SINEWS OF STEEL: CANADIAN RAILWAY TROOPS ON THE WESTERN FRONT, 1914-1918

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When the First World War ended with the signing of the Armistice on 11 November, 1918, Canada had more than 12,000 troops employed in the Canadian Corps of Railway Troops, the second largest unit in France after the Canadian Corps. These troops were responsible for the repair, maintenance and laying of standard gauge and light gauge railway lines, their operation, and the overall administration over the entire network of railways within the British Sector in France. Unlike the Canadian Corps, these troops worked for the Director General Transportation of the British armies in France.[1]

Photo courtesy of the Imperial War Museum CO 1259

In forward areas trains were split and hauled by tractors. This historic picture shows the first train over Vimy Ridge after the Arras offensive of April 1917.

When the First World War broke out, it was expected to be a war of the offence—over by Christmas. By December 1914, it was clear that this was going to be a different type of war and that there would be a great need for troops and supplies. "The most important characteristic of the war [First World War] was its scale…In August 1914 some six million men marched off to war…Wartime recruitment, including conscription, produced a full United Kingdom total of 5,704,416 and a British Empire total of 8,654,467."[2] While the year 1915 was one of small operations that were not successful in the main, it forced the British government to begin a general mobilization for an extended war. This meant that the country would need to turn itself into a wartime economy, focusing its efforts on war supplies as the main priority. The ammunition shortages that were an issue in 1915 were resolved by 1916 and the British at the behest of the French (to relieve pressure on Verdun) planned and executed the assault on the Somme. While much has been written on the tactics of the Battle of the Somme, only Ian Brown, in *British Logistics on the Western Front: 1914-1919*, has addressed the problems incurred in the provision of administrative support, which proved to be one of the failures. It is at this point that the recruitment of railway men from Canada became a priority, above even that of combat troops, and begins to identify the importance of their efforts. These troops came from all parts of Canada, most had railway experience (the first troops were recruited from the ranks of the Canadian Pacific Railway) by virtue of the fact that the previous 25 years in Canada had seen a massive railway-building boom, and found their unique skills vital to forging the sinews of steel that supported the strength of the British armies in France. Using war diaries, personal diaries and reports, their story is told against the backdrop of the general history of the Allied actions in the British sector from the time the first Canadian Railway Troops first landed in France in

1915 to the day the Armistice was signed. When the war ended, units of the Canadian Railway Troops were disbanded and, unlike many other units, they were not perpetuated in the Militia, thus they and their efforts have generally been forgotten. In this paper I will tell their story and will show how their efforts and sacrifices were instrumental in changing British tactical and strategic operations and thus brought the war to a more rapid and successful conclusion.

The use of railways to support war was not a new phenomenon of the First World War. As soon as railways began to expand their steel rails throughout Europe, North America and elsewhere, their application to military tactics was quickly realized. One of the first recorded uses of railways for military purposes was in Canada. "The year was 1837 and the occasion was the employment of the Champlain and St. Lawrence Rail Road, which had opened only the year before, to move British Soldiers during the Lower Canada Rebellion of that year".[3] Railways were also used to speed supplies and troops on the line of advance during the American Civil War[4].

During the war with Austria in 1866, von Moltke the Elder made extensive use of the railways to move troops south into northern Bohemia:

> [He] envisaged the coming of the railway as a promised extension of Napoleonic strategic mobility. By moving massed, yet dispersed, armies, with their supplies at six times the speed of marching troops, he foresaw the possibility of achieving rapid, surprise concentrations on a chosen battlefield as well as the feasibility of maintaining long sieges or unbroken frontages of several hundred miles, even in the depths of winter.[5]

The reality was hardly as smooth as desired by von Moltke. While the railway system was able to move large quantities to the railheads, the system broke down when it came to moving supplies to the troops in need. The overall planning was incomplete and added to the congestion of the system rather than making it a force multiplier.[6] "At the heart of the trouble lay the inability of the three Railway Battalions, formed by von Moltke in 1859, to carry out their task. Capable of carrying out minor repairs, they were ill-equipped to rapidly construct emergency loop lines or sidings".[7] While the idea of using railways to rapidly move large quantities of supplies was a sound decision, the complexity involved was generally beyond the experience of the railway troops and was not appreciated by the commanders on the ground. It was fairly clear that the interface between the user and the supplier was ill-defined and unworkable. It was also clear that by the time of the Franco-Prussian war improvements had not been instituted and the same levels of congestion and lack of supplies affected the Prussian advance. If not for the rapid collapse of the French forces, the Prussian armies would have been hard-pressed to continue their advance for any length of time.[8]

By 1914, the quantities of supplies that were required for the daily sustainment of troops and horses and the re-supply of munitions and petroleum oil and lubricants (POL) were much greater than had been experienced in 1870.

> …following the enormous rise in the consumption of ammunition, and other prerequisites of war (including for the first time, motor fuel), armies found themselves no longer able to take the majority of their supplies away from the country. Whereas, even as late as 1870, ammunition had formed less than 1 per cent of all supplies (6,000 tons were expended as against 792,000 tons of food and fodder consumed), in the first months of World War I the proportion of ammunition to other supplies was reversed…[9]

British troops were fed approximately one and a half pounds of fresh rations per day[10] to supplement the tinned rations of hard tack crackers and bully beef. There was also a requirement for water to be made available and, once trench warfare became the

Photo courtesy of the Imperial War Museum Q 1453

A man-hauled trolley taking heavy shells up to guns near Ovillers during the Somme campaign, September 1916.

norm, there was a need to have fresh water delivered in quantity to forward points.[11] By 1915, the need for food and forage was 4,400 tons per day.[12] In addition to the amount of supplies needed by the new armies, their size had grown to immense proportions: "in 1914, the combat troops of a corps took up 20 miles and more of road space, transport companies often found it difficult to reach them in one days march."[13]

Horses, on the other hand, ate ten times as much as their human counterparts and fodder had to be supplied on a daily basis as well.[14] While this requirement changed little during the First World War, the technological advances made in the art of artillery and machine guns increased tremendously, putting immense pressures on the supply system and limiting the ability of the commanders to plan their operations.

> The general picture of 1915 operations then, is one of inconclusive campaigns on both sides. The detailed picture is one constant small local actions along the front as each side established the strengths and weaknesses of its position vis-à-vis the other side, and concentrated on improving its trench systems and lines of communications. In the British sectors, these were not as given much attention as they deserved, since the prevailing strategy was still based on the belief that the 'war of movement' was bound to begin soon. Also, not enough material was yet being carried in the rear area to show the inadequacy of mechanical road and horse transport for the concentrated and sustained carriage of supplies.[15]

The one major lesson that became clear in 1915 occurred during the battle of Neuve Chapelle. General Rawlinson, commander of IV Corps, was responsible for planning the battle. Based on information passed to him from General Haig[16] when he had been commander of I Corps, he understood that success against a dug-in enemy would require the use of a heavy artillery bombardment, followed by a barrage.[17] Rawlinson's plan was successful on the first day and Neuve Chapelle was captured, however the follow-on attack on Aubers Ridge was unsuccessful, due to a lack of ammunition.[18]

> …but, as the months passed, the ever growing British armies crossed the channel in formidable numbers and tentative offensives were undertaken at Loos and Neuve Chapelle in 1915. They were not distinctly successful in a military sense, but many salutary lessons were learned. One of these was the value of gunfire; another (though it was not yet successfully learned) was the value of railways. Even in trench-warfare, mobility was found to be essential. This was not so much the mobility of the general battle zone as the mobility of the intense battle zone. It was demonstrated that in order to render successful a limited offensive a strong and almost overwhelming concentration of guns was necessary and, in order to effect such a concentration efficiently and expeditiously, and in order to provide unfailing supplies of ammunition, railways had to be built, developed and maintained.[19]

The failure of Neuve Chapelle was blamed on the lack of shells and that lead to the shell crisis of 1915, which ultimately brought down the British Government. It became clear that the economy would have to be geared towards war if victory was to be the outcome.[20]

The problem of supplying the shells to the front had not been an issue due to the fact that there were not that many to deliver. Once it became obvious that a newer, deadlier phase of warfare was developing and the ammunition requirement would increase exponentially, the issue of delivering the supplies in these massive quantities would become a concern. However, only after the Somme battles of 1916 did the Allies realize the magnitude of the problem.

Photo courtesy of the Imperial War Museum Q 1348

A mule-drawn Van Ness-type truck in Carnoy Valley during the Somme campaign.

"In the early stages of the war the French General staff was entirely responsible for construction and maintenance of the railways in the British as well as the French zones of operation in France".[21] The French railway system had developed as a result of the events of the Franco-Prussian war; the maintenance of large field armies under a central military control, with a strong interface with the civilian railway authorities in those areas outside of the army zones.[22] Due to the small size of the British force (five divisions) in comparison to the French armies, British influence on the railway system was non-existent. The Royal Engineers sent six railway construction companies, but they did very little work. In addition, Canadian railway contractors were requesting permission to raise a railway construction unit, but were turned down. The idea of using light railways was raised by civilian contractors, but Lord Kitchener, Secretary of State for War, replied "That is not our way of working."[23]

In Canada, as early as October 1914, a memorandum was submitted for the raising of railway troops for a second contingent. The author of the memorandum, Mr. A. MacDougall, noted that, as there were many men with experience in constructing the Transcontinental Railways and a similar type of construction that would be needed in France, it would make sense that a unit of railway men be raised:

> …it would seem that the experience thus gained in the operation of lines over temporary structures and with irregular and incomplete roadbed would be in a large measure analogous to conditions likely to be met with in keeping up communication with an army advancing over a country in which the enemy had wrecked existing structures and partially demolished the road bed…it is therefore suggested that a corps of specially-trained men organized in such a way as should be deemed advisable would be a valuable adjunct to the proposed second contingent.[24]

In a letter sent to Sir Robert Borden, on the same date, MacDougall clearly outlines the reasons that such a unit would be valuable to the allied cause. MacDougall notes with an uncanny prescience the requirements that the Allies would need when they finally broke the German defensive lines in August 1918.

The chief reasons are—

♦ It is vital to the success of the Allied troops, when a long distance for their base, that their lines of railways should always be capable of handling heavy traffic at high speed.

♦ The Germans will have totally destroyed every bridge and culvert, as well as long sections of road bed when they retreat.

♦ The most rapid method of replacing these bridges, etc, is to replace the permanent structures by wooden pile trestles to one side of the old railway line.

♦ In no country in the world can semi-permanent railway structures be built with greater speed than in Canada. This is the result of experience gained in building thousands of miles of railway with the most efficient and modern machinery. The European Engineers had had very little experience in this class of work, due to the practice in Europe being to always build permanent structures.

♦ A comparatively small amount of money will equip and maintain a construction force, capable of assisting to win the war out of all proportion to their numbers.[25]

The newspapers of the day reported that the Army Council[26] however, after inquiries by the Governor General to the Secretary of State for the Colonies, declined the offer. "Army Council highly appreciates patriotic offer regarding railway men. At present it is not desired to accept it but Army Council may be glad to accept later on."[27] It is important to note that each of the points raised were to be identified by the British after the Somme offensive of 1916.

With the situation in France changing into a period of more static warfare, the British Army Council sent a request for railway troops, "Army Council would be glad to accept corps of railway men if offer made in your telegram of 10th October still holds good. Skilled construction men are wanted and they would be required to enlist for duration of war."[28] On the 22nd of February 1915, the Government approved the creation of a railway construction unit, to be named the Canadian Overseas Railway Construction Corps (CORCC), organized primarily by the Canadian Pacific Railway Company, "given a reasonably free hand in the selection and appointment of officers, non-commissioned officers and men."[29]

Under the Command of C.W.P. Ramsey, Chief Engineer of Construction for the C.P.R. commissioned lieutenant-colonel, the unit was mobilized in St. John, New Brunswick, and sailed to England. Upon completion of work-up training, the unit was sent to France on 24th August, 1915. The unit was attached to the Belgian Army and was employed in laying 60 centimetre track as well as the construction of concrete machine-gun emplacements and other engineering construction. It must be noted that most men recruited for the CORCC, and subsequently for the Canadian Railway Troops, did not usually receive any training in weapons handling, or trench warfare for that matter. They were recruited for their knowledge in railway operations and construction and it was only as the war progressed that they found themselves in situations that required weapons, especially when the railways were pushed to within short distances of the rear trenches.

One of the most innovative works completed by the unit was the construction of a light railway system of 2-foot gauge, using 9-pound rail[30] for the carriage of supplies. It required horses and some mechanical power to operate, but was considered an improvement over horse and wagon and man transport.

> …stating that the Corps' principle work in Belgium had been the building of a narrow gauge railway behind the first line of trenches extending the whole of the German front…train is powered by 7 ft gasoline engines 3 ft high…by this train food and munitions and everything needed in the trench is conveyed during the night.[31]

The CORCC recommended a power operated 2-foot gauge railway on 30-pound rails, but as the authorities believed that a breakthrough was pending and the war of movement would return to the front, the idea of light railways was not pursued.[32] In September the unit was scheduled to sail to Salonika, but ended up spending time in England before returning to France in November 1915.[33]

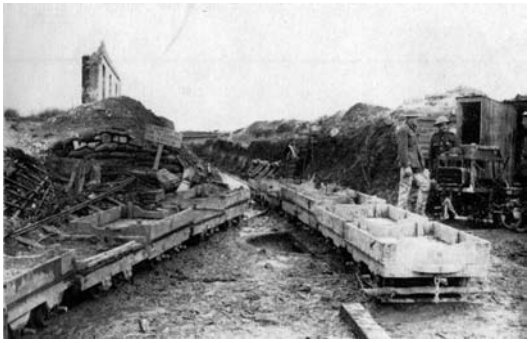

Photo courtesy of the Imperial War Museum Q 5093

A trench-tramway terminus on the outskirts of Arras, showing typical trucks and conditions. April 1917.

In January of 1916, the Officer Commanding[34] the CORCC, Lieutenant-Colonel Ramsey, sent a letter to the Honorary Colonel of the unit, Colonel Wanklyn (a senior member of the directors of the Canadian Pacific Railway), outlining the way that the railways should be employed and how the authorities were beginning to come around to seeing things in a different light. "Since coming over this second time we have been fighting the existing transportation system tooth and nail, and I am now of the opinion that the powers that be are beginning to see a great light." Ramsey goes on to describe what he saw as an inefficient use of motor transport and road maintenance that was costly in both manpower and vehicles. He estimated that by using railways to within three miles or so of the front, the armies could do away with 75% of the motor transport requirements, thus reducing the costs of operation and manpower. Lorries at that time could carry a maximum of three tons while railway cars could carry ten tons.[35] Ramsey also acknowledged that motor transport would be vital in the event of a rapid advance until such time as the railways could catch up. He also pointed out that railway lines are hard to damage three miles behind the front, with only temporary damage being done to the rails and sleepers, which could be easily repaired.[36]

Ramsey also identified a great need for mechanical assistance in the form of steam shovels and pile drivers. Within one month of the request, the government approved the purchase of two 2½-yard shovels at a cost of $16,000 and two pile drivers at a cost of $9000. The costs included a complete overhaul as well as spare parts, tools and other ancillary equipment.

As Ramsey and most of his unit had come from the Canadian Pacific Railway, and were familiar with the equipment, it made the purchase a much easier decision. It must also be noted that there was none of this type of equipment in France or England, and it would cut down on the amount of manual labour expended on loading ballast and other rail-building materials.[37]

By the early days of 1916, the supply of ammunition had become less of an issue for the British armies. In dealing with administrative issues, basically the logistic tail to the combat teeth of an army, there has always been a desire to have more teeth than tail. The problem, however, from a logistical standpoint is that the balance that must be struck usually requires a greater effort on the part of the tail than is understood by those concerned with the teeth. The British Army of the First World War was guided by the two-part 1912 Field Service Regulations. The problem lay with the first part, in which operational commanders were given carte blanche to ignore the logistical aspects of their campaign unless there was a problem. The difficulty with this arrangement was that the logistics staff was not connected to the operational staff and thus the two groups

could not coordinate the planning of the campaign, or even the tactical operation, much past the first few days. It was the difficulties of 1916 that brought to the fore these issues and it was Haig who realized that there was a dire need for intervention on a major scale when it came to reorganizing the administrative system of the British armies in France.[38]

Photo courtesy of the Imperial War Museum Q 35469

An ammunition train of loaded D wagons headed by a Baldwin 4-6-OT pulls out of a rear railhead in the Ypres salient.

The German attack on Verdun placed a great deal of pressure on the French armies and there was a demand that the British take some of the weight by attacking in the British sector. The British attack on the Somme began on July 1st and became known more for the immense loss of life than for any other factor. Yet it was here that the British High Command realized that in order to successfully defeat the German armies, the supply system had to keep up to the demands of the assaulting units. It became clear early on that the British administrative system was incapable of maintaining the level of intensity mandated by the strategic battle plan and was partially responsible for the inability to achieve a successful outcome.

> …Yet there resided the dilemma of generals who launched men into shell disrupted ground which denied immediate access to even motor transport. Unless infantry bore sufficient supplies on their backs they would be starved of the means to hold objectives and would be thrown back on their supporters. Yet until objectives on the commanding ground were secured there was no hope of engineers pushing through roads or light railways to make good the deficiencies. So the struggle on the Somme, like its counterpart at Verdun, festered on into the autumn because of the interaction of man's vulnerability to a devastating firepower and his inability to sustain supplies to the front.[39]

It is interesting to note that as 1916 progressed the railway policy continued to be adjusted. In the early days of the war, the QMG policy for use of military railways was as follows:

- Broad gauge railways should be advanced as far as possible.

- That tramways should be laid down from the trenches back to the most forward position which horsed transport could reach.[40]

This policy was clearly unworkable and in 1915 the Canadians pushed the railways as close to the trenches as possible.

> …it will be apparent the scheme was tentative rather than complete. A gap existed between railhead and tramways—roads were to be used for transportation; but in many cases roads were impassable and it was found necessary to extend the trench tramways back to the actual railhead.[41]

As the British gained more and more experience in the new static warfare, the railway policy was adjusted:

> Railway policy March 1916—
>
> 60 cm tramways between trenches and points beyond which horses could not work, track should be 9lb steel. Locomotive traction would only be used on broad

and metre gauge railway in an advance and on the heavier type of 60cm when the armies were in a stationary position.[42]

By the time the Somme offensive was a month old, the policy was once again being revamped:

> Railway policy August 1916—
>
> Light railways should be extensively used along whole of British front for the purpose of eliminating to as great an extent as possible the employment of road transport and to lighten the manual labour which fell in a great degree on the troops actually holding the lines.
>
> Purpose for new construction—
>
> - to transport heavy gun ammunition
> - to transport lighter ammunition
> - to transport R.E. [Royal Engineer] stores and material
> - to transport general supplies.[43]

The heavy fighting on the Somme front, which began July 1st 1916, and continued with varying fortune and undiminished ferocity through the autumn and winter months, had vividly demonstrated that the roads could not satisfactorily deal with the traffic which passed over them. A large amount of horse transport was diverted across country during the summer months when the rough trails were passable, but when winter conditions prevailed, this had to be abandoned and it became necessary to use the roads. As the fighting became more intense and the concentration of forces grew, the problem of transportation became more acute. The decisions of the Commander-in-Chief taken in August 1916 was largely the result of these conditions and it was now decided that light railways both metre gauge and 60 centimetre should be used extensively for the whole of the British front.[44]

In order to gain an appreciation of the sheer volume of supplies required for the Somme offensive, the following figures can offer at least a glimpse of the administrative burden that faced the entire force. "Ammunition trains began to run at a rate of seven per day to the railheads, and then have to be moved to the guns…each division [would] have on the ground the equivalent of the loads of 36 miles of motor lorries."[45] Yet with all of this ammunition and the number of troops allocated to the attack, the expected gains did not occur and the attack ground on for several months. The Allies, even with such a large (at that point) amount of ammunition available, did not have the administrative resources to continue to supply the front in a timely manner.

> Until a system had been created that could [sustain a large scale offensive], the BEF's would invariably have the same character as the Somme—a prolonged drive into German lines, using ever-increasing quantities of ammunition and increasingly damaging the transportation infrastructure, until the offensive could no longer be maintained.[46]

To overcome this shortfall, it was decided that an expert in transportation be brought in to study the transportation organization and to subsequently help sort it out. For this role, the British turned to Sir Eric Geddes. Geddes was the deputy general manager of the North Eastern Railway and was asked by the government to study the sustainment system in France. "His genius lay not so much in the way of doing things, as having them done for him."[47] He was able to break the system down into five categories and then studied how each of them worked and related to each other. The five categories were docks, railways, canals, light railways and roads.[48] Geddes' main

recommendations were that the entire transportation system be placed under control of one individual and that the BEF should create a new railway system immediately.

While there had been a certain amount of animosity towards Geddes by virtue of the fact that he was a civilian possessing great influence, it was clear to Haig that this was exactly the type of individual needed in his organization. To overcome the animosity, Geddes was given the honorary rank of Major General and the full support of Haig and the British War Secretary Lloyd George.

Photo courtesy of the Imperial War Museum Q 9200

King George V traveling with General Plumer in 2nd Army's 'observation coach' converted from a D-class wagon. August 1918.

Geddes had heard that Canada had offered skilled construction units at a very early stage in the war when the wisdom of having such units in France had not been recognized. He knew that Canada had many skilled engineers and experienced railway contractors who had been engaged on the great new system of railways that stretched from the Atlantic to the Pacific.[49] As it was clear that Canada could offer railway troops and, as mentioned above, Geddes had already had communications with Stewart, representation was made to Canada to raise more railway troops. This led to an interesting exchange between Haig and the War Office in London. On 7 February 1917, the War Office demanded that Haig confirm that he wanted railway troops from the Dominions and, if this was the case, he was to be aware that troops destined for replacement drafts would not be available nor would they be able to be replaced. Haig had to confirm that he wanted precedence given to railway troops over fighting troops. Haig's simple reply was "I have the honour to request that as regards Dominion forces, precedence should be given to Railway Troops over drafts for Fighting Units."[50]

This opened the floodgates of the raising and deploying of troops to France. Five units of Canadian Railway Troops were in France by the end of February 1917, with an additional seven more arriving between April 1917 and the last unit arriving on March 30th 1918.[51] Units were recruited by companies, across the country, which would then be mobilized at "some place near the point of embarkation for a week or two before embarking on Overseas Service."[52] There was also the campaign for getting members of influential families commands of railway units through the private funding of said units. "I again confirm my previous offer to provide all private money required to finance such a Battalion, provided my brother, Captain Walter McConnell…is given command… signed J.W. McConnell, President, St. Lawrence Sugar Refineries, Ltd."[53]

As the units began to arrive in France, the British and French began planning major offensives, known as the Nivelle offensives.[54] The first of these was the campaign on the Arras front, including the Canadian Corps attack on Vimy Ridge. The attack was three times larger than the attack on the Somme in regards to artillery ammunition usage, and could be successfully sustained due to the improvements instituted by Geddes.

The Canadian Railway troops were involved in the support of the Canadian Corps in its preparations for the attack on Vimy with the laying of rail lines to within a short distance of the front line. Once the attack was in full force, railway troops were sending supplies forward on standard gauge and narrow gauge line and evacuating the wounded back to the ambulance dressing stations. Within a week, trains were running to the top

of the ridge and, by the end of April, trains were running to British ration dumps on the level plains beyond the ridge.

Interestingly, even the members of the railway troops not involved in the actual support of the attack on Vimy recognized its importance.

> …The Canadians still hold Vimy and the papers are full of their "glorious dash". It is certainly wonderful how untrained men are now highly expert in the war-game. Canada has earned a great place for herself in the annals of war.[55]

> *The impact of the railways on the British armies was immediate. From initially looking upon them as of secondary importance, they quickly became a valuable tool for offensive actions:*

> "The results of the Arras offensive accelerated the development of light railways in the 1st Army Area. The tonnage carried over the 1st Army Light Railways in March 1917 was only 500 tons per day and in September it reached 6000 tons per day. The Armies who had looked with suspicion on the advent of light railways were now insistent in their demand for more. The success was almost dramatic.[56]

While the offensive on Vimy was a success, the rest of the attacks under Nivelle came to a grinding halt and it became clear that the British would have to continue to press the Germans in order to relieve the pressure on the French armies, allowing them time to recuperate and reconstitute.[57] The next major British attack was on the Messines Ridge, which was a set-piece battle with limited objectives, using a massive artillery attack as well as the detonation of one million pounds of explosives under the Germans. The railway troops provided more than sufficient support to the point that the Director General Transportation, General Nash—Geddes' replacement[58]—was able to cut back the number of trains going to the front as there were more than enough supplies, thus saving wear and tear.[59]

It is important to note that the work performed by the Canadian Railway Troops was recognized by the armies that they were supporting. Several examples of letters of commendation referring to either the actions of the unit or specific members were received in abundance throughout 1917 and 1918.

> I wish to bring to the notice of the Army Commander the excellent work done by the Officers, N.C.Os and men of the Light Railway Construction Troops under command of Lieutenant-Colonel Clarke, 2nd Bn., Canadian Railway Troops, during the operations of July 31st and subsequent days in maintaining the already constructed lines, and building new ones, through Ypres to Potijze St Jean and Wieltje under most difficult circumstances of weather, ground and shell fire.[60]

Photo courtesy of the Imperial War Museum Q 35524

The final stage: ballasting and boxing-in newly-laid track.

From the 2nd Battalion Canadian Railway Troops War Diary the entry for 31st July 1917: "The afternoon work was directed by Lt.-Col Clarke personally. Enemy shelling was most severe during the late afternoon."[61]

In July, 1917, the 2nd Battalion Canadian Railway Troops opened a training camp in Watou, several miles east of Ypres to develop techniques to improve the laying of light railway lines. In most cases, the Canadian Railway Troops

provided the expertise for railway construction and the Corps provided either: infantry units, pioneer units, or labour battalions as the heavy lifters. At the Watou camp, the 1st Battalion of the King's Own Light Infantry provided the necessary manpower for training during the first tranche. The training consisted of grading, bridging and culvert construction, followed by the rail section and platelayers (to connect the rails) and finally the trains themselves, which carried the rails, sleepers, ballast and other supplies for construction. Upon completion of each day, the troops, officers and NCOs would discuss the day's activities and make suggestions for improvements in the methodology employed as well as innovations in tools to assist the work. During the time that 2nd Battalion Canadian Railway Troops were at the school, they were visited by the Director of Light Railways, General Harrison. They were also visited by infantry commanding officers and were overseen during their training by the Officer Commanding the 2nd Battalion..

> I feel that the schooling has been a benefit to the 2nd CRT as well as to the Pioneer unit which they were training, as it enabled the men to experiment with different methods of track laying. It was found that by carrying the track over cars and off the end of the train and over the heads of the platelayers, that time was saved. In order to do this, long handled tongs had to be made and by using four sets to each rail section it was found that eight men could handle a section quite conveniently.[62]

The unit reported that it could lay up to two and a half miles of track per day, including four bridges, and sixteen culverts in a day of sixteen hours, and if it were in broken country it could lay approximately two miles per day.

While the attacks on Arras-Vimy and Messines had been successful, the attacks on Passchendaele and Cambrai were less so. At Cambrai, noted for its use of tanks on a major scale, the railways were used to bring the tanks forward to the battle area[63], and then the tanks used the railway road bed to drive forward; the road bed offering the most solid track forward. The use of railways had, however, allowed the British to manage four major operations during the year, and the limited ground gained was not as a result of a lack of supplies. In most cases, the support provided by the railways was exemplary.

The massive requirements for supplies meant that the railways were required to build an intricate and large scale web of standard and light gauge railways. The majority of the rails and track supplies actually came from Canada. The Canadian Northern and Grand Trunk Pacific railways had been amalgamated and with this there was a large quantity of supplies, which were then shipped to France.[64]

By early 1918, it was clear to the British that Germany would be launching a major offensive, with the fall of Russia and the freeing up of troops from the Eastern Front. The role of the Canadian Railway Troops during the German offensive, *Michael* in March and Georgette in April was to show how flexible the units were rather than being limited in their utility. The 2nd Battalion, Canadian Railway Troops were working in the Fifth Army sector when the German assault began. The first inkling the troops had was the movement of heavy artillery towards positions to the rear of where the railway troops were working. A heavy bombardment had been going on since the early morning and was continued throughout the day. Lieutenant-Colonel Clarke ensured that as much railway material as possible was secured in the forward areas by sending a company to repair damaged track, allowing for rearward movement. He also had one of the companies *stand to*[65] to ensure the security of the unit's sector. As the offensive continued, with the general withdrawal of the Fifth Army, the 2nd Battalion, Canadian Railway Troops was eventually moved to Villers Bretonneux to assist in the Amiens defence, commanded by General Carey.

Photo courtesy of the Imperial War Museum CO 1861

A Dick Kerr PE and its ammunition train in the ruined village of Lievin-Angres.

By the 27th March, 1918, the unit was being kitted out with extra ammunition, machine guns and other stores to take their place in the line to defend against further German incursions. During the actions from the 27th to the 31st March, the unit came under artillery fire numerous times, sent out patrols every night to harass the Germans, and withdrew from their positions several times as the units on their left and right fell back, suffering twenty-nine casualties and two deaths. The unit also worked on salvaging much of the railway supplies in the sector by tying the wood sleepers into booms (like log booms on the rivers of Canada to transport logs down river) and placing other supplies on them, essentially using them as rafts, which they sent down the canals to more secure areas in the rear.[66]

The remainder of the Canadian Railway Troops were placed under direct control of Brigadier-General Stewart and withdrawn to an area to the rear of Fifth Army. Here with over 30,000 troops and civilian labourers under command, he built a layered defensive line, some thirty miles wide, consisting of more than 120 miles of trenches. The positions were never tested, as the German attack had ground to a halt.[67]

> German offensive power was indeed vanishing; on 4 April a fresh attempt was made to capture the one strategic prize which had come into view—Amiens, with its rail junctions, only some 10 miles behind the front line. The attack was an absolute failure, and the following day the 'March Offensive' was formally stopped.[68]

The German attacks did damage the light railways, and when the British counter-attacked in August 1918, the Canadian Railway troops were directed to only repair standard-gauge railway lines. As the German armies retreated, they booby-trapped many of the lines and destroyed much of the railway infrastructure. It was up to the railway troops to repair and, as necessary, rebuild the lines.

The work of the Canadian Railway Troops was dangerous on several levels. The use of heavy equipment, laying railway track as well as working around heavy equipment was dangerous, additionally, as the railways were pushed close to the front, the threat of shelling was constant. Men were killed due to accidents, enemy shelling, aerial bombing as well as machine guns and rifle fire. The number injured from these incidents was even greater. While the troops in the front lines had the protection of their trenches during artillery shelling, the railway troops were out in the open, sometimes working above those trenches while the troops below went about their business, either moving supplies forward or repairing lines that had been damaged from shelling. The repairing of lines was a constant activity and the threat from shelling, either observed or random, was a daily occurrence. Entries in the war diaries of the Canadian Railway Troops report the injuries and deaths on a regular basis.

One of the injuries suffered by the troops was shell shock. A common injury amongst all of the troops on the front, the railway troops were more vulnerable for several reasons. They suffered from random shelling, and did not have any safe place to go and hide as they were out in the open. Many men who had already been diagnosed with shell shock while in infantry units were placed in railway units as it was

thought that it was less dangerous. Unfortunately, they tended to suffer an immediate recurrence when they came under fire. Many of the men enrolled in the railway troops were older and were not in as good physical condition as the troops in the front line units. Yet the work they were expected to carry out in the harsh conditions also took its toll.[69]

When the war ended, the Canadian Railway Troops, like the other Canadian units in France, were demobilized and returned to Canada. However, unlike many units that had roots in the Militia, the Canadian Railway Troops did not perpetuate the numbered battalions after the war. It is because of this that their efforts and their voices were not well known in the annals of Canadian military history. The focus of their efforts was to ensure that the British armies in France were supplied with all of the ammunition and supplies necessary to ensure that the set-piece attacks that began to define the Allied tactics could be executed successfully. However, it must be pointed out that not only did the work of the railway troops permit the Allies to execute these attacks, it also allowed them to plan and execute these attacks either in sequence or simultaneously, keeping the Germans off-balance and bringing the war to an end sooner than it otherwise would have.

Photo courtesy of the Imperial War Museum CO 3795

Another view of the general devastation surrounding the light railway through Lievin. July 1917.

By 1917, the issue of supplies was not problematic in any of the battles that defined that year. By the spring of 1918, the railway troops were sufficiently experienced that they could be employed in the front lines, in an emergency, with confidence. When the war began in 1914, only a few forward-thinking souls could see that there would be a requirement for railways to support the allied operations. It took the devastation of the Somme and a greater appreciation of new battlefield tactics to begin to engage the experience of the greater community. Having Sir Eric Geddes come and examine the sustainment system of the British armies and provide suggestions was a successful decision; having him stay on to develop and run the system was nothing short of brilliant. His knowledge of the railway system in Britain and his contacts in Canada made for the logical conclusion to have Canada provide the resources and knowledge to make his plans successful. Canadian experiences in railway building through the West easily translated to the devastation of the Western Front. Temporary lines and bridges were a standard way of doing business, and thus were easily adaptable in any situation. Canadian Railway Troops were thus the “Sinews of Steel” of the British armies in France.

About the Author ...

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Endnotes

1. This meant that they responded to both the senior Canadian in the General Headquarters, Brigadier-General James W. Stewart, Director Light Railways as well as the Director General Railways. There were thus occasions that Stewart was in the difficult position of having to deal with two commands and two masters, which is a difficult situation at the best of times. To Stewart's credit, there is no evidence of any ill will or controversial decisions that he took when dealing with both interests.
2. John Terraine, *White Heat: The New Warfare 1914-18*, (London: Sidgwick & Jackson, 1982), p 21.
3. Fred Angus, "The Canadian Railway Troops in World War I," *Canadian Rail, Journal of the Canadian Railroad Historical Association*, (November-December 1993), 191.
4. Kenneth Macksey, *For Want of a Nail: The Impact on War of Logistics and Communication*, (London: Brassey's, 1989), p. 19.
5. Macksey, pp. 22-23.
6. Martin Van Creveld, *Supplying War, Logistics from Wallenstein to Patton*, (Cambridge: Cambridge University Press, 2004), p. 84.
7. Macksey, p. 25.
8. *Ibid*. 28.
9. Van Creveld, p. 233.
10. John Ellis, *Eye Deep in Hell*, (London: Croom Helm, 1977), p. 125.
11. *Ibid*. p. 132.
12. Ian Malcolm Brown, *British Logistics on the Western Front: 1914-1918*, (Westport: Praeger Publishers, 1998), p. 82.
13. Van Creveld, p.113.
14. Van Creveld, p.111.
15. W.J.K. Davies, *Light Railways of the First World War*, (Newton: Latimer Trend and Company, 1966), p.23.
16. Field Marshal Sir Douglas Haig was raised to the position of Commander of British Armies in France, replacing Sir John French in December 1915. There are numerous works on Haig, many critical of his command and his leadership, especially for the Battle of the Somme and Passchendaele. It is not the aim of this paper to comment on Haig's abilities or failures; however, there are a number of books that provide insights into his personality. Tim Traver's *The Killing Ground: The British Army, The Western Front and the Emergence of Modern Warfare 1900-1918*, (London: Allan & Unwin, 1987) is recommended reading.
17. Unlike a bombardment that is a massing of artillery fire on a general area, a barrage is used against identified targets, and usually limited in scope and time. A barrage can be a creeping barrage, whereby it moves ahead of advancing troops, on a timed basis, or it can be a box barrage, which fires on an identified target and lifts at a certain time, in order for the assaulting troops to attack the position, before the enemy has time to return to its firing positions. A barrage would also be used to break up a counter-attack, firing on concentration of troops.
18. Brown, *British Logistics on the Western Front: 1914-1918*, p. 88.
19. Ian A. Mackenzie Papers, "History of the Canadian Railway Troops Typescript", p 3, MG 27, III, B5, Vol. 1, File 5. ("Henceforth Mackenzie Papers Typescript")
20. Wikipedia, *Battle of Neuve Chapelle*, http://en.wikipedia.org/wiki/Neuve_Chapelle. (5 April, 2007).
21. Angus, "The Canadian Railway Troops in World War I", p. 191.
22. Brown, *British Logistics on the Western Front: 1914-1918*, p. 56.
23. Angus, "Canadian Railway Troops in World War I," p. 192.
24. Memorandum submitted by Mr. A. MacDougall, Oct. 9 1914, Historical Section, Department of National Defence, HQ. 600-10-18. Vol.1.f. 24.
25. Letter to Sir Robert Borden, Oct. 9 1914, Historical Section, Department of National Defence, HQ.600-18. Vol.1 folio 38.
26. The Army Council was the British Army's brain trust, which made overall strategic decisions for the War.
27. Telegram, Governor-General of Canada—Secretary of State for the Colonies, October 10, 1914 and October 22, 1914, Historical Section, Department of National Defence, Canadian Railway Troops files, E.W.P. No. 4, No. 868, No. 907, No. 943.
28. Telegram from Secretary of State for the Colonies to the Governor General, 21st January, 1915, Historical Section, Department of National Defence, Canadian Railway Troops Files.
29. Report of the Committee of the Privy Council, 22nd February, 1915. Historical Section, Department of National Defence, HQ. 600-10-18, Vol.1.fo.192.
30. A description of railway terminology can be found in the appendix.
31. "Principle Work of the CORCC," *Canadian Railway and Marine World*, December 1915, p. 462.
32. Angus, "The Canadian Railway Troops in World War I", pp. 193-194.
33. Unsigned manuscript "Canadian Overseas Railway Construction Corps, Canadian Railway Troops Files, Historical Section, Department of National Defence. No page number.
34. While today the term Officer Commanding is used in reference to Company Commanders, usually of the rank of major, in the First World War the term was the equivalent of today's Commanding Officer, usually of the rank of Lieutenant Colonel.
35. Davies, *Light Railways of the First World War*, p. 169.
36. Letter from Lieutenant Colonel Ramsey to Colonel Wanklyn, 23 January 1916, Department of National Defence HQ.

600-10-18. Vol.4. f.150. p. 63. The complete extract of the letter is reproduced in the Annex to this paper.
37. Report of the Committee of the Privy Council, 10 March, 1916, Historical Section, Department of National Defence, HQ. 600-10-18, vol. 4. folio 132.
38. John Conrad, "Canadian Corps Logistics During the Last Hundred Days, August-November 1918," *The Canadian Army Journal*, Vol. 8.2, (Summer 2005), p. 87.
39. Macksey, *For Want of a Nail: The Impact on War of Logistics and Communications*, p. 74.
40. Mackenzie Papers Typescript," p. 3.
41. *Ibid*., p.3.
42. *Ibid*., p.4
43. *Ibid*., p.4
44. *Ibid*., p.7
45. Brown, *British Logistics of the Western Front: 1914-1918*, pp.121-122.
46. *Ibid*., p. 134.
47. "Mackenzie Papers Typescript," p. 8.
48. Brown, p. 140.
49. "Mackenzie Paper Typescript," p. 8.
50. Letters from War Office to Haig and reply, 7th February and 13th February, Historical Section, Department of National Defence, O/S. R. 26-5 Vol. 3.
51. For a list of units and dates of arrival see Annex XX
52. Letter 6th January, 1917 from Adjutant-General, Canadian Militia to All concerned, Historical Section, Department of National Defence, HQ. 600-10-44. f.11.
53. Telegram, 18th December, 1916 to Cecil G. Williams, Chief Recruiting Officer for Canada, from J.W. McConnell, Historical Section, Department of National Defence, HQ. 600-10-42, f. 3.
54. Nivelle had fought in the Battle of Verdun and was given command of the French Forces in December 1916. He envisaged a massive attack on German lines, using the British forces in the Arras sector to draw away German reserves. While conceptually a good idea, he was unable to execute it and by May 1917 it had petered out, with several French units mutinying.
55. Entry 11 April 1917, Personal diary, Ian Mackenzie. Ian Mackenzie papers MG 27 III B 5 Vol. 1, file 5.
56. "Mackenzie papers Typescript," p. 74.
57. Davies, *Light Railways of the First World War*, p. 65.
58. Geddes work was such that he was called back to England to the Admiralty to assist it in sorting out issues for the Royal Navy. Haig was so impressed with Geddes that he was able to keep him as an official advisor of railways for the remainder of the war.
59. Brown, *British Logistics on the Western Front 1914-1919*, p. 163,
60. Letter, 1917, H. Watts Lt. General, Commanding XIX Corps, Fifth Army, Ian Mackenzie papers
MG 27 III B 5 Vol. 1. file 1.
61. War Diary, 2*nd* Battalion, Canadian Railway Troops, Library and Archives Canada, ArchiviaNet on-line research tool, War Diaries of the First World War. 31 July, 1917.
62. Annex C to 2*nd* Battalion Canadian Railway Troops War Diary, July 1917, Library and Archives Canada, ArchiviaNet on-line research tool, War Diaries of the First World War.
63. The tanks were limited in the distances they could travel on their tracks before they needed an overhaul. The use of railways to transport the tanks as far forward without putting any stress on the tracks ensured that the tanks would at least not suffer from track breakdowns.
64. Angus, "Canadian Railway Troops in World War I," p. 198.
65. Stand to is the military term for putting a unit on full alert, where every man is awake and in a position to repulse an attack.
66. 2nd Battalion Canadian Railway Troops War Diary, 21-31 March, 1918, Library and Archives Canada, ArchiviaNet on-line research tool, War Diaries of the First World War. A map of the positions held by the 2nd Battalion is found in the Annex A.
67. Geoffrey Wilson Taylor, *The Railway Contractors*, (Victoria: Morris Publishers, 1988), pp.116-117.
68. Terraine, *White Heat, The New Warfare 1914-18*, p. 288.
69. Medical Report, Senior Medical Officer, Canadian Railway Troops, Dec. 1. 1917. Historical Section, Department of National Defence, OS.R.104-33.