishment of a Divisional Artillery consisted of three brigades of field artillery, each with 3 batteries of six 18-pounder guns, one brigade of field artillery consisting of three batteries of six 4.5-inch howitzers, and one battery of four 60-pounder guns from the Royal Garrison Artillery. Although this was the doctrinal structure of a Divisional Artillery, in reality the exact composition of Divisional Artilleries would vary from formation to formation.¹³ At the end of 1915, this

structure was changed in order to eliminate the variations in divisions and develop a common composition throughout the Army. Thereafter, a Divisional Artillery consisted of four brigades of three, four-gun 18-pounder batteries and one, four-gun 4.5-inch howitzer battery.¹⁴ This organizational structure did not survive the horrific casualties of the Somme. In 1917, after high casualty rates in the British artillery resulted in a significant shortage of experienced battery commanders, Divisional Artilleries were reorganized to a structure of three brigades of three, six-gun 18-pounder batteries, and one six-gun 4.5-inch howitzer battery each. While the total number of guns available to an infantry division did not change, they were grouped into larger individual fire units.¹⁵

Medium and Heavy artillery – those guns and howitzers of the 60-pounder and 6-inch variety, also went through an organizational evolution. As noted above, at the outbreak of the war Divisional Artilleries were allocated a battery of 60-pounder guns. Due to a shortage of pieces, and ammunition, these guns were withdrawn and held by no less than the Commander-in-Chief. This bit of over-centralization was eventually relaxed and Heavy Artillery organizations were created at the Army level which allowed the GOC RA at an Army to augment the firepower of subordinate Corps artillery as required. By July of 1916 the British Artillery settled on a structure in which Divisional Artilleries would hold 18-pounder and 4.5-inch guns, Corps Artilleries would hold medium guns, and Army Artillery would hold Heavy Artillery. In practice, Heavy Artillery was often detached to Corps to augment their fire, so the Corps' artillery headquarters were augmented by a permanent Heavy Artillery Headquarters in order to coordinate their fire.¹⁶

The Heavy Artillery was focussed on two tasks: the destruction of defences and communication as part of the normal barrage work, and counter-battery fire.¹⁷ As mentioned above, Heavy Artillery batteries belonged to Army Headquarters and were then delegated to Corps Artillery Headquarters depending on the Army's scheme of manoeuvre for operations. Once so delegated, and because the Heavy Artillery batteries were not organized into brigades for command and control reasons, they were organized into Heavy Artillery Groups which fell under the command of the aforementioned Heavy Artillery Headquarters in the Corps Artillery.¹⁸

In order to employ this system effectively, the ability of the artillery to locate enemy batteries also required improvement. Over the course of the war, target acquisition consistently improved - sound ranging, flash-spotting and the use of aircraft equipped with wireless all materially contributed to the artillery's ability to locate and engage German fire support systems in a relatively timely and accurate way.¹⁹ By the summer of 1917, British sound rangers and flash spotters were able to determine the location of hostile batteries to within fifteen meters as well as locate the fall of shot for British guns and assist in their calibration.²⁰ Of equal importance, organizationally, was the creation of the position of the Counter-Battery Staff Officer (CBSO) at the Corps Artillery Headquarters who advised the Corps GOC RA on the counter-battery requirements of the Corps and executed the Corps' counter-battery programme. While nominally only a staff officer, the CBSO nonetheless exercised executive command of the guns allocated to him for counter-battery work.²¹

By late 1916, the organizational, doctrinal and institutional pieces were in place to allow for the planning and execution of the barrage at Vimy Ridge. It is to the question of how the fire support plan supported the Canadian Corps' assault in April 1917 that we now turn our attention.

The Vimy Ridge Barrage – A Top-Down Fire Plan

The barrage was an essential component of the assault on Vimy Ridge, but more than that, it represented a paradigm shift in how the artillery would be used for the remainder of the war. In his book, *Barrage*, British historian and Second World War artillery officer Ian Hogg remarked that the Battle of Arras – of which the Canadian assault on Vimy Ridge was part – “saw the use of a barrage in ample depth, augmented by sufficient counter-battery fire...it was virtually the pattern for the rest of the war.”²² Writing in the inter-war years, Major (later Field Marshall) Allan Brooke – a Royal Artillery officer who served in the Canadian Corps Artillery Headquarters at Vimy Ridge and would serve as the British Chief of the Imperial General Staff during the Second World War – observed that the offensive at Arras was “the first real opportunity of employing the new artillery power which we had created and free from many of the difficulties which had been evident during its development.”²³ But before any investigation of the Vimy Ridge fire plan can commence, it is first necessary to establish the manoeuvre plan.

The Vimy Ridge Manoeuvre Plan

It is beyond the scope of this article to give a full background survey of the strategic machinations that eventually resulted in the Canadian Corps assaulting Vimy Ridge.²⁴ It is sufficient for our study to note that the Canadian Corps' operation was part of a much larger two-army assault - the First U.K. Army on the left and the Third U.K. Army on the Right - known as the Battle of Arras. The Canadian Corps formed the right-hand Corps of the First Army, bounded on its left by I Corps, and the XVII Corps of Third Army on its right. The main effort of the Battle of Arras was the Third Army's assault, for which the First Army was to serve as a defensive flank to cover the Third Army's advance.²⁵ Within the First Army's area of operations, the main effort was the Canadian Assault on Vimy Ridge.²⁶ Specifically, seizing the ridge was seen as critical to denying the Germans the ability to use the high ground to observe the Third Army's anticipated operations.²⁷ In January of 1917 the Commander of the Canadian Corps, General Julian Byng, was given his task to assault Vimy Ridge.²⁸

The plan for artillery support began at the very top. Byng's tasks were clearly laid out before him – the parameters and objectives of his attack were dictated to him by First Army Headquarters. As it was First Army that determined the breadth and depth of his operations, it was also the artillery commander at First Army that would ensure he had sufficient artillery support. The scheme of fire support was established by the Major General Royal Artillery (MGRA) commanding the artillery of First Army who issued orders directly to the GOC RA of both I (UK) and the Canadian Corps while also allocating them army-level artillery units to augment their fire. Uniquely, while the majority of the senior command appointments of the Canadian Corps were British, the GOC RA was indeed a Canadian – Brigadier-General E.W.B. Morrison. Brigadier-General Morrison now had the tool he required to support the Canadian Corps' assault on Vimy Ridge.

The Vimy Ridge Fire Support Organization

To say that the artillery organization supporting the Canadian Corps' assault was robust would be a gross understatement. Conforming to the doctrine of *artillery destruction*, an extremely large fire support organization, commanded and controlled centrally, was used to literally smash the German defences over an extended period. Overall command of the artillery was vested in the GOC RA Canadian Corps – Brigadier-General Morrison. He exercised the command of the subordinate artillery formations and units through functional groupings: the four Divisional Artilleries that were tasked to provide close support to the assaulting divisions, and Heavy Artillery responsible for depth fire and counter-battery work (see figure 1). We will investigate both, starting with the heavies.

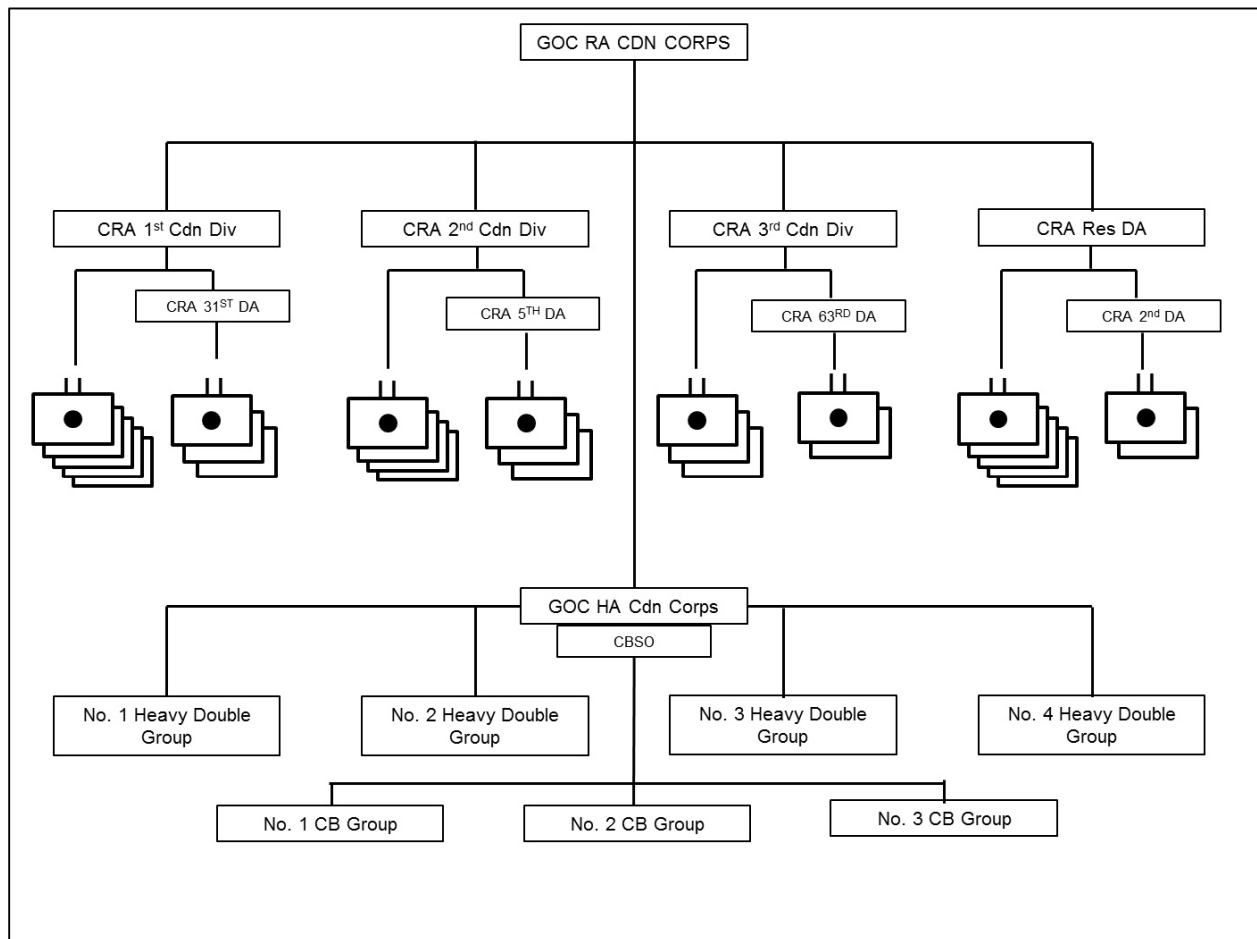


Figure 1- Canadian Corps Artillery Organization at Vimy Ridge

Heavy Artillery

The Heavy Artillery in support of the Canadian Corps was commanded by the GOC Heavy Artillery (GOC HA). It comprised eight siege groups divided into four Heavy Artillery Double Groups, each tasked to cover the frontage of one of the assaulting divisions.²⁹ Each double group was comprised of, on average, nine or ten batteries of Medium or Heavy Artillery – in sum

total, the four double groups had a total of 14 Heavy Artillery batteries and 24 medium artillery batteries.³⁰

In addition to the four Heavy Artillery Double Groups were three Counter Battery Groups that were nominally under command of the GOC HA but under the *de facto* executive command of the CBSO. Each of these organizations comprised an assortment of calibres and totaled 18 Heavy Howitzer Batteries, 26 Medium Howitzer Batteries, 3 4.5-inch Howitzer Batteries, 9 60-pounder batteries and 2 6-inch Mk. VIII batteries.

Divisional Artilleries

The four assaulting divisions of the Canadian Corps was supported by the three Canadian Divisional Artilleries (CDA) - the 4th CDA would not be organized until June 1917 – and the British 5th Divisional Artillery (DA) that was placed in direct support to 4th Canadian Division. Additionally, three other British DA's were tasked to augment the Canadian Corps' fire, each integrated into a CDA. For example, the British 31st DA was integrated into the 1st CDA so that while the CRA of 31st DA retained command of his three artillery brigades, he answered to the CRA of 1st CDA.³¹ To add a joint flavour to the organization, one of the British Divisional Artilleries was the 63rd (Royal Navy) DA comprising surplus naval personnel pressed into service on land.³²

The number of guns allocated to each assaulting division was calculated based on equalizing the frontage-per-18-pounder gun. Consequently the wider the assaulting division's frontage was, the more guns were allocated to the supporting CDA.³³ As well, since the scheme of manoeuvre tasked the 1st and 2nd Canadian Divisions to conduct a deeper penetration of the line, those divisions were allocated additional fire support units which would be deployed well forward and would remain silent during the preparatory stages, only opening fire when their respective infantry had advanced beyond the range of their CDA.³⁴ Additionally several independent batteries and brigades were attached to the Canadian Corps so that in support of the four Canadian divisions was a total of 480 18-pounders, 138 4.5-inch howitzers, 96 2-inch Trench Mortars and 24 9.45-inch Trench Mortars.³⁵

The Fire Plan

As the Fire Plan was top-down, the GOC RA Corps Headquarters issued the fire plan to the CDAs on 28 March 1917.³⁶ The plan was relatively straightforward, and was divided into four phases: Phase 1 lasted from Z-20 to Z-7 (Z-day representing the day of the attack); Phase 2 from Z-6 to Z-day; Phase 3 was the bombardment in support of the assault; and Phase 4 was the planned forward displacement by the artillery.³⁷ Each phase will be considered in sequence below.

Phase 1 – Initial Preparatory Fire.

The first thirteen days of the Vimy Ridge barrage were focussed on a general increase of activity that gradually intensified towards the transition to Phase 2, while maintaining some degree of surprise concerning the amount of fire support available to the Canadian Corps. In order to achieve the latter, no more than 50% of the Heavy and Siege Artillery batteries were

allowed to disclose themselves by firing, while the CRAs were ordered to attempt to use no more than two brigades of guns.³⁸

During this period the fire support had a number of goals. Firstly, the destruction of trenches began, leveraging the target acquisition resources of the Royal Flying Corps to identify and engage the German trench network. Additionally, the barrage focussed on cutting wire, in particular along the German first and second lines of defence. While the focus on wire cutting would be delegated to the 18-pounders of the CDAs, any wire that could not adequately be cut by the CDAs could be nominated for engagement by Heavy Artillery assets. As well, the artillery supporting I Corps on the left flank of Canadian Corps also fired in support of wire cutting in the Canadian zone of operations.³⁹

Carried out concurrently during the first phase was the systematic destruction of hostile batteries under the supervision of the CBSO. All hostile batteries that were accurately located were to be destroyed as soon as possible during this period, focussing first on independent batteries and then on larger groupings of fire support elements.

During periods of darkness, Heavy and Medium Artillery focussed on the reinforcement and communication routes employed by the Germans, focussing in particular on main routes, communications, light railways, refilling points and ammunition dumps. This task was given to the CRAs, although the Heavy Double Groups also assisted.⁴⁰

Phase 2 – Intensified Preparatory Fire

During the second phase of the fire plan, the amount of fire increased exponentially to the point that by the end of the phase, all artillery, less the silent batteries deployed forward, was firing. The work of trench destruction, wire cutting and counter-battery continued along the same lines as during Phase 1, with more ammunition and guns used, including the introduction of fire from the Trench Mortars at Z-4. Unique to this phase was the destruction of villages within the zone of operations. In particular, the villages of Thelus, Tilleuls, Farbus, Givenchy, Vimy Ridge, Petit Vimy Ridge, La Chaudiere and Villerval were subjected to intense bombardments coordinated by the GOC RA Canadian Corps.⁴¹

During phase 2 the fire plan incorporated feint barrages; two of them were carried out along the whole Corps frontage while each CRA was tasked to conduct additional minor feints along their respective frontages. The goal of the feint barrages was twofold; first they served as a rehearsal of the barrage, and second, they provided an opportunity to observe how the Germans reacted, hopefully forcing them to disclose their battery locations when they fired defensive barrages in response to the anticipated attacks. The guiding principle of these barrages was to open the firing, roll forward and then quickly return to the original opening line of fire. The intent here was to catch defenders who had emerged from dugouts back into the open at their defensive positions, thinking that the barrage had moved on. During the actual assault, the barrage would *not* roll back onto the original line; it was hoped the feints had convinced the Germans the fire would return and thus trick them into remaining in their dugouts until the assaulting infantry was upon them.⁴²

Phase 3 – Support to the Assault

Phase 3 of the artillery programme was the bombardment in support of the actual assault. The fire plan consisted of a creeping barrage – a line of fire that crept forward at predetermined increments – of 18-pounders, the purpose of which was to suppress “any machine guns or riflemen that may still lurk in shell holes” between the line of departure and the objective.⁴³ The creeping barrage “lifted” every 100 yards, firing three rounds per-gun, per-minute. The Divisional Artillery staff assigned a portion of their frontage to each brigade, which in turn divided up its frontage between two of its three 18-pounder batteries. The third 18-pounder battery was to superimpose its fire across the whole brigade frontage, and thus could be tasked to engage targets of opportunity without adversely limiting the fire falling on the brigade frontage (see figure 2).⁴⁴ The barrage map issued by GOC RA Headquarters

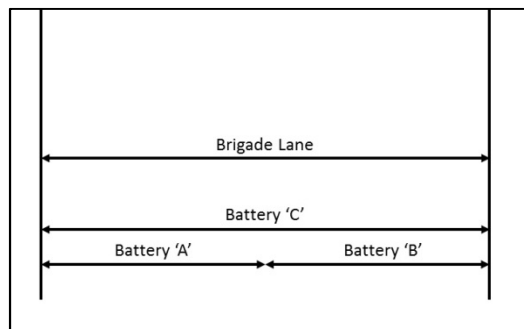


Figure 2 - Sample Brigade 18-pounder Distribution of Fire During a Barrage.

provided the specific location and timing for each line of the barrage. Doctrinally, the pace of a barrage was based on the principle that “the slowest man can easily keep close up under the barrage. 100 yards in 3 minutes is a good average pace over dry ground pitted with shell holes.”⁴⁵ The Vimy Ridge barrage generally adhered to this timing – a review of the barrage map indicates that the average lift was about five minutes per line, the extra two minutes likely being added to accommodate the slope of the ridge and the expected heavily pockmarked terrain.⁴⁶ The silent batteries that were deployed well forward and intended for use once the infantry advance went beyond the range of their supporting guns were ordered to remain silent but were tasked to remain in readiness to respond to “LL Calls” – calls for fire from all available guns, used for emergencies and targets of opportunity.⁴⁷

While the 18-pounders conducted the rolling barrage, a portion of 18-pounders, 4.5-inch howitzers and the Medium and Heavy Artillery batteries fired standing barrages on known trenches and defensive systems.⁴⁸ A standing barrage was a barrage that was fired “on each objective when it is to be assaulted, with the object of forcing the enemy to take cover and of preventing him manning his defences.”⁴⁹ While a creeping barrage would move forward incrementally with the advance of the infantry, the standing barrage suppressed specific objectives until the infantry could close with them. Doctrinally, the creeping and standing barrages were to be used together. The creeping barrage would precede the infantry while the standing barrage would suppress the known enemy locations until the fire of the creeping barrage would “join the standing barrage, [after which] both barrages lift off together.”⁵⁰

For the Heavy Artillery and Counter-Battery Groups, the intent of the fire plan was to complete the counter-battery programme during the preparatory phases. The goal of the CBSO and his guns during the actual assault therefore shifted to one of intense neutralization of any remaining hostile artillery, the timing of which was determined by observation of the timing of the retaliatory fire during the feints executed in Phase 2.⁵¹ In order to assist with the neutralizing effect of the counter-battery programme, for the first fifteen minutes of the assault, the CDAs supporting the

1st, 2nd and 4th Canadian Infantry Divisions delegated one 4.5-inch howitzer battery to reinforce the counter-battery groups.

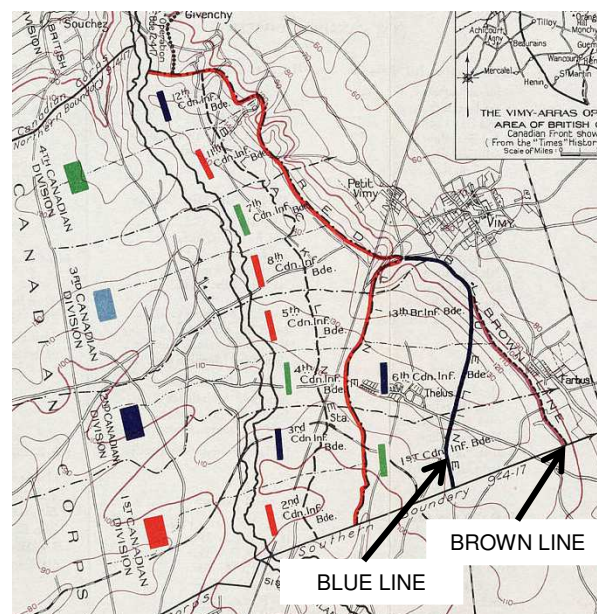
A key element of the fire plan at Vimy Ridge, as it is today, is the close coordination between the assaulting infantry and their fire support. This close liaison was achieved in a number of ways. Firstly, Divisional Artilleries, Groups and Brigades were ordered to deploy their headquarters as close as possible to their affiliated infantry headquarters.⁵² If that was not possible, each headquarters was tasked to despatch a liaison officer who was to be “as senior an Artillery officer as can be spared without affecting the formation” to coordinate with the supported infantry.⁵³ In particular, the CDAs were tasked to provide a liaison officer to each of the battalion headquarters attacking on their frontage. These officers were tasked to “gather all possible information from Infantry Reports, and to transmit such information to their Artillery Brigades...[and] investigate and report on cases of short-shooting.”⁵⁴

A key force multiplier was the use of aircraft to observe and adjust fire. This was not new for the artillery, as aircraft had been used in this role for some time on the western front. Nonetheless it was still a work in progress. The Artillery Instruction reflected the embryonic state of air observation by acknowledging that “the necessity of close liaison with the RFC [Royal Flying Corps] is now fully appreciated.” To this end, Battery Commanders were tasked to visit No. 16 Squadron, RFC “with a view to making the personal acquaintance of observers and pilots working with them.”⁵⁵ The work of the RFC was valuable, and dangerous. The British planes were no match for their German counterparts, and the Canadian Gunners had a front-row seat to what seemed like a very uneven contest. On 5 April 1917 the War Diarist of the 2nd Canadian Divisional Artillery noted: “Our planes active. For the past three weeks enemy planes have had the best of every encounter on our front, [and] there have been many.”⁵⁶

Phase 4 – Forward Movement of the Artillery

The final phase of the fire plan involved the forward displacement of the artillery in order to provide continuous fire support to the advancing infantry. On the left, within the boundaries of the 3rd and 4th Canadian Divisions, the problem was not deemed overly dangerous as the distance of the final objectives of these two divisions was substantially shorter than that for their sister divisions further to the right. Consequently the plan was only to move a few batteries forward once the 3rd and 4th Divisions had secured their objectives, their forward movement triggered when the distance of the infantry advance rendered their fire ineffective.⁵⁷

The situation on the right flank, where the 1st and 2nd Canadian Divisions were attacking, was much more problematic. Due to the further distance of



Map 1 – “Plan of Attack at Vimy Ridge”, Library and Archives Canada.

their objectives, the fire plan concluded that fire support between the objectives BLUE line and BROWN line would have to be provided by the silent forward batteries (see map 1). Understanding the importance of having artillery well forward to defend against the inevitable counter attacks, the GOC RA Corps directed it was “essential for these batteries to move forward as soon as circumstances will admit, to ensure sufficient defence of the newly gained objectives during consolidation.”⁵⁸ Of course, such a broad forward displacement would be a logistical and administrative challenge to say the least. The GOC RA Corps stressed the importance of planning each detail to the letter. He directed his CRAs that they were to produce the schemes for the forward movement of their batteries that included:

the sequence of batteries detailed to move... with estimates of the time required for the completion of the move of each battery, exact roads and tracks to be followed, state of previous preparation of the forward positions, and forward wagon line dispositions...these preparations will include bridging trenches up to the front line, a reserve of artillery bridges (60 at present under construction by C.E.) and the organization of fatigue parties from Trench Mortar batteries to assist guns forward.⁵⁹

In order to expedite the process and maintain some command and control, the GOC RA Corps also directed that Brigade Headquarters would remain in place until the batteries were deployed into their forward positions, and that the advancing batteries were to link into the telephone wire previously used by Observation Posts in order to maintain communications.⁶⁰

The forward deployment of the Heavy Artillery Groups was also deemed essential. The GOC RA Corps knew there was to be a determined counter-attack that would require augmented defensive fire and that the advance of the Canadian infantry would force the German artillery to move eastward, out of range of the Canadian counter-battery fire, thus necessitating the hasty forward movement of the medium and Heavy Artillery. With priority going to the 6-inch howitzers, the GOC HA was tasked with developing a bold plan to get the heavies forward as soon as possible.⁶¹

A great concern for the GOC RA Corps was that, due to the location of the final objective, laying as it did on eastern slope of the ridge and hence out of sight of the Canadian Corps prior to Z day, it was impossible to register defensive barrages prior to the launch of the attack. To this end, he directed that as soon as observation could be made onto the eastern slope of the ridge, the registration and preparation of defensive barrages should commence as soon as possible. Doubly concerning was the fact that the great majority of the ammunition was allocated for the attack and thus the amount available to defeat counter-attacks was limited. To this end he encouraged the CRAs to work out a system of communication, combining flares, visual signals, telephone communications and runners to link the infantry in to their supporting guns. In this way fire could be brought to bear quickly and effectively, hopefully avoiding unnecessarily long and ineffectual barrages that would expend the limited ammunition remaining.⁶²

Conclusion

The story of the successful assault on Vimy Ridge has been told and retold and need not be repeated in detail here. Needless to say, the fire plan that was devised and executed by the gunners of the Canadian Corps was instrumental in the sensational Canadian victory. But it was not an easy victory. In a report prepared by the First Army entitled *The Artillery Preparation for the Attack on the Vimy Ridge by the First Army* it was noted that during Phase 1 the 18-pounders of the Canadian Corps fired 93,501 18-pounder shrapnel rounds, and 61,668 high explosive rounds. Those numbers increased exponentially during Phase 2 to 195,395 and 99,590 respectively. Even more impressive, on the day of the attack alone, the 18-pounders fired 111,181 shrapnel and 36,976 high explosive rounds.⁶³ All of these rounds had to be transported, dumped in a central location, hauled forward to gun positions, stacked and fired (see figure 1).

The near insatiable appetite of the guns resulted, of course, in appalling losses for that most noble cohort of the artillery, the poor war horse, whose ranks were decimated by exposure and fatigue. Early in the preparatory barrage, on 3 April, the 4th Brigade, CFA reported that “we are 79 horses under strength at present...the road between batteries and their wagon lines is strewn with dead horses.”⁶⁴ Things did not improve for the Canadian mounts. The day before the assault, the war diarist of the 1st Brigade, CFA reported that “many horses died during the past few days owing to so much hauling of ammunition and cutting down of hay and straw ration.”⁶⁵ The same day, the 2nd CDA reported that “[the] roads are now in very bad condition and... nearly impassable. Our horses have worked hard [and] unceasingly for the past seven weeks... most of them have been standing in the open, and a number have died in harness from exhaustion.”⁶⁶

But such is war, and the sacrifices of the artillery horses, along with the men who stormed the ridge, played a major role in not only the overall Allied victory in the Great War, but in the development of a Canadian national identity. The fire plan that assured this was innovative and robust and reflected the emergence of a new paradigm of *artillery destruction* that would become *de rigueur* on the western until the closing months of the war. The destruction-based fire plan at Vimy Ridge is representative of a doctrine of necessity that emerged and eventually contributed to overall Allied victory, and helped to build a nation.

Notes

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- ¹ John Keegan, *The First World War*, (Toronto: Vintage Canada, 2000, originally published 1998), 326.
- ² Lt.-Col (later Field Marshal) Allan Francis Brooke (hereafter Allanbrooke), "The Evolution of Artillery in the Great War" in *Royal Artillery Journal*, Vol. LI, No. 5, Allan Brooke, "Evolution of Artillery" *Royal Artillery Journal*, Vol.L1, No.5, 261.
- ³ J.A.B. Bailey, *Field Artillery and Firepower*, (Annapolis: Naval Institute Press, 2004), 240.
- ⁴ Allanbrooke, "The Evolution of Artillery...", 261; Shelford Bidwell and Dominick Graham, *Firepower, The British Army Weapons and Theories of War 1905-1945* (Barnsley: Pen & Sword Military Classics, 2004), 68-69; Bailey, *Field Artillery....*, 240.
- ⁵ Bidwell & Graham, *Firepower....*, 62.
- ⁶ United States Army War College, *Artillery in offensive operations*, (Washington, Government Printing Office, 1917), p. 9. This is a US Army War College reproduction of the British Army's *Artillery Notes No. 4: Artillery in offensive operations* which was the doctrinal foundation for the use of artillery in Commonwealth armies, issued in February 1917.
- ⁷ Although the British Expeditionary Force is used to describe the organization and doctrine of the artillery it should be noted that the Canadian artillery was organized and fought in the same manner. Thus all references to British artillery can be assumed to also pertain to Canadian artillery.
- ⁸ Allanbrooke, "The Evolution of Artillery...", 259.
- ⁹ *Ibid*, 259, 261.
- ¹⁰ J.A.B. Bailey, *Field Artillery and Firepower*, 250.
- ¹¹ War Department, SS 139/4, *Artillery Notes No. 4 – Artillery in Offensive Operations*, p.27.
- ¹² J.A.B. Bailey, *Field Artillery and Firepower....* 250, n27.
- ¹³ Allanbrooke, "The Evolution of Artillery...", 258.
- ¹⁴ Colonel G.W.L Nicholson, *Gunners of Canada Volume II*, 251.
- ¹⁵ *Ibid*, 276.
- ¹⁶ Allanbrooke, "The Evolution of Artillery...: II – Factors Effecting the Evolution of Artillery", in *Royal Artillery Journal*, Vol. LI, No. 6, 374-377.
- ¹⁷ *Artillery notes....*"13.
- ¹⁸ Allanbrooke, "The Evolution of Artillery...: II – Factors Effecting the Evolution of Artillery", 376.
- ¹⁹ See William Van der Kloot "Lawrence Bragg's Role in the Development of Sound-Ranging in World War I" in *Notes and Records of the Royal Society*, no. 59, 2005, 273-284;
- ²⁰ Bidwell & Graham, *Firepower....*, 110.
- ²¹ Allanbrooke, "The Evolution of Artillery in the Great War No. IV – The Evolution of Artillery Organization and Command" in *The Royal Artillery Journal* (Vol. LII, No. 3), 378-379.
- ²² Ian Hogg, *Barrage*, (New York: Ballantine Books, 1970), 28.
- ²³ Allanbrooke, "The Evolution of Artillery...: VI – Evolution of Artillery Tactics (2)" in, *Royal Artillery Journal*, Vol. LIII No.2, 240.
- ²⁴ See G.W.L. Nicholson, *Official History of the Canadian Army in the First World War*, (Ottawa: Queen's Printer, 1962), 233-268.
- ²⁵ Canada, Library and Archives Canada, *The Artillery Preparation for the Attack on the Vimy Ridge by the First Army*, found at http://data4.collectionscanada.ca/netacgi/nph-brs?s1=1st+army&s13=&s12=&l=20&s9=RG9&s7=9-52&Sect1=IMAGE&Sect2=THESOFF&Sect4=AND&Sect5=WARDPEN&Sect6=HITOFF&d=FINDD&p=1&u=http://www.collectionscanada.ca/archivianet/02015202_e.html&r=5&f=G last accessed 3 November 2014.
- ²⁶ *Ibid*.
- ²⁷ War Diary (WD) General Officer Commanding Royal Artillery Canadian Corps (hereafter GOC RA), "Canadian Corps: Artillery Instructions for the Capture of Vimy Ridge", 38.
- ²⁸ G.W.L. Nicholson, *Official History of the Canadian Army in the First World War*, (Ottawa: Queen's Printer, 1962), 245.
- ²⁹ WD, GOC RA, "Canadian Corps: Artillery Instructions.....", 39.
- ³⁰ *Ibid*, 56.
- ³¹ WD, 1st CDA, 2 April 1917.
- ³² *Ibid*, 55.
- ³³ *Ibid*, 39.
- ³⁴ *Ibid*, 39.
- ³⁵ *Ibid*, 55.
- ³⁶ WD, GOC RA, 28 March 1917.
- ³⁷ *Ibid*, 40.
- ³⁸ *Ibid*, 41.
- ³⁹ *Ibid*, 40-41.

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- ⁴⁰ *Ibid*, 42.
- ⁴¹ *Ibid*, 44.
- ⁴² *Ibid*, 45.
- ⁴³ *Artillery Notes No. 4 – Artillery in Offensive Operations*, 21
- ⁴⁴ WD, GOC RA, “Canadian Corps: Artillery Instructions.....”, 46.
- ⁴⁵ *Artillery Notes No. 4 – Artillery in Offensive Operations*, 21.
- ⁴⁶ WD, GOC RA, “Canadian Corps: Artillery Instructions.....”, 141-144.
- ⁴⁷ “Artillery communication letter codes” located <http://www.1914-1918.net/artillerycodes.html> last accessed 5 November 2014.
- ⁴⁸ WD, GOC RA, “Canadian Corps: Artillery Instructions.....”, 46.
- ⁴⁹ *Artillery Notes No. 4 – Artillery in Offensive Operations*, 21.
- ⁵⁰ *Ibid*, 20.
- ⁵¹ WD, GOC RA, “Canadian Corps: Artillery Instructions.....”, 47.
- ⁵² *Ibid*, 48.
- ⁵³ *Ibid*, 48.
- ⁵⁴ *Ibid*, 49.
- ⁵⁵ *Ibid*, 49.
- ⁵⁶ WD, 2nd CDA, 5 April 1917.
- ⁵⁷ WD, GOC RA, “Canadian Corps: Artillery Instructions.....”, 51.
- ⁵⁸ *Ibid*, 51.
- ⁵⁹ *Ibid*, 51-52.
- ⁶⁰ *Ibid*, 52.
- ⁶¹ *Ibid*, 52.
- ⁶² *Ibid*, 53-54.
- ⁶³ Canada, Library and Archives Canada, *The Artillery Preparation for the Attack on the Vimy Ridge by the First Army*, found at http://data4.collectionscanada.ca/netacgi/nph-brs?s1=1st+army&s13=&s12=&l=20&s9=RG9&s7=9-52&Sect1=IMAGE&Sect2=THESOFF&Sect4=AND&Sect5=WARDPEN&Sect6=HITOFF&d=FINDD&p=1&u=http://www.collectionscanada.ca/archivianet/02015202_e.html&r=5&f=G last accessed 3 November 2014..
- ⁶⁴ WD, 4th Brigade CFA, 3 Apr 1917.
- ⁶⁵ WD, 1st Brigade CFA, 8 Apr 1917.
- ⁶⁶ WD, 1st CDA, 8 Apr 1917.